A Captain of Industry

THE STORY OF
DAVID MAYDOLE
INVENTOR OF THE ADZ-EYE HAMMER

BY JAMES PARTON

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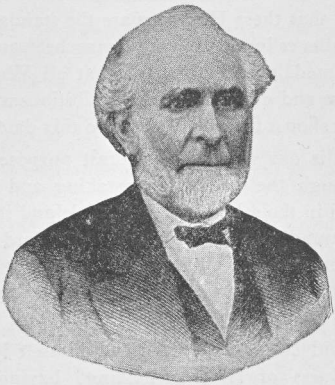
THE DAVID MAYDOLE HAMMER COMPANY
NORWICH, N.Y.
U.S.A.

A CAPTAIN OF INDUSTRY



THE STORY OF

DAVID MAYDOLE

INVENTOR OF THE ADZ-EYE HAMMER

By JAMES PARTON

To which is added a Catalog of the Principal Varieties of Hammers made by

THE DAVID MAYDOLE HAMMER COMPANY

Together with much Useful Information for Mechanics and Others

PREFACE

IN presenting this story of the life of David Maydole and this pocket catalog of Maydole Hammers, we ask attention to the fact that these Hammers are the standard of excellence in all respects, having been awarded medals and first prizes at all World's Fairs and other industrial exhibitions whereever shown from 1849 down to this date.

It is our firm and steadfast purpose that through the utmost painstaking and care, both in the selection of materials and in our manufacturing processes, this standard shall be maintained, and the name Maydole shall continue to represent the highest quality.

It is now more than eighty years since David Maydole established himself in the business of Hammer-making, having invented and made the first Adz Eye Hammer about ten years before.

We have added to this catalog many items of useful information, to which we invite the attention of all thoughtful mechanics.

For prices purchaser should consult his local dealer, who will unquestionably have our goods, as they are to be found in all first-class hardware stores in every part of the civilized world.

Respectfully,

The David Maydole Hammer Co.

Norwich, Chenango County,

New York, U.S.A.

A CAPTAIN OF INDUSTRY

DAVID MAYDOLE

Hammer-Maker

(Written by JAMES PARTON, after visiting the David Maydole Hammer Works in 1873.)

WHEN a young man begins to think of making his fortune, his first notion usually is to go away from home to some very distant place. At present, the favorite spot is Colorado; a while ago it was California; and old men remember when Buffalo was about as far west as the most enterprising person thought of venturing.

It is not always a foolish thing to go out into the world far beyond the parent nest, as the young birds do in mid-summer. But I can tell you, boys, from actual inquiry, that a great number of the most important and famous business men of the United States struck down roots where they were first planted, and where no one supposed there was room or chance for any large thing to grow.

I will tell you a story of one of these men, as I heard it from his own lips some time ago, in a beautiful village where I lectured.

He was an old man then; and a curious thing about him was that, although he was too deaf to hear one word of a public address, even of the loudest speaker, he not only attended church every Sunday, but was rarely absent when a lecture was delivered.

While I was performing on that occasion, I saw him sitting just in front of the platform, sleeping the sleep of the just till the last word was uttered.

Upon being introduced to this old gentleman in his office, and learning that his business was to make hammers, I was at a loss for a subject of conversation, as it never occurred to me that there was anything to be said about hammers.

I have generally possessed a hammer, and frequently inflicted damage on my fingers therewith, but I had supposed that a hammer was simply a hammer, and that hammers were very much alike. At last I said,—

"And here you make hammers for mankind, Mr. Maydole?"

You may have noticed the name of "David Maydole" upon hammers. He is the man.

"Yes," said he, "I have made hammers here for a life-time."

"Well then," said I, shouting in his best ear, "by this time you ought to be able to make a pretty good hammer."

"No, I can't," was his reply. *"I can't make a pretty good hammer. I make the best hammer that's made."*

That was strong language. I thought, at first, he meant it as a joke; but I soon found it was no joke at all.

He had made hammers the study of his life-time, and, after many years of thoughtful and laborious experiment, he had actually produced an article, to which, with all his knowledge and experience, he could suggest no improvement.

I was astonished to discover how many points there are about an instrument which I had always supposed a very simple thing. I was surprised to learn in how many ways a hammer can be bad.

But, first, let me tell you how he came to think of hammers.

There he was, in 1840, in Norwich, a small village in the central part of the State of New York; no railroad yet, and even the Erie Canal many miles distant. He was the village blacksmith, his establishment consisting of himself and a boy to blow the bellows.

He was a good deal troubled with his hammers. Sometimes the heads would fly off. If the metal was too soft, the hammer would spread out and wear away; if it was too hard, it would split.

At that time blacksmiths made their own hammers, and he knew very little about mixing ores so as to produce the toughest iron. But he was particularly troubled with the hammer getting off the handle, a mishap which could be dangerous as well as inconvenient.

At this point of his narrative the old gentleman showed a number of old hammers, such as were in use before he began to improve the instrument; and it was plain that men had tried very hard before him to overcome this difficulty.

One hammer had an iron rod running down through the handle with a nut screwed on at the end. Another was wholly composed of iron, the head and handle being all of one piece. There were various other devices, some of which were exceedingly clumsy and awkward.

At last, he hit upon an improvement which led to his being able to put a hammer upon a handle in such a way that it would stay there. He made what is called an adz-handled hammer, the head

being attached to the handle after the manner of an adz.

The improvement consists in merely making *a longer hole* for the handle to go into, by which device it has a much firmer hold of the head, and can easily be made extremely tight.

With this improvement, if the handle is well seasoned and well wedged, there is no danger of the head flying off. He made some other changes, all of them merely for his own convenience, without a thought of going into the manufacture of hammers.

The neighborhood in which he lived would have scarcely required half a dozen new hammers per annum. But one day there came to the village six carpenters to work upon a new church, and one of these men, having left his hammer at home, came to David Maydole's blacksmith shop to get one made.

"Make me as good a hammer," said the carpenter, "as you know how."

That was touching David upon a tender place.

"As good a one as I know how?" said he. "But perhaps you don't want to pay for as good a one as I know how to make."

"Yes, I do," replied the man; "I want a good hammer."

The blacksmith made him one of the best. It was probably the best hammer that had ever been made in the world, since it contained two or three important improvements never before combined in the instrument.

The carpenter was delighted with it, and showed it, with a good deal of exultation, to his five companions; every man of whom came the next day to the shop and wanted one just like it. They did not understand all the blacksmith's notions about tempering and mixing the metals, but they saw at a glance that the head and the handle were so united that there never was likely to be any divorce between them.

To a carpenter building a wooden house, the mere removal of that one defect was a boon beyond price; he could hammer away with confidence, and without fear of seeing the head of his hammer leap into the next field unless stopped by a comrade's head.

When all the six carpenters had been supplied with these improved hammers, the contractor came and ordered two more. He seemed to think, and, in fact, said as much, that the blacksmith ought to make *his* hammers a little better than those he had made for the men.

"I can't make any better ones," said honest David. "When I make a thing, I make it as well as I can, no matter who it's for."

Soon after, the storekeeper of the village, seeing what excellent hammers these were, gave the blacksmith a magnificent order for two dozen, which, in due time, were placed upon his counter for sale.

At this time something happened to David Maydole which may fairly be called good luck; and you will generally notice events of the kind in the lives of meritorious men. "Fortune favors the brave," is an old saying, and good luck in business is very apt to befall the man who could do very well without it.

It so happened that a New York dealer in tools, named Wood, whose store is still kept in Chatham Street, New York, happened to be in the village getting orders for tools. As soon as his eye fell upon those hammers, he saw their merits, and bought them all. He did more. He left a standiny order for as many hammers of that kind as David Maydole could make.

That was the beginning. The young blacksmith hired a man or two, then more men, and made more hammers, and kept on making hammers during the whole of his active life, employing at last a hundred and fifteen men.

During the first twenty years he was frequently experimenting with a view to improve the hammer. He discovered just how to make his hammers hard enough, without being too hard.

He gradually found out precisely the best form of every part. There is not a turn or curve about either the handle or the head which has not been patiently considered, and reconsidered, and considered again, until no further improvement seemed possible. Every handle is seasoned three years, or until there is no shrink left in it.

Each hammer is hammered out from a piece of steel, and is tempered over a slow charcoal fire, under the inspection of an experienced man. He looks as though he were cooking his hammers on a charcoal furnace, and he watches them until the process is complete, as a cook watches mutton chops.

I heard some curious things about the management of this business. The founder never did anything to "push" it. He never advertised. He never reduced the price of his hammers because other manufacturers were doing so.

His only care, he said, had been to make a perfect hammer, to make just as many of them as

people wanted, and *no more*, and to sell them at a fair price. If people did not want his hammers, he did not want to make them. If they did not want to pay what they were worth, they were welcome to buy cheaper ones of someone else.

For his own part, his wants were few, and he was ready at any time to go back to his blacksmith's shop.

The old gentleman concluded his interesting narration by making me a present of one of his hammers, which I now cherish among my treasures.

If it had been a picture, I should have had it framed and hung up over my desk, a perpetual admonition to me to do my work well; not too fast; not too much of it; not with any showy false polish; not letting anything go till I had done all I could to make it what it should be.

In telling this little story, I have told thousands of stories. Take the word *hammer* out of it, and put *glue* in its place, and you have the history of Peter Cooper. By putting in other words, you can make the true history of every great business in the world which has lasted thirty years.

The true "protective system," of which we hear so much, is *to make the best article;* and he who does this need not buy a ticket for Colorado.

A CAPTAIN OF INDUSTRY

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(See next two pages.)

CAPTAINS OF INDUSTRY

or

Men of Business Who Did Something Besides Making Money

By JAMES PARTON

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CAPTAINS OF INDUSTRY

By JAMES PARTON

✣

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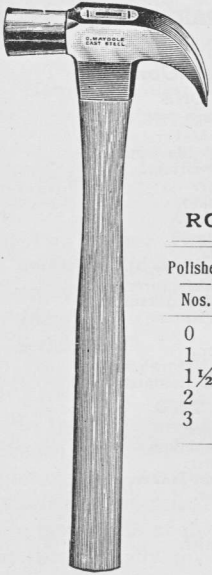
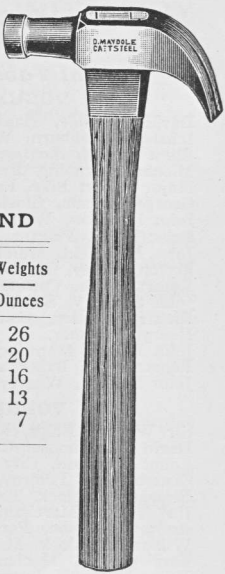
ADZ EYE NAIL HAMMERS





ROUND

Polished Nos.	Weights Ounces
0	26
1	20
1½	16
2	13
3	7

BELL FACE

Polished Nos.	Full Polished Nos.	Nickel Plated Nos.	Polished Faces Creased Nos.	Full Polished Handles Ebonized Nos.	Nickel Plated Handles Ebonized Nos.	Weights Ounces
10			810			25
11	1511	511	811	1411	611	19
11½	1511½	511½	811½	1411½	611½	16
12	1512	512	812	1412	612	12
12½	1512½	512½	812½	1412½	612½	10
13	1513	513	813	1413	613	7
14	1514	514		1414	614	5

The weights given do not include weight of handle.

Guaranty

Every Hammer which is stamped "D. MAYDOLE CAST STEEL" is forged from high-grade special steel, and is warranted to be a first-class tool in all respects. Any Maydole Hammer which proves to be defective in proper usage, will if returned to us, be replaced.

HOW HAMMERS ARE INJURED

The silent stories told by returned hammers are very interesting and furnish a strong proof of the mechanical ability of those using them. We seldom receive a complaint from a good mechanic but what is just, but hammers which plainly show misuse, some of which having been traced back for information, show a painful lack of knowledge on the part of the user.

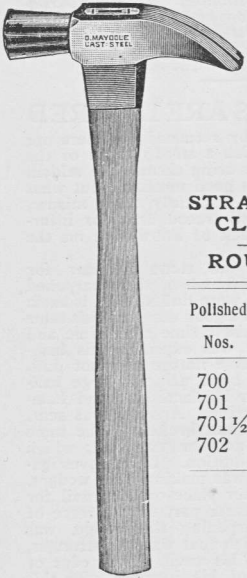
One mason had used his stone hammer for months on sandstone, and when the sharpened pein and edges of the face were dulled, sent it back. We found the hammer had a good temper. This same mason would grind his chisels time after time and never once think that he was expecting his hammer to do work of the same nature and not dull.

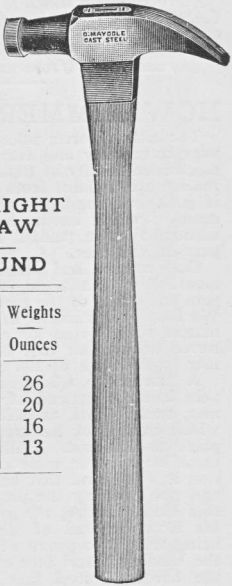
A blacksmith who had been using a large ball-pein hammer instead of a blacksmith's hand hammer, sent it back as defective. Another was sent, which came back battered and broken in the same place as the first. Still another was sent, which came back in the same condition. Upon investigation it was found that he was making steel wedges, and not knowing the proper place on his anvil for this kind of work, the greater part of the force of his blow, instead of sharpening the wedge, was being wasted to prove which tool was the stronger, the hardened steel face of his anvil, or the edge of the hardened steel face of his hammer. If this man should throw a chunk of granite against a large bowlder of the same stone he would hardly expect to see the bowlder break instead of the chunk, but he did not see the same principle in his hammer and anvil.

A small nail hammer was returned with a peculiar shaped hole in the face. This hammer was replaced by another which came back in the same condition; another was sent, with a like result. Inquiry revealed the fact that the hammers were used for heading down rivets close to chilled cast iron projections, and that the riveter hit the projections quite as often as the rivet. This man was ignorant of the nature of chilled cast iron and expected his hammer to stand the repeated blows against it, and not batter or break.

A nail hammer was returned cracked through the eye. By inquiry we ascertained that the buyer had discovered that his hammer was soft between the face and claw. He had therefore taken it to

ADZ EYE NAIL HAMMERS





STRAIGHT CLAW

ROUND

Polished Nos.	Weights Ounces
700	26
701	20
701½	16
702	13

STRAIGHT CLAW——BELL FACE

Polished Nos.	Full Polished Nos.	Nickel Plated Nos.	Polished Faces Creased Nos.	Full Polished Handles Ebonized Nos.	Nickel Plated Handles Ebonized Nos.	Weights Ounces
710						25
711	2211	1211	911	2111	1311	19
711½	2211½	1211½	911½	2111½	1311½	16
712	2212	1212	912	2112	1312	12
712½	2212½	1212½	912½	2112½	1312½	10
713	2213	1213	913	2113	1313	7
714	2214	1214		2114	1314	5

The weights given do not include weight of handle.

a blacksmith and had it hardened all over, resulting in the crack mentioned. He did not know that the face of a Maydole hammer is given a different temper from that given to the claw, and that the middle of the hammer is kept soft for strength.

A very common way of injuring a nail hammer is by pulling out a hardened steel nail set, which has become stuck in driving a nail through a board, and the injury done by driving the claw of one hammer with another hammer on the set to get a firm hold for pulling. The result quite often is a damaged claw or face, or both.

The writer once watched a farmer taking down a barb wire fence, and to pull the staples from the posts used a straight-claw nail hammer and a short iron bar. By driving the claw behind the wire at the staples and striking the poll of the hammer a sharp blow with the bar, the staples flew. Working at one which had been driven into a knot, and striking a harder blow than common, the claw of the hammer flew; at which he wondered and made some very torrid remarks about hammers in general, and this one in particular. But a hammer is a hammer, and most of us will go on using and misusing them until the end.

A mechanic cannot be continually changing hammers for one just suited to the work in hand; and hammers, as well as other tools, are often sacrificed to save valuable time when the right tool cannot be obtained.

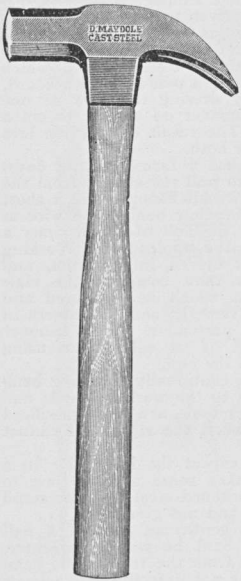
Not many, however, expect the impossible in a hammer, although it takes some a long time to learn that a piece of hardened steel will not stand being battered for ever and not give way.

Not long ago an old gentleman brought a nail hammer to the office. Said he was a carpenter, had just broken a piece from the face of his hammer, and asked if it was not defective. We knew by the shape that it was very old, which was verified by his admission that he had used the hammer continually for thirty years. We gave him a new one. Not because the old hammer had not done its work well, but for the old gentleman's "cheek," which was certainly "well hardened."

Send Your Boy to an Industrial School

Too large a class of young people in America, of both sexes, are seeking pursuits not requiring manual labor. Their education, as given at present in the high schools and colleges, tends rather to unfit them for the active industries of life in a country, where the vast resources of nature are waiting for willing and trained hands to utilize them. The American boy, with his inborn ambition and natural ingenuity, would cease to regard manual labor as drudgery if his hand and mind together were industrially trained through the school period.—*William Mather.*

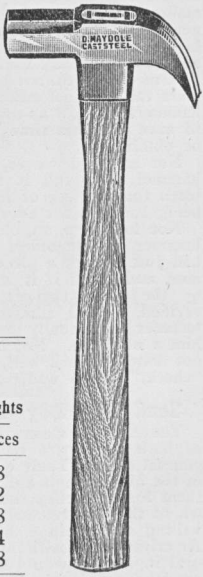
ADZ EYE NAIL HAMMERS



FLOORING

OCTAGON

Oil Finish Half Curve Claw Nos.	Weights Ounces
2700	28
2701	22
2701½	18



OCTAGON

Polished Nos.	Polished Faces Creased Nos.	Nickel Plated Nos.	Weights Ounces
200	1000	1100	28
201	1001	1101	22
201½	1001½	1101½	18
202	1002	1102	14
203	1003	1103	8

The weights given do not include weight of handle.

USEFUL SUGGESTIONS

In Cases of Accidents to Mechanics

By A. H. Robinson, M. D.

BLEEDING:—If blood spurts from wound, an artery is divided; bind limb tightly above wound with India-rubber tubing, strap, handkerchief, or scarf, or bend the limb forcibly at next joint above wound; or press flat hand or stone where blood is flowing. If blood flows freely, but does not spurt, a vein is divided; then apply same measures as in case of wounded artery, but below the wound. If scalp wounded, make a pad of cloth or waste, and bandage very tightly over wound with folded pocket-handkerchief.

BURNS AND SCALDS:—Apply lint, cotton wool, or waste, soaked in oil, or oil and lime water, and bind the same on with handkerchief. If necessary to remove clothes, cut them off by running knife or scissors along seams.

BROKEN LEG:—Pull on leg steadily and firmly until it is of same length as sound one. Roll up a coat or empty sack into form of a cushion; carefully place leg upon it; then bind the two together with scarfs or handkerchiefs. Do not lift patient from the ground until stretcher is close at hand. Take great pains, by careful lifting, to prevent broken bone coming through skin.

BROKEN THIGH:—Take hold of ankle, and, by steady traction, pull limb to same length as sound one; another person must then tie knees together, and afterward the ankles. Both limbs should then be laid over a sack of straw, or folded coat, so as to bend the knees. Patient should on no account be moved until stretcher or cart is close at hand.

BROKEN ARM:—Pull arm to length of sound one. Apply two splints, one outside, and the other inside, binding them firmly on with pocket-handkerchiefs. The best splints are made by folding newspapers to necessary length, binding them above and below seat of fracture; anything hard and light, of suitable size, would act equally well, for instance, wood, pasteboard, twigs, leather, etc.

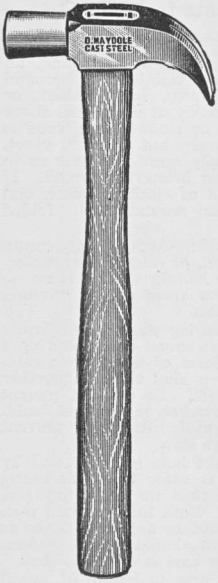
BROKEN RIBS:—Cause intense pain when patient breathes; bind roller towel firmly round chest, fastening with pins, or sewing.

BROKEN COLLAR-BONE:—Bend arm over front of chest; place it in a sling; bind it in that position by scarf going round chest, outside sling.

DOG BITES:—Tie a handkerchief or a cord tightly round limb above wound; suck the wound.

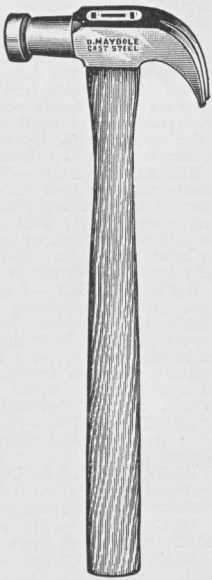
FLESH WOUNDS:—Uncover wound; wash it with clean water; wring out a clean handkerchief, or some lint, in cold water, and lay it over the wound. Then bind in position with handkerchief.

PLAIN EYE NAIL HAMMERS



JOINERS' ROUND

Polished Nos.	Weights Ounces
20	24
21	18
21½	15
22	12
23	7



JOINERS' BELL FACE

Polished Nos.	Weights Ounces
31	17
31½	14
32	11
33	7
34	4

The weights given do not include weight of handle.

FAINTING:—From heat, exhaustion or loss of blood. Keep head low; undo clothing about neck; plenty of fresh air; dash cold water on face and chest; smelling salts, carefully used; a little brandy when sensibility has returned, excepting in cases of sunstroke, and where means have not been taken to prevent further bleeding.

INSENSIBILITY:—From blows or wounds on head. Send at once for doctor or take patient to hospital, keeping him on his back, with head raised· undo clothing round neck; do not give brandy.

INSENSIBILITY:—From being buried in falls of earth, or breathing foul gas; proceed as in drowning.

FITS:—1. If snoring and face flushed, undo clothing round neck, keep head raised, and dash cold water on top of head; hot water bottles to feet. Send for doctor. Do not give brandy.

2. If foaming at mouth and convulsed, undo clothing, apply smelling salts, and prevent patient hurting himself until conscious again.

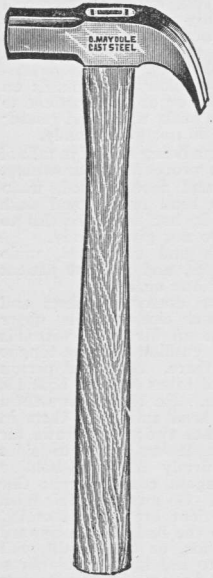
DROWNING:—Send for doctor, blankets and dry clothing. Take off wet clothes from upper part of body. Lay patient on his back, with his head on a folded coat for cushion. Draw tongue out of mouth and hold it there. A second person kneels at patient's head and takes hold of both his arms just below the elbows. He then draws them upward over the patient's head and holds them in that position until he counts two; this draws air into the lungs. He then lowers arms to sides again and presses them firmly inwards, holding them there until he has again counted two; this forces air out of the lungs. Go on doing this until doctor arrives, or until patient breathes naturally. As soon as he does so, rub the limbs in an upward direction with the dry hands, or better still with hot flannels. Put patient to bed between blankets, surrounded with hot water bottles. May give him wine or brandy when quite sensible.

RUPTURE, or "break of the body":—Try and push it back with flat hand; keep man on his back. Cold wet clothes laid over rupture will, perhaps, aid its return.

(From Edison's Handy Encyclopedia. Copyrighted, 1901, by Wm. H. Lee. Published by Laird & Lee, Chicago.)

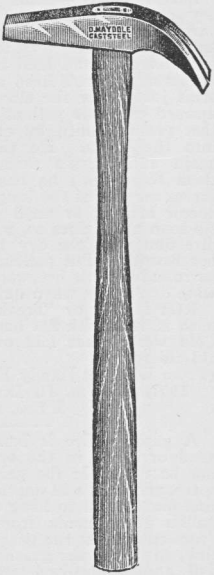
A gasoline fire is best extinguished with flour, sand or earth in the order named; water should not be used. If the gasoline be confined in small space, ammonia will smother it. Some users of gasoline find it well to hang a bottle containing about a gallon of ammonia from the top of the tank or room containing the gasoline, by a string or fusible link, so that if the gasoline takes fire the bottle will fall and be broken, releasing the ammonia and promptly putting out the burning gasoline.—From *Power and Transmission.*

PLAIN EYE NAIL HAMMERS



OCTAGON

Polished Nos.	Weights Ounces
220	26
221	19
221½	16
222	13
223	8
224	5



PLAIN EYE BRAD HAMMERS

OCTAGON

Polished Nos.	Weights Ounces
226	4
227	3
228	2

The weights given do not include weight of handle.

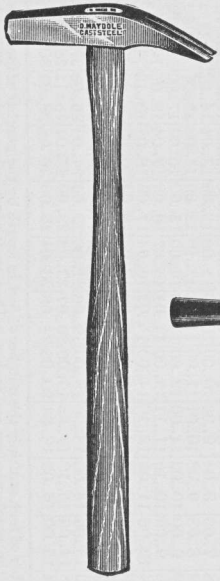
BOARD AND PLANK MEASUREMENT AT SIGHT

This table gives the square feet and inches in boards or planks from 3 to 20 inches wide, and 4 to 20 feet long. If a board be longer than 20 feet, or wider than 20 inches, unite two of the numbers.

L'gth	4 ft.	5 ft.	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.	11 ft.	12 ft.	13 ft.	14 ft.	15 ft.	16 ft.	17 ft.	18 ft.	19 ft.	20 ft.
Width	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
3 in..	1..00	1..03	1..06	1..09	2..00	2..03	2..06	2..09	3..00	3..03	3..06	3..09	4..00	4..03	4..06	4..09	5..00
4 in..	1..04	1..08	2..00	2..04	2..08	3..00	3..04	3..08	4..00	4..04	4..08	5..00	5..04	5..07	6..00	6..04	6..08
5 in..	1..08	2..01	2..06	2..11	3..04	3..09	4..02	4..07	5..00	5..05	5..10	6..03	6..08	7..01	7..03	7..11	8..04
6 in..	2..00	2..06	3..00	3..06	4..00	4..06	5..00	5..06	6..00	6..06	7..00	7..06	8..00	8..06	9..00	9..06	10..00
7 in..	2..04	2..11	3..06	4..01	4..08	5..03	5..10	6..05	7..00	7..07	8..02	8..09	9..04	9..11	10..06	11..01	11..08
8 in..	2..08	3..04	4..06	4..08	5..04	6..00	6..08	7..04	8..00	8..08	9..04	10..00	10..08	11..04	12..00	12..08	13..04
9 in..	3..00	3..09	4..00	5..03	6..00	6..09	7..06	8..03	9..00	9..09	10..06	11..03	12..00	12..09	13..06	14..03	15..00
10 in..	3..04	4..02	5..06	5..10	6..08	7..06	8..04	9..02	10..00	10..10	11..08	12..06	13..04	14..02	15..00	15..10	16..08
11 in..	3..08	4..07	5..00	6..05	7..04	8..03	9..02	10..01	11..00	11..11	12..10	13..09	14..08	15..07	16..06	17..05	18..04
12 in..	4..00	5..00	6..00	7..00	8..00	9..00	10..00	11..00	12..00	13..00	14..00	15..00	16..00	17..00	18..00	19..00	20..00
13 in..	4..04	5..05	6..00	7..07	8..08	9..09	10..10	11..11	13..00	14..01	15..02	16..03	17..04	18..05	19..06	20..07	21..08
14 in..	4..08	5..10	7..06	8..02	9..04	10..06	11..08	12..10	14..00	15..02	16..04	17..06	18..08	19..10	21..00	22..02	23..04
15 in..	5..00	6..03	7..00	8..09	10..00	11..03	12..06	13..09	15..00	16..03	17..06	18..09	20..00	21..03	22..06	23..09	25..00
16 in..	5..04	6..08	8..00	9..04	10..08	12..00	13..04	14..08	16..00	17..04	18..08	20..00	21..04	22..08	24..00	25..04	26..08
17 in..	5..08	7..01	8..06	9..11	11..04	12..09	14..02	15..07	17..00	18..05	19..10	21..03	22..08	24..01	25..06	26..11	28..04
18 in..	6..00	7..06	9..00	10..06	12..00	13..06	15..00	16..06	18..00	19..06	21..00	22..06	24..00	25..06	27..00	28..06	30..00
19 in..	6..04	7..11	9..06	11..01	12..08	14..03	15..10	17..05	19..00	20..07	22..02	23..09	25..04	26..11	28..06	30..01	31..08
20 in..	6..08	8..04	10..00	11..08	13..04	15..00	16..08	18..04	20..00	21..08	23..04	25..00	26..08	28..04	30..00	31..08	33..04

EXPLANATION.—To ascertain the number of feet, multiply the number of feet in length by the number of inches in width, and divide the product by 12; the result will be the number in feet and inches. Thus, multiply 9 inches wide by 26 feet long, and the result will be 234. Divide this by 12 and we have the product 19 feet and 6 inches.—*From Armstrong's Little Giant Cyclopedia.*

PLAIN EYE BRAD HAMMERS



STRAIGHT CLAW

OCTAGON

Polished Nos.	Weights Ounces
926	4
927	3
928	2

PATTERN-MAKERS' HAMMERS

ADZ EYE

Oil Finish No.	Weight Ounces
935	5

The weights given do not include weight of handle.

PROPER SPEED OF CIRCULAR SAWS

Nine thousand feet per minute—that is, nearly two miles per minute—for the rim of a circular saw to travel, may be laid down as a rule.

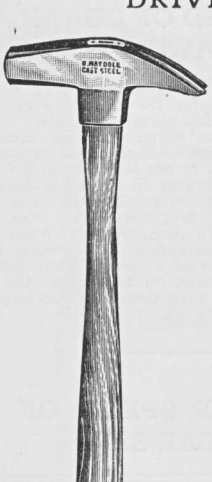
For example: A saw twelve inches in diameter, three feet around the rim, 3,000 revolutions; twenty-four inches in diameter, or six feet around the rim, 1,500 revolutions; three feet in diameter, or nine feet around the rim, 1,000 revolutions; four feet in diameter, or twelve feet around the rim, 750 revolutions; five feet in diameter, or fifteen feet around the rim, 600 revolutions. Of course it is understood that the rim of a saw will run a little faster than this reckoning, on account of the circumference being more than three times as large as the diameter.

TABLE OF SPEED OF CIRCULAR SAWS

Size of Saw	Revolutions per Minute	Size of Saw	Revolutions per Minute
8 in.	4,500	42 in.	870
10 in.	3,600	44 in.	840
12 in.	3,000	46 in.	800
14 in.	2,585	48 in.	750
16 in.	2,222	50 in.	725
18 in.	2,000	52 in.	700
20 in.	1,800	54 in.	675
22 in.	1,636	56 in.	650
24 in.	1,500	58 in.	625
26 in.	1,384	60 in.	600
28 in.	1,285	62 in.	575
30 in.	1,200	64 in.	550
32 in.	1,125	66 in.	545
34 in.	1,058	68 in.	529
36 in.	1,000	70 in.	514
38 in.	950	72 in.	500
40 in.	900		

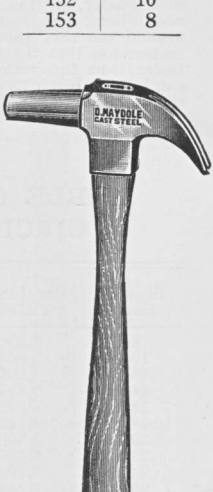
—*American Saw Co.'s* 1894 *Catalogue.*

FARRIERS' ADZ EYE DRIVING HAMMERS



BOSTON PATTERN

Polished Nos.	Weights Ounces
151	13
152	10
153	8



ROUND

Polished Nos.	Weights Ounces
251	12
252	10
253	8

The weights given do not include weight of handle.

RULES RELATIVE TO THE CIRCLE, ELLIPSE, HEXAGON, TRIANGLE, ETC.

To find circumference multiply diameter by 3.1416, or divide diameter by 0.3183.

To find diameter multiply circumference by 0.3183, or divide circumference by 3.1416.

To find radius multiply circumference by 0.15915, or divide circumference by 6.28318.

To find side of an inscribed square multiply diameter by 0.7071, or multiply circumference by 0.2251, or divide circumference by 4.4428.

To find side of an equal square multiply diameter by 0.8862, or divide diameter by 1.1284, or multiply circumference by 0.2821, or divide circumference by 3.545.

Square.—A side multiplied by 1.4142 equals diameter of its circumscribing circle.

A side multiplied by 4.443 equals circumference of its circumscribing circle.

A side multiplied by 1.128 equals diameter of an equal circle.

A side multiplied by 3.545 equals circumference of an equal circle.

Square inch multiplied by 1.273 equals circle inches of an equal circle.

To find the area of a circle multiply circumference by one-quarter of the diameter, or multiply the square of diameter by 0.7854, or multiply the square of circumference by 0.07958, or multiply the square of one-half diameter by 3.1416.

To find the area of an ellipse multiply the product of its axes by .785398, or multiply the product of its semi-axes by 3.14159.

Area of a hexagon—length of one side X 2.598.

Given the diameter of a hexagon nut across the flats, to find the diameter across corners, multiply the diameter across flats by 1.156.

Contents of cylinder = area of end × length.

Contents of wedge = area of base × one-half altitude.

Surface of cylinder = length × circumference + area of both ends.

Surface of sphere = diameter squared × 3.1416, or = diameter × circumference.

Contents of sphere = diameter cubed × 0.5236.

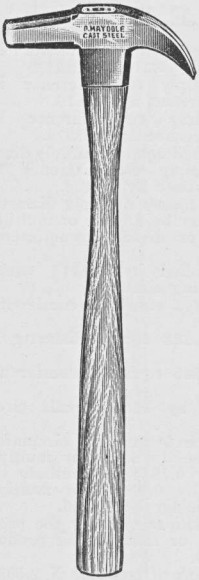
Contents of pyramid or cone, right or oblique, regular or irregular = area of base × one-third altitude.

Area of triangle = base × one-half altitude.

Area of parallelogram = base × altitude.

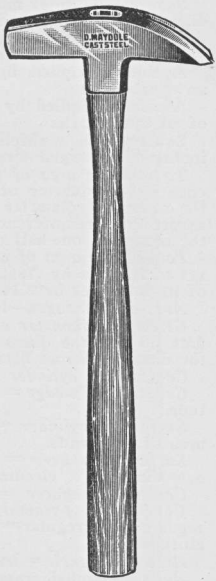
Area of trapezoid = altitude × one-half the sum of parallel sides.

FARRIERS' ADZ EYE DRIVING HAMMERS



OCTAGON

Polished Nos.	Weights Ounces
351	13
352	10
353	7



CALIFORNIA PATTERN

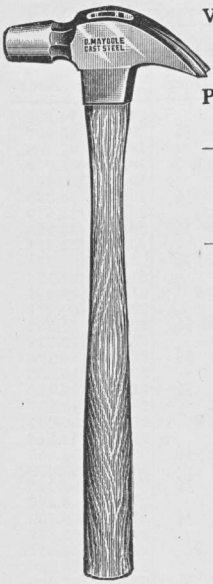
Oil Finish Nos.	Weights Ounces
450	15
451	12
452	9

The weights given do not include weight of handle.

CIRCUMFERENCES AND AREAS OF CIRCLES

Diam.	Circ.	Area	Diam.	Circ.	Area
⅛	.3926	.01227		17.67	24.850
¼	.7854	.04908	¾	18.06	25.967
⅜	1.178	.1104		18.45	27.108
½	1.570	.1963	6	18.84	28.274
⅝	1.963	.3067		19.24	29.464
¾	2.356	.4417	¼	19.63	30.679
⅞	2.748	.6013		20.02	31.919
1	3.141	.7854	½	20.42	33.183
	3.534	.9940		20.81	34.471
¼	3.927	1.227	¾	21.20	35.784
	4.319	1.484		21.57	37.122
½	4.712	1.767	7	21.99	38.484
	5.105	2.073		22.38	39.871
¾	5.497	2.405	¼	22.77	41.282
	5.890	2.761		23.16	42.718
2	6.283	3.141	½	23.56	44.178
	6.675	3.546		23.95	45.663
¼	7.068	3.976	¾	24.34	47.173
	7.461	4.130		24.74	48.707
½	7.854	4.908	8	25.13	50.265
	8.246	5.411		25.52	51.848
¾	8.639	5.939	¼	25.91	53.456
	9.032	6.491		26.31	55.088
3	9.424	7.068	½	26.70	56.745
	9.817	7.669		27.09	58.426
¼	10.21	8.295	¾	27.48	60.132
	10.60	8.946		27.88	61.862
½	10.99	9.621	9	28.27	63.617
	11.38	10.320		28.66	65.396
¾	11.78	11.044	¼	29.05	67.200
	12.17	11.793		29.45	69.029
4	12.56	12.566	½	29.84	70.882
	12.95	13.364		30.23	72.759
¼	13.35	14.186	¾	30.63	74.662
	13.74	15.033		31.02	76.588
½	14.13	15.904	10	31.41	78.539
	14.52	16.800		31.80	80.515
¾	14.92	17.720	¼	32.20	82.516
	15.31	18.665		32.59	84.540
5	15.70	19.635	½	32.98	86.590
	16.10	20.629		33.37	88.664
¼	16.49	21.647	¾	33.77	90.762
	16.88	22.690		34.16	92.885
½	17.27	23.758			

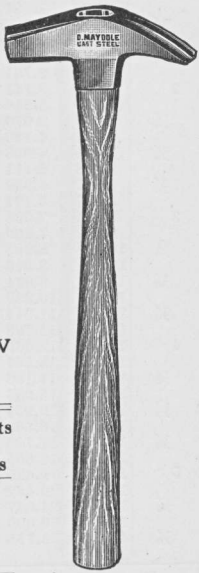
FARRIERS' ADZ EYE DRIVING HAMMERS



WHALEBACK CLAW

Octagon Neck—Round

Polished Nos.	Oil Finish Nos.	Weights Ounces
	950	14
551	951	12
552	952	10
553	953	8



WHALEBACK CLAW

OCTAGON

Polished Nos.	Oil Finish Nos.	Weights Ounces
	850	14
651	851	12
652	852	10
653	853	8

The weights given do not include weight of handle.

DECIMAL EQUIVALENTS

of 8ths, 16ths, 32ds and 64ths of an inch.

8THS

1/8	= .125
1/4	= .250
3/8	= .375
1/2	= .500
5/8	= .625
3/4	= .750
7/8	= .875

16THS

1/16	= .0625
3/16	= .1875
5/16	= .3125
7/16	= .4375
9/16	= .5625
11/16	= .6875
13/16	= .8125
15/16	= .9375

32DS

1/32	= .03125
3/32	= .09375
5/32	= .15625
7/32	= .21875
9/32	= .28125
11/32	= .34375
13/32	= .40625
15/32	= .46875
17/32	= .53125
19/32	= .59375
21/32	= .65625
23/32	= .71875
25/32	= .78125
27/32	= .84375
29/32	= .90625
31/32	= .96875

64THS

1/64	= .015625
3/64	= .046875
5/64	= .078125
7/64	= .109375
9/64	= .140625
11/64	= .171875
13/64	= .203125
15/64	= .234375
17/64	= .265625
19/64	= .296875
21/64	= .328125
23/64	= .359375
25/64	= .390625
27/64	= .421875
29/64	= .453125
31/64	= .484375
33/64	= .515625
35/64	= .546875
37/64	= .578125
39/64	= .609375
41/64	= .640625
43/64	= .671875
45/64	= .703125
47/64	= .734375
49/64	= .765625
51/64	= .796875
53/64	= .828125
55/64	= .859375
57/64	= .890625
59/64	= .921875
61/64	= .953125
63/64	= .984375

ELECTRICAL DEFINITIONS

The "volt" is a measure of electro-motive force, or original energy, corresponding to the dynamic term "pressure," but not of "power." It is based on the product of one Daniell cell of a battery.

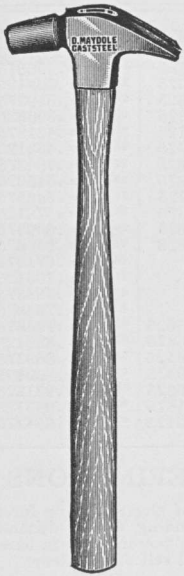
The "ohm" is the measure of resistance, and compares to the dynamic term of "loss by transmission." It is based on the resistance offered by a copper wire .05 in. diameter, 250 ft. long; or a copper wire, 32 gauge, 10 ft. long.

The "ampere" is the measure for current, or what passes; the intensity it may be called, and is comparable to the dynamic term of "power transmitted" or "effect." It is the residual force of one "volt" after passing through one "ohm" of resistance.

The "coulomb" is a measure of current, qualified by time; one ampere acting for one second of time, comparing in nature with the dynamic "foot pound."

The "watt" is the unit for dynamic effect produced by electro-motive force, or current. It equals 44.22 foot pounds, or 1/746 h. p.—*Industry.*

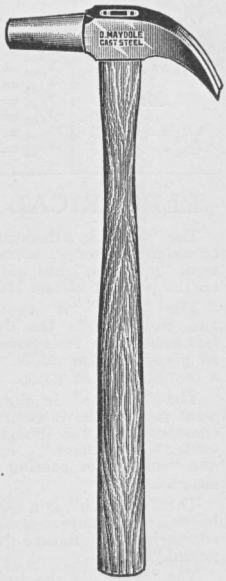
FARRIERS' ADZ EYE DRIVING HAMMERS



WHALEBACK CLAW

ROUND

Oil Finish Nos.	Weights Ounces
750	14
751	12
752	10
753	8



FARRIERS' PLAIN EYE DRIVING HAMMERS

ROUND

Polished Nos.	Weights Ounces
54	9
55	7

The weights given do not include weight of handle.

This Item of Information is of Value to Everyone.

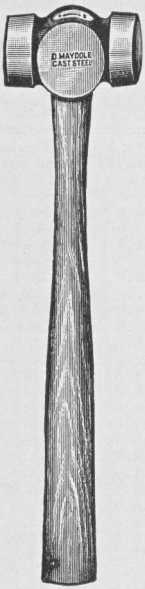
PROPORTIONATE PROPERTIES OF FOOD

100 parts of each	Water, etc.	Muscle Making	Heat and Fat Making
Apples	84.0	5.0	10.0
Barley	14.0	15.0	68.8
Beans	14.8	24.0	57.7
Beef	50.0	15.0	30.0
Buckwheat	14.2	8.6	75.4
Butter	....	....	all
Cabbage	90.0	4.0	5.0
Cheese	10.0	65.0	19.0
Chicken	46.0	18.0	32.0
Corn	14.0	12.0	73.0
Cucumbers	97.0	1.5	1.0
Eggs, white of	53.0	17.0	none
Eggs, yolk of	79.0	15.0	27.0
Lamb	50.5	11.0	35.0
Milk, Cows'	86.0	5.0	8.0
Mutton	44.0	12.5	40.0
Oats	13.6	17.0	66.4
Peas	14.0	23.4	60.0
Pork	38.5	10.0	50.0
Potatoes	75.2	1.4	22.5
Rice	13.5	6.5	79.5
Turnips	94.4	1.1	4.0
Veal	68.5	10.1	16.5
Wheat	14.0	14.6	69.4

"PENNIES"

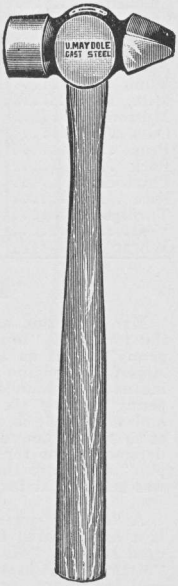
Many persons are puzzled to understand what the terms of "fourpenny," "sixpenny" and "tenpenny" mean as applied to nails. The *Scientific American* explains this by saying that "fourpenny" means four pounds to the thousand nails or "sixpenny" means six pounds to the thousand nails, and so on. It is an old English term, and meant at first "ten pound" nails (the thousand being understood), but the old English clipped it to "tenpun" and from that it degenerated until "penny" was substituted for "pounds."—*Race's Scrap Book.*

A "monkey wrench" is not so named because it is a handy thing to monkey with, or for any kindred reason. "Monkey" is not its name at all, but "Moncky." Charles Moncky, the inventor of it, sold his patent for $2,000 and invested the money in a house in Brooklyn.



HORSESHOERS' ROUNDING HAMMERS

Polished Nos.	Weights Ounces
211	44
212	40
213	36
214	32
215	28
216	24



HORSESHOERS' FITTING HAMMERS

Polished Nos.	Weights Ounces
411	44
412	40
413	36
414	32
415	28
416	24

The weights given do not include weight of handle.

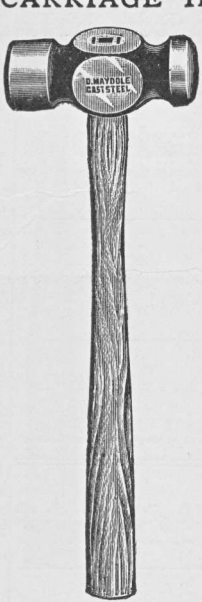
U. S. STANDARD SYSTEM OF BOLTS AND NUTS

As Recommended by the Franklin Institute, of Philadelphia, December 15, 1864.

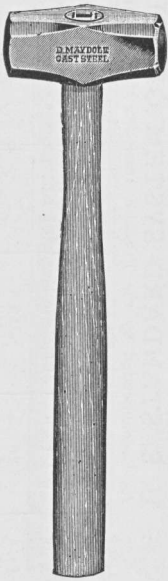
Diameter of Bolt	Number of Threads per Inch	Diameter of Hole in Nut	Short Diameter of Nut*	Diameter of Bolt	Number of Threads per Inch	Diameter of Hole in Nut	Short Diameter of Nut
1/4 in.	20	.185	1/2	2 in.	4 1/2	1.712	3 1/8
5/16 "	18	.240	19/32	2 1/4 "	4 1/2	1.962	3 1/2
3/8 "	16	.294	11/16	2 1/2 "	4	2.175	3 7/8
7/16 "	14	.344	25/32	2 3/4 "	4	2.425	4 1/4
1/2 "	13	.400	7/8	3 "	3 1/2	2.628	4 5/8
9/16 "	12	.454	31/32	3 1/4 "	3 1/2	2.878	5
5/8 "	11	.507	1 1/16	3 1/2 "	3 1/4	3.100	5 3/8
3/4 "	10	.620	1 1/4	3 3/4 "	3	3.317	5 3/4
7/8 "	9	.731	1 7/16	4 "	3	3.566	6 1/8
1 "	8	.837	1 5/8	4 1/4 "	2 7/8	3.825	6 1/2
1 1/8 "	7	.940	1 13/16	4 1/2 "	2 3/4	4.027	6 7/8
1 1/4 "	7	1.065	2	4 3/4 "	2 5/8	4.255	7 1/4
1 3/8 "	6	1.160	2 3/16	5 "	2 1/2	4.480	7 5/8
1 1/2 "	6	1.284	2 3/8	5 1/4 "	2 1/2	4.730	8
1 5/8 "	5 1/2	1.389	2 9/16	5 1/2 "	2 3/8	5.053	8 3/4
1 3/4 "	5	1.490	2 3/4	5 3/4 "	2 3/8	5.203	8 3/4
1 7/8 "	5	1.615	2 15/16	6 "	2 1/4	5.423	9 1/8

*Or Size of Wrench.

CARRIAGE IRONERS' HAND HAMMERS



Face, Sides and Pein Polished	Oil Finish	Weights
Nos.	Nos.	Ounces
111	1011	44
112	1012	38
113	1013	32
114	1014	28
115	1015	24



DRILL SHARPENING HAMMERS

Full Polished	Oil Finish	Weights
Nos.	Nos.	Ounces
481	981	38
482	982	30
483	983	22

The weights given do not include weight of handle.

HORSE POWER

Horse power is an amount of mechanical force capable of raising 33,000 pounds one foot high, per minute.

Rule to Find Horse Power of an Engine

Area of piston in inches, multiplied by pressure per square inch, multiplied by speed of piston in feet per minute, and that product divided by 33,000 = 1 Horse Power.

The pressure per square inch should be the mean pressure throughout the stroke exerted on the piston, which can be found by attaching an indicator to the engine. The result will then be what engineers term Indicated Horse Power.

The Horse Power of Boilers is best defined by the heating surface of a boiler and is different according to their construction. A Tubular Boiler will give one horse power to every 15 square feet of heating surface; a Flue Boiler every 12 square feet, and a Cylinder Boiler 10 square feet gives one horse power. There is no standard law governing the Horse Power of Steam Boilers, but this rule is adopted by most experts as a fair rating.

One cubic foot of water evaporated per hour = 1 nominal horse power.

7½ pounds of coal consumed per hour will evaporate 1 cubic foot of water—1 horse power.

One square foot of grate will consume an average of 12 pounds of coal per hour= 1 6-10 horse power.

A theoretically perfect steam engine consumes 66-100 pounds of coal per hour per horse power.

Marine condensing engines consume 2 to 6 lbs. of coal per horse power.

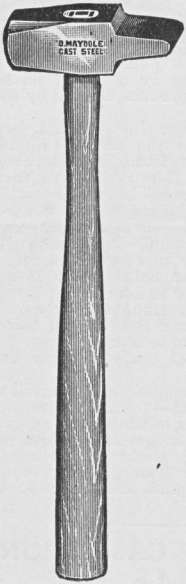
WEIGHT OF CAST IRON BALLS

Diam.	Weight.	Diam.	Weight	Diam.	Weight.
1	0.136	5	17.04	9	99.40
1½	0.460	5½	22.68	9½	116.90
2	1.09	6	29.45	10	136.35
2½	2.13	6½	37.44	10½	157.84
3	3.68	7	46.76	11	181.48
3½	5.84	7½	57.52	11½	207.37
4	8.72	8	69.81	12	235.62
4½	12.42	8½	83.73		

—*Engineering Magazine.*

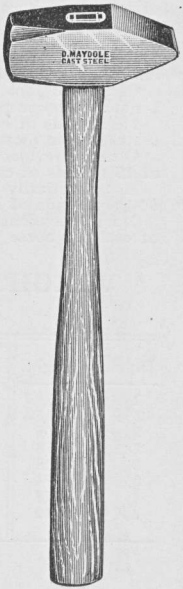
IF A BOILER GAUGE GLASS BREAKS, shut off the water first, and the steam afterward, to avoid being scalded.

BLACKSMITHS' HAND HAMMERS



SHOULDER PEIN

Full Polished Nos.	Weights Ounces
65	46
66	40
67	32



WEDGE PEIN

Full Polished Nos.	Oil Finish Nos.	Weights Ounces
60	760	64
60½	760½	56
61	761	48
62	762	42

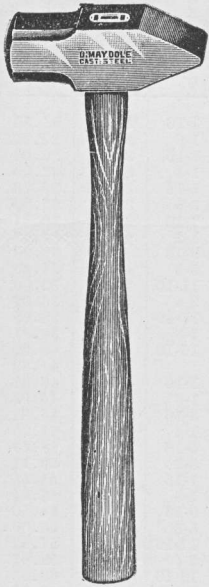
The weights given do not include weight of handle.

WEIGHTS
of Square and Round Bars of Wrought Iron

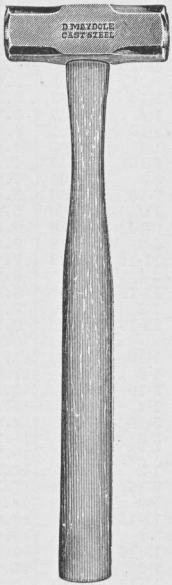
In Pounds Per Lineal Foot.—*Kent.*
Iron weighing 480 lbs. per cubic foot. For steel add 2 per cent.

Thickness or Diameter in Inches	Weight of Square Bar One Foot Long	Weight of Round Bar One Foot Long	Thickness or Diameter in Inches	Weight of Square Bar One Foot Long	Weight of Round Bar One Foot Long
0			3 1-16	31.26	24.55
1-16	.013	.010	1-8	32.55	25.57
1-8	.052	.041	3-16	33.87	26.60
3-16	.117	.092	1-4	35.21	27.65
1-4	.208	.164	5-16	36.58	28.73
5-16	.326	.256	3-8	37.97	29.82
3-8	.469	.368	7-16	39.39	30.94
7-16	.638	.501	1-2	40.83	32.07
1-2	.833	.654	9-16	42.30	33.23
9-16	1.055	.828	5-8	43.80	34.40
5-8	1.302	1.023	11-16	45.33	35.60
11-16	1.576	1.237	3-4	46.88	36.82
3-4	1.875	1.473	13-16	48.45	38.05
13-16	2.201	1.728	7-8	50.05	39.31
7-8	2.552	2.004	15-16	51.68	40.59
15-16	2.930	2.301	4	53.33	41.89
1	3.333	2.618	1-16	55.01	43.21
1-16	3.763	2.955	1-8	56.72	44.55
1-8	4.219	3.313	3-16	58.45	45.91
3-16	4.701	3.692	1-4	60.21	47.29
1-4	5.208	4.091	5-16	61.99	48.69
5-16	5.742	4.510	3-8	63.80	50.11
3-8	6.302	4.950	7-16	65.64	51.55
7-16	6.888	5.410	1-2	67.50	53.01
1-2	7.500	5.890	9-16	69.39	54.50
9-16	8.138	6.392	5-8	71.30	56.00
5-8	8.802	6.913	11-16	73.24	57.52
11-16	9.492	7.455	3-4	75.21	59.07
3-4	10.21	8.018	13-16	77.20	60.63
13-16	10.95	8.601	7-8	79.22	62.22
7-8	11.72	9.204	15-16	81.26	63.82
15-16	12.51	9.828	5	83.33	65.45
2	13.33	10.47	1-16	85.43	67.10
1-16	14.18	11.14	1-8	87.55	68.76
1-8	15.05	11.82	3-16	89.70	70.45
3-16	15.95	12.53	1-4	91.88	72.16
1-4	16.88	13.25	5-16	94.08	73.89
5-16	17.83	14.00	3-8	96.30	75.64
3-8	18.80	14.77	7-16	98.55	77.40
7-16	19.80	15.55	1-2	100.8	79.19
1-2	20.83	16.36	9-16	103.1	81.00
9-16	21.89	17.19	5-8	105.5	82.83
5-8	22.97	18.04	11-16	107.8	84.69
11-16	24.08	18.91	3-4	110.2	86.56
3-4	25.21	19.80	13-16	112.6	88.45
13-16	26.37	20.71	7-8	115.1	90.36
7-8	27.55	21.64	15-16	117.5	92.29
15-16	28.76	22.59	6	120.0	94.25
3	30.00	23.56			

PLOW OR ENGINEERS' HAMMERS



Polished Nos.	Oil Finish Nos.	Weights Ounces
461	861	64
462	862	56
463	863	48
464	864	40
465	865	32
466	866	26
467	867	20



DOUBLE FACE

Polished Nos.	Oil Finish Nos.	Weights Ounces
1261	1661	64
1262	1662	56
1263	1663	48
1264	1664	40
1265	1665	32
1266	1666	26
1267	1667	20

The weights given do not include weight of handle.

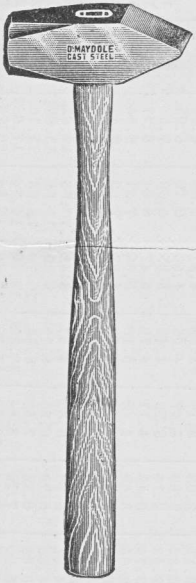
Per lineal foot in pounds

WEIGHTS OF FLAT IRON.

For steel about 2 per cent. should be added to the weight

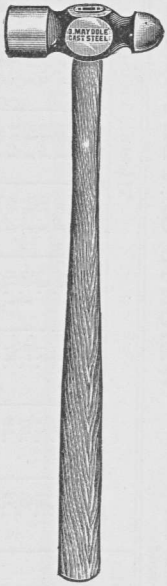
Width in Inches	Thickness in Inches											
	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
1	.21	.42	.63	.84	1.05	1.26	1.47	1.68	2.11	2.53	....	....
1⅛	.24	.47	.71	.95	1.18	1.42	1.66	1.90	2.37	2.84	....	....
1¼	.26	.53	.79	1.05	1.32	1.58	1.84	2.11	2.63	3.16	3.68	4.21
1⅜	.29	.58	.87	1.16	1.45	1.74	2.03	2.32	2.89	3.47	4.05	4.63
1½	.32	.63	.95	1.26	1.58	1.90	2.21	2.53	3.16	3.79	4.42	5.05
1⅝	.34	.68	1.03	1.37	1.71	2.05	2.39	2.74	3.42	4.11	4.79	5.47
1¾	.37	.74	1.11	1.47	1.84	2.21	2.58	2.95	3.68	4.42	5.16	5.89
2	.42	.84	1.26	1.68	2.11	2.53	2.95	3.37	4.21	5.05	5.89	6.74
2¼	.47	.95	1.42	1.90	2.37	2.84	3.32	3.79	4.74	5.68	6.83	7.58
2½	.53	1.05	1.58	2.11	2.63	3.16	3.68	4.21	5.26	6.32	7.37	8.42
2¾	.58	1.16	1.74	2.32	2.89	3.47	4.05	4.63	5.79	6.95	8.10	9.26
3	.63	1.26	1.90	2.53	3.16	3.79	4.42	5.05	6.32	7.58	8.84	10.10
3¼	.68	1.37	2.05	2.74	3.42	4.11	4.79	5.47	6.84	8.21	9.58	10.95
3½	.74	1.47	2.21	2.95	3.68	4.42	5.16	5.89	7.37	8.84	10.32	11.79
3¾	.79	1.58	2.37	3.16	3.95	4.74	5.53	6.32	7.89	9.47	11.05	12.63
4	.84	1.68	2.53	3.37	4.21	5.05	5.89	6.74	8.42	10.10	11.79	13.47
4½	.95	1.90	2.84	3.79	4.74	5.68	6.63	7.58	9.47	11.38	13.26	15.16
5	1.05	2.11	3.16	4.21	5.26	6.32	7.37	8.42	10.53	12.63	14.74	16.84
6½	1.16	2.32	3.47	4.63	5.79	6.95	8.10	9.26	11.58	13.89	16.21	18.52
6	1.26	2.53	3.79	5.05	6.32	7.58	8.84	10.10	12.63	15.16	17.68	20.21
7	1.47	2.94	4.42	5.90	7.36	8.84	10.32	11.79	14.74	17.68	20.64	23.58
3	1.68	3.36	5.05	6.74	8.42	10.10	11.78	13.48	16.84	20.20	23.58	26.94

ENGINEERS' HAMMERS



RIVETING PEIN

Oil Finish Nos.	Weights Ounces
791	36
791½	32
792	28
793	24



BALL PEIN

Oil Finish Nos.	Polished Face, Sides and Pein Nos.	Weights Ounces
781	81	32
782	82	25
783	83	18

The weights given do not include weight of handle.

USEFUL INFORMATION FOR THE MOTORIST

WHEN you purchase an automobile you receive an instruction book governing the care of your car. Do not lay this aside and forget it; read it and follow the instructions the manufacturer gives you that you may avoid unnecessary repair bills and trouble.

Particular attention should be given to the oiling and greasing if you would prolong the life of your car. Do not use "any old oil" in your motor; inquire of your local dealer what particular oil gives the best results for your make of car, and use no other. Carry a small supply with you.

There are a number of solutions and accessories on the market, such as carbon remover, radiator cleaning compound, vaporizers, powders and paste for stopping leaks. Don't experiment with these. Find out from a reliable source if they are O. K. and adaptable to your particular car—you'll save money and trouble.

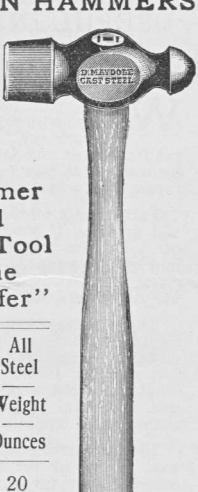
Before starting on a trip inspect—the tank for gas, the motor for oil, the radiator for water, the steering gear for any loose bolts or nuts, and test the brakes and the battery. Start the motor and listen for any unusual knock or pound.

If the motor does not start—don't attempt to adjust the carburetor. Leave the carburetor to a mechanic who understands it. First see if the lights are in order, and if you have gas. If the lights do not work, look at the battery. Are the terminals loose or corroded?

If lights are O. K., see if your ammeter registers toward discharge when ignition switch is turned on. If not, look for a loose connection either at switch or ammeter. If it does, turn off switch, remove cover from the distributor, and crank motor over until distributor points are closed; again turn on switch and open and close distributor points with your fingers. If you get no spark, check over wiring between distributor and switch for a bare spot grounded on metal of car, or a broken wire; but if you get a spark at this point and the wires are tight on coil and condenser, call the nearest Service Station for a mechanic with a new coil and condenser, as one or the other has gone bad and no effort will start the motor.

Don't neglect the battery. Inspect it once a week in warm weather—water evaporates much faster in hot weather. Your hydrometer should

AUTO BALL PEIN HAMMERS



Hammer and Tire Tool "The Chauffer"

Oil Finish No.	All Steel Weight Ounces
2173	20

ROUND—SHORT HANDLES

Oil Finish Nos.	Polished Sides, Face and Pein Nos.	Full Polished Nos.	Nickel Plated Nos.	Nickel Plated. Handles Ebonized Nos.	Weights Ounces
273	1173	473	1273	1073	20
274	1174	474	1274	1074	16
275	1175	475	1275	1075	13
276	1176	476	1276	1076	10
277	1177	477	1277	1077	7

The weights given do not include weight of handle, except No. 2173.

read 1280 for a fully charged battery. If it shows less than 1200 have it recharged at once. On a long trip, feel of the battery to see if it is heating up from excessive charging; if so, turn on your headlights which will reduce the current going into the battery, and prevent overheating. The following table shows the freezing point of the battery by Specific Gravity Test, which you get with your hydrometer:

Specific Gravity	Freezing Point
1100	18° above
1125	13° above
1150	6° above
1175	3° below
1200	16° below
1225	34° below
1250	60° below
1275	83° below

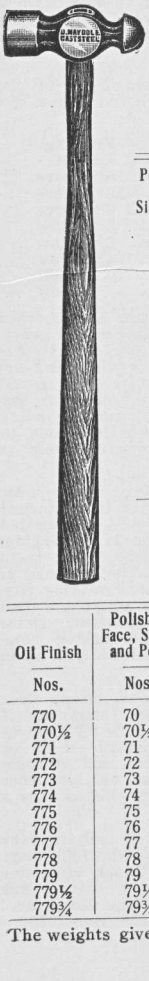
Should your ammeter not indicate charge when running 15 miles an hour or more, check up generator. Is fuse O. K? Is commutator clean? Are any of the brushes sticking in their slides and not resting on the commutator? Is wire from generator to ammeter tight at terminals, broken, or has it a bare spot touching metal of car? Finding none of these defects, you have what is known as a "short", and had best go to your mechanic or Service Station.

Should the starter refuse to turn motor over fast enough to start, try it with your lights turned on. If they go out, you have a loose or corroded battery terminal, or the battery needs recharging. Start motor with crank, being sure spark is in retard position. Should the starter not respond at all, see if starter switch is clean and making contact. Are wire terminals tight at starting switch and starter? Is commutator of starting motor clean and brushes all free and touching commutator? Finding none of these defects, you again have a "short."

Don't neglect a leak. Keep your garage floor clean and it will tell you when a leak starts and if it is oil, gas or water. If gas, it not only reduces your mileage but creates a fire hazard—if oil or water, you may forget it some day and overheat your motor, possibly burning out one or more bearings, or warping the cylinders, which makes a very expensive repair job.

Don't start away without a kit of tools in your car, which should consist at least of the following: One pair slip nose gas pliers, one 6-inch adjustable crescent wrench, one 8-inch screw driver, one "Maydole Hammer" No. 273, and "The Chauffeur," **a Combination Tire Tool and Hammer No. 2173.**

MACHINISTS' BALL PEIN HAMMERS



OCTAGON

Polished Face, Sides and Pein	Nickel Plated	Weights
Nos.	Nos.	Ounces
120	620	48
121	621	36
122	622	30
123	623	24
124	624	20
125	625	16
126	626	13
127	627	10
128	628	7
128½	628½	5
129	629	3
129½	629½	2
129¾	629¾	1

ROUND

Oil Finish	Polished Face, Sides and Pein	Full Polished	Nickel Plated	Weights
Nos.	Nos.	Nos.	Nos.	Ounces
770	70	370	570	48
770½	70½	370½	570½	36
771	71	371	571	30
772	72	372	572	24
773	73	373	573	20
774	74	374	574	16
775	75	375	575	13
776	76	376	576	10
777	77	377	577	7
778	78	378	578	5
779	79	379	579	3
779½	79½	379½	579½	2
779¾	79¾	379¾	579¾	1

The weights given do not include weight of handle.

Don't attempt to thaw out a frozen radiator by running the motor. Have the car taken into a warm garage and let stand with drain cocks open until free of ice—do not add boiling water.

Denatured alcohol is most commonly used to prevent freezing of the cooling system. The following table shows what proportions to use for different temperatures:

30° above	1 part	alcohol to	19 parts	water
25° above	1 part	alcohol to	11 parts	water
20° above	1 part	alcohol to	6 parts	water
15° above	1 part	alcohol to	4 parts	water
10° above	1 part	alcohol to	3 parts	water
5° above	1 part	alcohol to	2 parts	water
0° above	2 parts	alcohol to	3 parts	water
5° below	9 parts	alcohol to	11 parts	water
10° below	1 part	alcohol to	1 part	water

Don't use gasoline to clean top, curtains or upholstery. Use soft brush and a weak solution of ammonia and water. For cloth upholstery, use warm water and Ivory Soap, with a woolen cloth to remove grease spots.

Don't leave ignition switch on when going down a steep hill in low or second gear.

Don't put oil or grease on commutator of generator or starting motor. No lubrication is required.

Don't take anything apart that you can not put together.

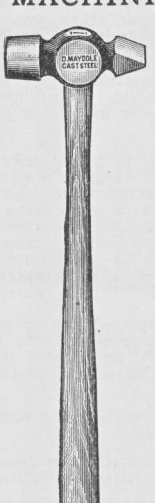
Don't try to run the car with the starting motor, as this will seriously injure the battery.

—D. C. Cate

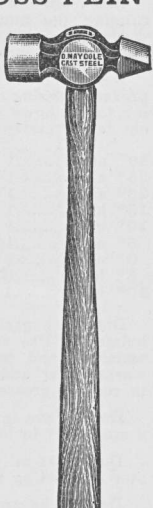
BREAKING GLASS TO ANY REQUIRED FIGURE

Make a small notch by means of a file on the edge of the glass, then heat the end of an iron rod red hot and apply the iron to the notch, drawing it slowly along the surface of the glass in any direction desired, and a crack will follow the direction.

MACHINISTS' CROSS PEIN HAMMERS



ROUND



OCTAGON

Polished Sides, Face and Pein Nos.	Weights Ounces	Polished Sides, Face and Pein Nos.	Weights Ounces
170	48	320	48
170½	36	321	36
171	30	322	30
172	24	323	24
173	20	324	20
174	16	325	16
175	13	326	13
176	10	327	10
177	7	328	7
178	5	328½	5
179	3	329	3
179½	2	329½	2

The weights given do not include weight of handle.

TIRE PRESSURE ACCORDING TO LOAD WEIGHT

It is no longer necessary to carry as much air in tires as in the past. At the same time underinflation is still the worst form of tire abuse. Proper inflation is necessary. The only difference is that tires are now built to require less pressure than in the past.

A new schedule of inflation and weights has been worked out by the Rubber Association of America, and calls for a minimum pressure of 35 pounds for a 3½-inch tire to a maximum pressure of 70 pounds for a 5-inch size.

The recommended air pressure means that the pressure should be kept consistently at the suggested figure and not permitted to fluctuate.

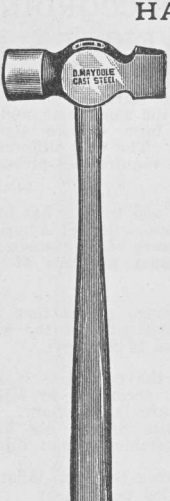
With the development of the cord tire it has been proven in actual tests, according to Miller tire men, that less air pressure is necessary. At the same time riding qualities of the car have been made much more comfortable without injury to the tire.

The accompanying table shows the ideal inflation to the amount of weight carried per wheel:

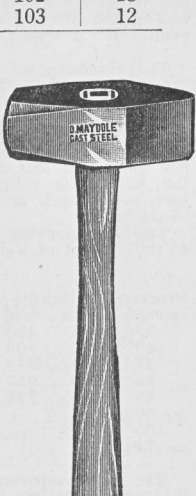
	Min. Inflation				
Pressure (pounds)	3½-inch fabric	3½-inch cord	4-inch	4½-inch	5-inch
35	375	425			
40	450	500	700		
45	525	575	800	950	1,200
50	600	650	900	1,050	1,325
55	675	725	1,000	1,150	1,450
60			1,100	1,250	1,575
65				1,350	1,700
70					1,825

The most important thing to bear in mind is that underinflation is far different from proper inflation. Proper inflation figures on a 3½-inch tire, for example, may vary as much as 20 pounds, according to the weight carried. In other words, for a 3½-inch fabric tire, carrying a load of 375 pounds, 35 pounds of air is sufficient. For a 3½-inch fabric tire, carrying 675 pounds, 55 pounds of air should be used. That is a variance of 20 pounds of pressure in the same size tire, the difference resulting from increased load.

MACHINISTS' CHIPPING HAMMERS



Polished Sides, Face and Pein	Weights
Nos.	Ounces
100	28
101	22
102	18
103	12



COOPERS' HAMMERS

Full Polished	Weights
Nos	Ounces
130	64
131	56
132	48
133	42

The weights given do not include weight of handle.

TAP DRILLS

FOR TAPS ¼ TO 2 INCHES

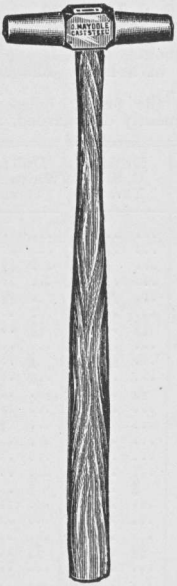
We append the following table, showing the different sizes of drills that should be used when a full thread is to be tapped in a hole. The sizes given are practically correct.

This table also indicates the proper holes for nuts, a matter which is frequently disregarded.

Diam. of Tap	No. Threads to inch			Drill for V Thread			Drill for U. S. S. Thread			Drill for Whitworth Thread		
¼	16	18	20	5/32	5/32	11/64	...	..	3/16	...	..	3/16
9/32	16	18	20	9/64	13/64	13/64	...	..	..	...	..	..
5/16	16	18	..	7/32	15/64	..	...	1/4	..	...	15/64	..
11/32	16	18	..	11/64	17/64	..	...	..	..	...	..	..
3/8	14	16	18	1/4	9/32	9/32	...	9/32	..	...	9/32	..
13/32	14	16	18	19/64	21/64	21/64	...	..	..	...	..	..
7/16	14	16	..	23/64	11/32	..	11/32	..	..	11/32	..	..
15/32	14	16	..	27/64	25/64	..	...	..	..	...	..	..
½	12	13	14	29/64	13/32	25/64	13/32	..	..	3/8	..	..
17/32	12	13	14	31/64	27/64	27/64	...	..	..	...	..	..
9/16	12	14	..	17/32	29/64	..	7/16	..	..	...	..	..
19/32	12	14	..	9/16	31/64	..	...	..	..	...	..	..
5/8	10	11	12	37/64	17/32	..	...	1/2	..	...	1/2	..
21/32	10	11	12	39/64	35/64	35/64	...	..	..	...	..	..
11/16	10	12	..	41/64	37/64	..	...	..	..	...	..	..
23/32	11	12	..	43/64	19/32	..	...	..	..	...	..	..
¾	10	11	12	21/32	39/64	39/64	9/16	..	..	9/16	..	..
25/32	10	11	12	45/64	41/64	..	...	..	..	...	..	..
13/16	10	..	..	47/64	43/64	..	...	..	..	...	..	..
27/32	10	..	..	49/64	45/64	..	...	..	..	...	..	..
7/8	9	10	..	25/32	23/32	..	5/8	..	..	5/8	..	..
29/32	9	10	..	47/64	47/64	..	...	..	..	...	..	..
15/16	9	..	..	49/64	3/4	..	...	..	..	...	..	..
31/32	9	..	..	51/64	..	..	...	..	..	...	..	..
1	8	..	..	13/16	..	..	27/32	..	..	27/32	..	..
1 1/32	8	..	..	53/64	..	..	...	..	..	...	..	..
1 1/16	7	8	..	27/32	13/16	..	15/16	..	..	15/16	..	..
1 3/32	7	8	..	55/64	53/64	..	...	..	..	1	..	..
1 1/8	7	..	..	1 1/32	..	..	1 1/16	..	..	1 1/16	..	..
1 5/32	7	..	..	1 1/16	..	..	...	..	..	...	..	..
1 3/16	6	..	..	1 3/32	..	..	1 5/32	..	..	1 5/32	..	..
1 7/32	6	..	..	1 7/64	..	..	1 9/32	..	..	1 9/32	..	..
1 ¼	6	..	..	1 9/32	..	..	...	..	..	...	..	..
1 9/32	6	..	..	1 11/64	..	..	1 13/32	..	..	1 13/32	..	..
1 5/16	5	5½	..	1 5/16	1 5/16	..	...	1 3/8	..	1 23/64	..	..
1 11/32	5	5½	..	1 19/64	1 11/32	..	...	..	..	...	..	..
1 3/8	5	..	..	1 13/32	...	..	1 7/16	..	..	1 1/2	..	..
1 13/32	5	..	..	1 7/16	...	..	...	..	..	...	..	..
1 7/16	4½	5	..	1 17/32	1 17/32	..	...	1 1/2	..	1 37/64	..	..
1 15/32	4½	5	..	1 19/32	1 9/16	..	...	..	..	...	..	..
1 ½	4½	..	..	1 21/32	...	..	1 17/32	..	..	1 45/64	..	..

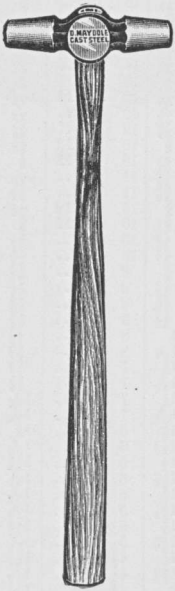
—From Wiley & Russell Mfg. Co. Price List.

Boiler Riveting Hammers



SQUARE

Polished Nos.	Weights Ounces
141	48
142	42
143	38
144	32



OCTAGON

Polished Nos.	Weights Ounces
441	48
442	42
443	38
444	32

The weights given do not include weight of handle.

THE SPEED OF DRILLS

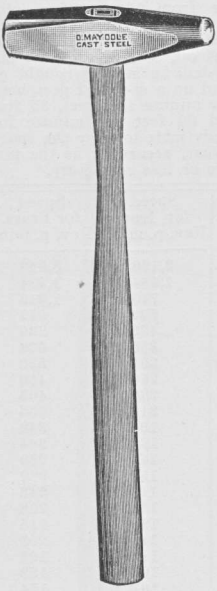
A feed of one inch in from 95 to 125 revolutions is all that should be required according to the size of the drill. At these speeds it will be necessary to use plenty of oil, or a solution of oil, potash and water, when drilling steel, wrought or malleable iron. It is based on a speed of periphery of the drill of 30 feet per minute for steel, 35 feet per minute for iron, and 60 feet per minute for brass. It will be found advisable to vary the speed given in the table somewhat, according as the material to be drilled is more or less refractory.

Diameter of Drill	Speed for Soft Steel. Rev. p. min.	Speed for Iron. Rev. p. min.	Speed for Brass. Rev. p. min.
1/16 in.	1,824	2,128	3,648
1/8 "	912	1,064	1,824
3/16 "	608	710	1,216
1/4 "	456	532	912
5/16 "	365	425	730
3/8 "	304	355	608
7/16 "	260	304	520
1/2 "	228	266	456
9/16 "	203	236	405
5/8 "	182	213	365
11/16 "	166	194	332
3/4 "	152	177	304
13/16 "	140	164	280
7/8 "	130	152	260
15/16 "	122	142	243
1 "	114	133	228
1 1/16 "	108	125	215
1 1/8 "	102	118	203
1 3/16 "	96	112	192
1 1/4 "	91	106	182
1 5/16 "	87	101	174
1 3/8 "	83	97	165
1 7/16 "	80	93	159
1 1/2 "	76	89	152
1 9/16 "	73	85	145
1 5/8 "	70	82	140
1 11/16 "	68	79	135
1 3/4 "	65	76	130
1 13/16 "	63	73	125
1 7/8 "	60	71	122
1 15/16 "	59	69	118
2 "	57	67	114

It is sometimes desirable to drill, or otherwise work, some part of a hardened piece of steel after the hardening. Ability to do this can be assured by clamping on to the heated piece a block of cold metal, before hardening, at the point designed to remain soft.

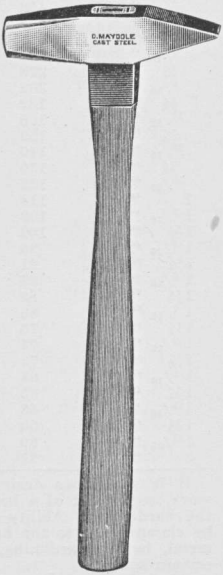
By this means the quenching will be so retarded as to prevent hardening.—From *"Sparks from the Anvil."*

RIVETING HAMMERS, Double Face



Plain Eye

Oil Finish Nos.	Full Polished Nos.	Weights Ounces
940	240	26
941	241	19
942	242	12
943	243	8
944	244	5
945	245	3
946	246	2
947	247	1



Riveting Hammers

Adz Eye

Polished Nos.	Weights Ounces
360	24
361	18
362	14
363	10
364	6

The weights given do not include weight of handle.

TENSILE STRENGTH

Weight of force necessary to tear asunder 1 square inch, in pounds, bar iron, 60,000; cast iron, 15,000; wrought copper, 34,000; steel, 120,000; copper wire, 61,000; iron wire, 103,000.

NOTE.—The practical value is about ¼ of the above.

ALLOYS

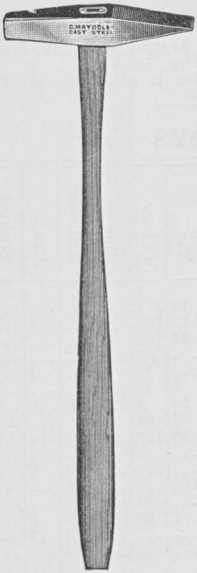
ALLOYS.	Tin	Copper	Zinc	Antimony	Lead	Bismuth
Brass, engine bearing....	13	112	¼	...	...	...
Tough brass, engine work.	15	100	15	...	...	...
Tough, for heavy bearings.	25	160	5	...	...	...
Yellow brass, for turning.	...	2	1	...	...	...
Flanges to stand brazing..	...	32	1	...	1	...
Bell-metal	5	16	...	...	...	...
Babbitt's metal	10	1	...	1	...	...
Brass, locomotive bearings	7	64	1	...	...	...
Brass, for straps and glands	16	130	1	...	...	...
Muntz's sheathing	...	6	4	...	...	...
Metal to expand in cooling	...	...	...	2	9	1
Pewter	100	...	...	17	...	...
Spelter	...	1	1	...	...	...
Statuary bronze	2	90	5	...	2	...
Type-metal, from	...	...	...	1	3	...
Type-metal, to	...	...	...	1	7	...
SOLDERS						
For lead	1	...	...	...	1½	...
For tin	1	...	...	...	2	...
For pewter	2	...	...	...	1	...
For brazing (hardest)....	...	3	1	...	...	...
For brazing (hard).....	...	1	1	...	...	...
For brazing (soft).....	1	4	3	...	...	...
For brazing (soft) or....	2	...	...	1	...	...

FLUXES FOR SOLDERING OR WELDING

Iron .....Borax
Tinned Iron .....Resin
Copper and Brass.....Sal Ammoniac
Zinc .....Chloride of Zinc
Lead .....Tallow of Resin
Lead and Tin Pipes.....Resin and Sweet Oil

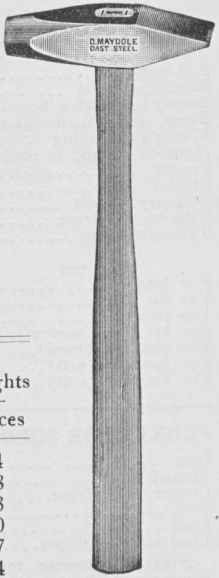
STEEL. Pulverize together 1 part of sal ammoniac and 10 parts of borax and fuse until clear. **When solidified, pulverize to powder.**

RIVETING HAMMERS



PLAIN EYE

Full Polished Nos.	Weights Ounces
265	6
266	4
267	3
268	2
269	1



PLAIN EYE

Oil Finish Nos.	Full Polished Nos.	Weights Ounces
740	40	24
741	41	18
742	42	13
742½	42½	10
743	43	7
744	44	4

The weights given do not include weight of handle.

MELTING POINTS OF METALS, IN FAHRENHEIT

	Degrees
Alloy, 3 Lead, 2 Tin, 5 Bismuth	200
Alloy, 1 Tin, 1 Lead	370-460
Aluminum	1,160
Aluminum Bronze	1,700
Antimony	950
Bismuth	510
Brass	1,870
Bronze	1,690
Copper	2,000
Gold	2,020
Iron, Cast { white	2,075
Iron, Cast { gray	2,264
Iron, Wrought	3,000-3,500
Lead	610
Magnesium	1,200
Mercury	—39
Platinum	3,500
Steel	2,370-2,550
Silver	1,860
Tin	445
Zinc	700

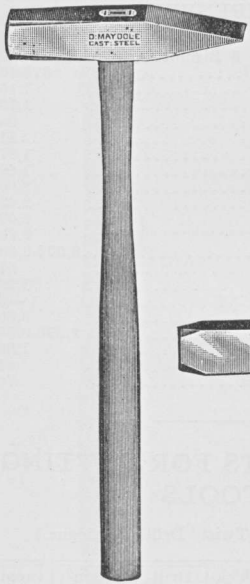
LUBRICANTS FOR CUTTING TOOLS

(From Morse Twist Drill Catalogue.)

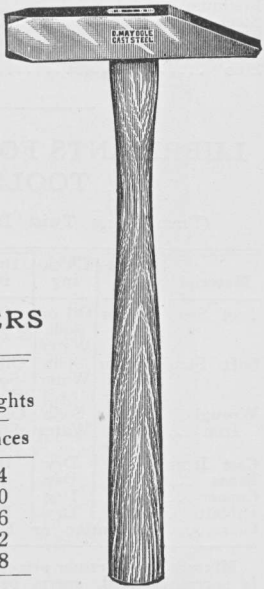
Material	Turning	Ch'cking	Drilling	Reaming	Tappi'g Milling
Tool Steel	Dry or Oil	Oil or Soda Water	Oil	Lard Oil	Oil
Soft Steel	Dry or Soda Water	Soda Water	Oil or Soda Water	Lard Oil	Oil
Wrought Iron ..	Dry or Soda Water	Soda Water	Oil or Soda Water	Lard Oil	Oil
Cast Iron.	Dry	Dry	Dry	Dry	Dry
Brass ...	Dry	Dry	Dry	Dry	Dry
Copper ..	Dry	Dry	Dry	Mixture	Dry
Babbitt ..	Dry	Dry	Dry	Dry	Dry
Glass.....	Turpentine or Kerosene				

Mixture is 1-3 crude petroleum, 2-3 lard oil. Oil is sperm or lard, sperm preferable. When two lubricants are mentioned the first is preferable.

Tinners' Riveting Hammers



Full Polished Nos.	Weights Ounces
291	24
292	20
293	16
294	12
295	8



ROOFING HAMMERS

Full Polished Nos.	Weights Ounces
531	24
532	20
533	16
534	12
535	8

The weights given do not include weight of handle.

THICKNESS AND WEIGHT OF SHEET IRON AND STEEL

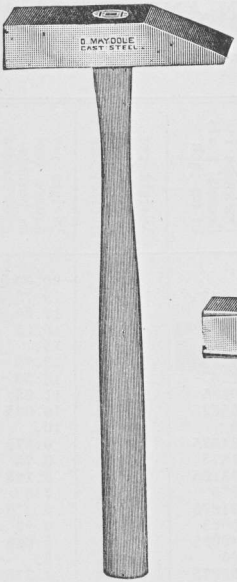
Adopted by U. S. Government, July 1, 1893.

Number of Gauge	Approximate thickness in fractions of an inch	Approximate thickness in decimal parts of an inch	Weight per square foot in ounces avoirdupois	Weight per square foot in pounds avoirdupois
0000000	1-2	.5	320	20.00
000000	15-32	.46875	300	18.75
00000	7-16	.4375	280	17.50
0000	13-32	.40625	260	16.25
000	3-8	.375	240	15.
00	11-32	.34375	220	13.75
0	5-16	.3125	200	12.50
1	9-32	.28125	180	11.25
2	17-64	.265625	170	10.625
3	1-4	.25	160	10.
4	15-64	.234375	150	9.375
5	7-32	.21875	140	8.75
6	13-64	.203125	130	8.125
7	3-16	.1875	120	7.5
8	11-64	.171875	110	6.875
9	5-32	.15625	100	6.25
10	9-64	.140625	90	5.625
11	1-8	.125	80	5.
12	7-64	.109375	70	4.375
13	3-32	.09375	60	3.75
14	5-64	.078125	50	3.125
15	9-128	.0703125	45	2.8125
16	1-16	.0625	40	2.5
17	9-160	.05625	36	2.25
18	1-20	.05	32	2.
19	7-160	.04375	28	1.75
20	3-80	.0375	24	1.50
21	11-320	.034375	22	1.375
22	1-32	.03125	20	1.25

STUDY THE MAN

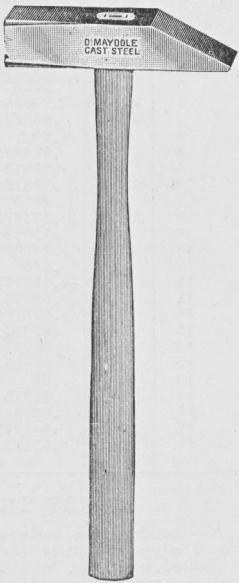
Any smith whose business it is to dress tools I would advise to study the man who uses them. A skilled mechanic, who knows how to grind a tool and use it properly, will use a much finer and higher tempered tool than a poorer mechanic or an apprentice could make a success of.—*Sparks.*

Tinners' Setting Hammers



SQUARE

Full Polished Nos.	Weights Ounces
301	24
302	20
303	16
304	12
305	8



BEVELED

Full Polished Nos.	Weights Ounces
331	24
332	20
333	16
334	12
335	8

The weights given do not include weight of handle.

FOR TINNERS

TIN PLATE	Thickness Stubs' Gauge	Number of Sheets in Box	Net Weight of Box, 14x20 Sheets
Taggers	38 (34)	225 (150)	112 lbs.
IC	30	112	107 lbs.
IX	28	112	135 lbs.
IXX	27	112	156 lbs.
IXXX	26	112	176 lbs.
IXXXX	25	112	196 lbs.

Sheet Zinc—M. & H. Gauge.

No. 1 = 0.002 in.	No. 11 = 0.024 in.	No. 21 = 0.080 in.
" 2 = 0.004 "	" 12 = 0.028 "	" 22 = 0.090 "
" 3 = 0.006 "	" 13 = 0.032 "	" 23 = 0.100 "
" 4 = 0 008 "	" 14 = 0.036 "	" 24 = 0.125 "
" 5 = 0.010 "	" 15 = 0.040 "	" 25 = 0.250 "
" 6 = 0.012 "	" 16 = 0.045 "	" 26 = 0.375 "
" 7 = 0 014 "	" 17 = 0.050 "	" 27 = 0.500 "
" 8 = 0.016 "	" 18 = 0.055 "	" 28 = 1.000 "
" 9 = 0 018 "	" 19 = 0.060 "	
" 10 = 0.020 "	" 20 = 0.070 "	

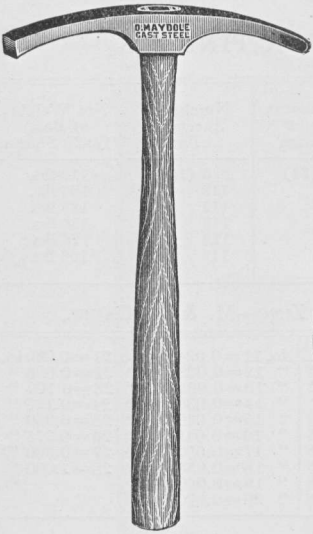
American Russia Iron.

No. 7 = .015 in.	No. 12 = .021 in.
" 8 = .016 "	" 13 = .024 "
" 9 = .017 "	" 14 = .025 "
" 10 = .018 "	" 15 = .027 "
" 11 = .020 "	" 16 = .030 "

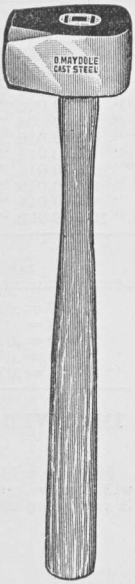
IMPROVED SOLDERING OR TINNING ACID

Muriatic acid 1 pound; put into it all the zinc it will dissolve, and 1 ounce of sal ammoniac, then it is ready for use.

Copperworkers' Hammers



Polished No.	Weight Ounces
494	10



PROSPECTING HAMMERS

Oil Finish Nos.	Full Polished Nos.	Weights Ounces
681	281	32
682	282	28
683	283	22
684	284	16

The weights given do not include weight of handle.

SPECIFIC GRAVITY

The specific gravity of a body is the ratio between its weight and the weight of a like volume of distilled water at a temperature of 39.2 degrees F. To find the weight of a cubic foot of any liquid or solid, multiply its specific gravity by 62.425 pounds avoirdupois, the weight of a cubic foot of water.

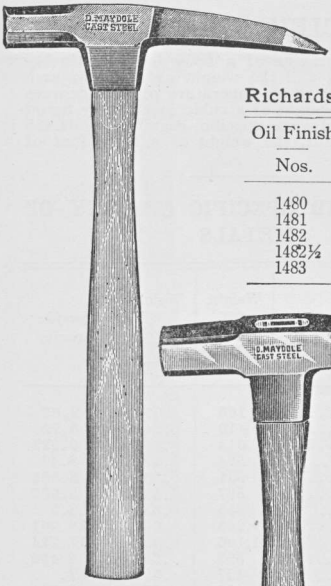
WEIGHT AND SPECIFIC GRAVITY OF METALS

	Weight per Cubic Foot Pounds	Weight per Cubic Inch Pounds	Specific Gravity
Aluminum	166	.096	2.67
Antimony	419	.242	6.72
Bismuth	613	.353	9.822
Brass, Cast	524	.3	8.4
Bronze	534	.308	8.561
Copper, Cast	537	.31	8.607
Copper Wire	555	.32	8.9
Gold, 24 Karat	1,208	.697	19.361
Gold, Standard	1,106	.638	17.724
Gun Metal	528	.304	8.459
Zinc	437	.252	7.
Iron, Cast	450	.26	7.21
Iron, Wrought	485	.28	7.78
Lead, Cast	708	.408	11.36
Lead, Rolled	711	.41	11.41
Mercury	849	.489	13.596
Platinum	1,344	.775	21.531
Platinum Sheet	1,436	.828	23.
Silver, Pure	654	.377	10.474
Silver, Standard	644	.371	10.312
Steel	490	.284	7.85
Tin, Cast	455	.262	7.291

A Universal Tool

The best all-round tool for any mechanic is "gumption."

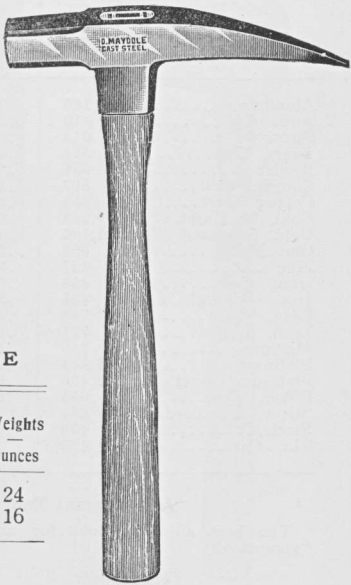
PROSPECTING PICKS



ADZ EYE

Richardson Pattern

Oil Finish — Nos.	Weights — Ounces
1480	32
1481	28
1482	24
1482½	20
1483	16



ADZ EYE

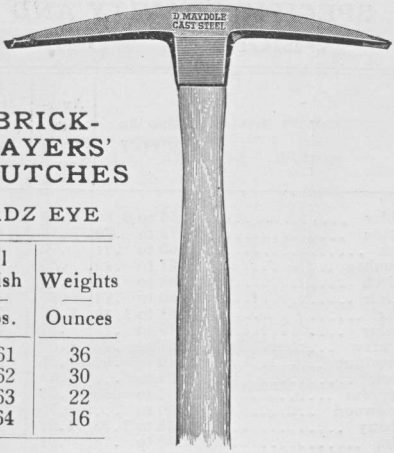
Oil Finish — Nos.	Polished — Nos.	Weights — Ounces
882	382	24
883	383	16

The weights given do not include weight of handle.

SPECIFIC GRAVITY AND WEIGHT OF WOOD

	Specific Gravity	Average Specific Gravity	Weight per Cubic Foot Pounds
Alder	0.56 to 0.80	0.68	42
Apple	.73 to .79	.76	47
Ash	.60 to .84	.72	45
Bamboo	.31 to .40	.35	22
Beech	.62 to .85	.73	46
Birch	.56 to .74	.65	41
Box	.91 to 1.33	1.12	70
Cedar	.49 to .75	.62	39
Cherry	.61 to .72	.66	41
Chestnut	.46 to .66	.56	35
Cork	.24 to ...	.24	15
Cypress	.41 to .66	.53	33
Dogwood	.76 to ...	.76	47
Ebony	1.13 to 1.33	1.23	76
Elm	.55 to .78	.61	38
Fir	.48 to .70	.59	37
Gum	.84 to 1.00	.92	57
Hackmatack	.59 to ...	.59	37
Hemlock	.36 to .41	.38	24
Hickory	.69 to .94	.77	48
Holly	.76 to ...	.76	47
Hornbeam	.76 to ...	.76	47
Juniper	.56 to ...	.56	35
Larch	.56 to ...	.56	35
Lignum Vitæ	.65 to 1.33	1.00	62
Linden	.604 to ...	....	37
Locust	.728 to ...	....	46
Mahogany	.56 to 1.06	.81	51
Maple	.57 to .79	.68	42
Mulberry	.56 to .90	.73	46
Oak, Live	.96 to 1.26	1.11	69
Oak, White	.69 to .86	.77	48
Oak, Red	.73 to .75	.74	46
Pine, White	.35 to .55	.45	28
Pine, Yellow	.46 to .76	.61	38
Poplar	.38 to .58	.48	30
Spruce	.40 to .50	.45	28
Sycamore	.59 to .62	.60	37
Teak	.66 to .98	.82	51
Walnut	.50 to .67	.58	36
Willow	.49 to .59	.54	34

Cast iron is approximately 17½ times heavier than ordinary kiln-dried wood used in common patterns.



BRICK-LAYERS' SKUTCHES

ADZ EYE

Oil Finish Nos.	Weights Ounces
2561	36
2562	30
2563	22
2564	16

BRICK-LAYERS' HAMMERS

ADZ EYE

Oil Finish Nos.	Polished Nos.	Weights Ounces
561	161	36
562	162	30
563	163	22
564	164	16

The weights given do not include weight of handle.

WROUGHT IRON PIPE—TABLE OF STANDARD DIMENSIONS

Diameter of Tube.				Thickness of Metal. Inches.	Screwed Ends		Dia. at end of Pipe		Drill for Tapping. Inches.	Length of Pipe per Square Foot of		L'gth of Pipe containing 1 Cu. Foot. Feet.	Nominal Weight per Foot. Pounds.
Nominal Inside. Inches.	Actual Inside. Inches.	Approx. Outside. Inches.	Actual Outside. Inches.		No. of Threads per Inch	L'gth of Taper & of p'rf ct Screw. Inches.	Outside. Inches.	At Bottom of Thread. Inches.		Extern'l Surface. Feet.	Internal Surface. Feet.		
⅛	0.270	$\frac{13}{32}$	0.405	0.068	27	0.19	0.393	0.342	$\frac{21}{64}$	9.44	14.15	2513.	.241
¼	.364	$\frac{17}{32}$	.540	.088	18	.29	.522	.445	$\frac{29}{64}$	7.075	10.49	1383.3	.42
⅜	.494	$\frac{11}{16}$	.675	.091	18	.30	.656	.579	$\frac{19}{32}$	5.657	7.73	751.2	.559
½	.623	$\frac{27}{32}$	.840	.109	14	.39	.816	.717	$\frac{23}{32}$	4.547	6.13	472.4	.837
¾	.824	$1\frac{1}{16}$	1.050	.113	14	.40	1.025	.926	$\frac{15}{16}$	3.637	4.635	270.	1.115
1	1.048	$1\frac{5}{16}$	1.315	.134	11½	.51	1.283	1.162	$1\frac{3}{16}$	2.904	3.645	166.9	1.668
1¼	1.380	$1\frac{21}{32}$	1.660	.140	11½	.54	1.626	1.505	$1\frac{15}{32}$	2.301	2.768	96.25	2.244
1½	1.610	$1\frac{29}{32}$	1.900	.145	11½	.55	1.866	1.745	$1\frac{23}{32}$	2.01	2.371	70.66	2.678
2	2.067	$2\frac{3}{8}$	2.375	.154	11½	.58	2.339	2.218	$2\frac{3}{16}$	1.608	1.848	42.91	3.609
2½	2.468	$2\frac{7}{8}$	2.875	.204	8	.89	2.819	2.646	$2\frac{5}{8}$	1.328	1.547	30.1	5.739
3	3.067	$3\frac{1}{2}$	3.500	.216	8	.95	3.441	3.268	$3\frac{1}{4}$	1.091	1.245	19.5	7.536
3½	3.548	4	4.000	.226	8	1.00	3.938	3.765	$3\frac{3}{4}$	.955	1.077	14.57	9.001
4	4.026	4½	4.500	.237	8	1.05	4.434	4.261	$4\frac{1}{4}$	.849	.949	11.31	10.665
4½	4.508	5	5.000	.246	8	1.10	4.931	4.758	$4\frac{3}{4}$	.764	.848	9.02	12.34
5	5.045	$5\frac{9}{16}$	5.563	.259	8	1.16	5.491	5.318	$5\frac{5}{16}$	.687	.757	7.2	14.502
6	6.065	$6\frac{5}{8}$	6.625	.280	8	1.26	6.546	6.373	$6\frac{5}{16}$	.577	.63	4.98	18.762
7	7.023	$7\frac{5}{8}$	7.625	.301	8	1.36	7.540	7.367	$7\frac{3}{8}$	.501	.544	3.72	23.271
8	7.982	$8\frac{5}{8}$	8.625	.322	8	1.46	8.534	8.361	$8\frac{3}{8}$	.443	.478	2.88	28.177

The taper of the tap is ¾ of an inch to the foot, that is ⅜ inch each way from a central line.

The Locomotive, by Hartford Steam Boiler Insp. & Ins. Co.
Book of Tools, by Chas. A. Strelinger Co., Detroit, Mich.

TABLE OF EMERY WHEEL SPEEDS

Diam. Wheel	Rev. per Minute for Surface Speed of 4,000 ft.	Rev. per Minute for Surface Speed of 5,000 ft.	Rev. per Minute for Surface Speed of 6,000 ft.
1 in.	15,279	19,099	22,918
2 "	7,639	9,549	11,459
3 "	5,093	6,366	7,639
4 "	3,820	4,775	5,730
5 "	3,056	3,820	4,584
6 "	2,546	3,183	3,820
7 "	2,183	2,728	3,274
8 "	1,910	2,387	2,865
10 "	1,528	1,910	2,292
12 "	1,273	1,592	1,910
14 "	1,091	1,364	1,637
16 "	955	1,194	1,432
18 "	849	1,061	1,273
20 "	764	955	1,146
22 "	694	868	1,042
24 "	637	796	955
30 "	509	637	764
36 "	424	531	637

Above table designates number of revolutions per minute for special diameters of wheels to cause them to run at the respective periphery rates of 4,000, 5,000 and 6,000 feet per minute.

The medium of 5,000 feet is usually employed in ordinary work, but in special cases it is sometimes desirable to run them at a lower or higher rate, according to requirements.

The stress on the wheel at 4,000 feet periphery speed per minute is 48 lbs. per square inch. At 5,000 feet, 75 lbs. At 6,000 feet, 108 lbs.

POINTER

Put hard soap on lag screws, wood screws or any screw for wood. It will surprise you how much easier they will go in.

SPEED OF GRINDSTONES

Grindstones used for grinding machinists' tools are usually run so as to have a peripheral speed of about 900 feet per minute, and those used for grinding carpenters' tools about 600 feet per minute. With regard to safety, it may be stated in general that with any size of grindstone having a compact and strong grain, a peripheral velocity of 2,800 feet per minute should not be exceeded.

SPEED OF POLISHING WHEELS

Polishing wheels are run at about the following peripheral speeds:

Leather-covered wooden wheels...7,000 ft. per min.
Walrus-hide wheels .....8,000 ft. per min.
Rag wheels .....7,000 ft. per min.

WANTED.—Wanted, men and women with a genius for work. It is well that they should have talent, it is well that they should have training, it is well that they should have good character, but if they do not know how to work, and have not an abiding zeal for work, their talent, training, and character will count for little towards that subduing of the earth which God had in view when He gave the world to man as the scene of his present activities.—*Advance.*

A SIMPLE METHOD OF SQUARING

With a mark, nail or stake as a starting point draw two lines as nearly right-angle as the eye will determine. From the starting point, measure and mark 3 feet one way and 4 feet the other. When the distance across from one mark to the other is exactly 5 feet a perfect right angle will be obtained. Any multiples of 3-4-5, such as 6-8-10, 9-12-15, may be used also.

POINTER

Put a piece of resin the size of a walnut, into your babbit; stir thoroughly, then skim. It makes poor babbit run better, and improves it. Babbit heated just hot enough to light a pine stick, will run in places with the resin in, where without it, it would not. It is also claimed that resin will prevent blowing when pouring in damp boxes.

RULES FOR CALCULATING SIZE AND SPEED OF PULLEYS

To Find Diameter of Driver.

Multiply number of revolutions of driven by its diameter and divide product by number of revolutions of driver.

To Find Diameter of Driven.

Multiply number of revolutions of driver by its diameter and divide product by number of revolutions of driven.

To Find Revolutions of Driven Shaft.

Multiply diameter of pulley on drive-shaft by its number of revolutions and divide product by diameter of pulley on driven shaft.

Reverse above rule to ascertain number of revolutions of drive-shaft.

RULE FOR CALCULATING LENGTH OF BELTING

Before Pulleys Are Placed in Position.

Add together the diameters of the two pulleys and multiply the sum by 3.14159. To half of the result thus obtained add twice the distance from center of one pulley (or shaft) to center of the other pulley (or shaft).

Example: Given the distance between centers of pulleys, 28 feet 8 inches; diameter of pulleys, 52 and 46 inches. What is length of belt?

$52 + 46 = 98 \times 3.14159 = 307.87$ inches.

$307.87 \div 2 = 153.93$ inches $\div 12 = 12.83$ feet.

Centers $28\frac{8}{12}$ feet $\times 2 =$ 57.33 "

Answer, 70⅙ feet.

RULE FOR FINDING THE LENGTH OF ROLLS OF BELTING

Take the over-all diameter and add to it the diameter of the hole in the center of the roll; then divide the sum by 2 to find the mean diameter; this multiplied by 3.1416 (3 1-7) will give the circumference. Then, multiply this by the number of "laps," and the result is obtained in inches, and dividing by 12 the length of the roll is obtained in feet.

TO CALCULATE THE DRIVING POWER OF BELTS

Divide the speed in feet per minute by 1,100; the quotient will be the horse power per inch of the belt's width that is allowed in good practice to be transmitted by single thickness leather belting having laced joints. Although this is the best practice, the amount is often exceeded by as much as 25 per cent. with satisfactory results, though the life of the belt is shortened.

Double thickness belts will transmit twice and triple thickness belts three times as much power as single thickness belts.

Spliced belts will transmit a third more power than those that are laced.

The adhesion of belts to pulleys and the consequent driving power vary so much under different conditions of use that some intelligent deviation is occasionally necessary from any simple rule. From the horse power given by the above rule, therefore, some deduction should be made when the belt is vertical or inclined instead of horizontal; when the arc of contact on the pulley is much less than 180 degrees or a "half wrap"; when the speed of the belt is less than 900 feet per minute, and also when one or both of the pulleys are small in diameter.

Five per cent. should be deducted for every 10 degrees less than a "half wrap."

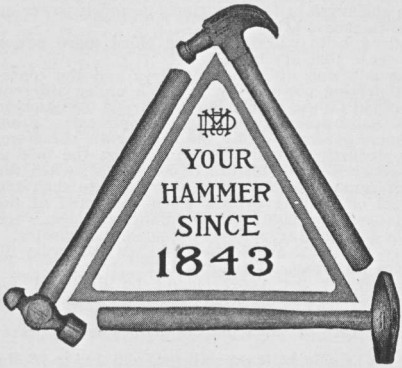
Twenty-five per cent. should be deducted for vertical belts when used without a tightening pulley.

In the case of small pulleys deduct as follows:

Deduct from 0 to 60% for	single belts on pulleys from	12″	to	2″	dia.
	double	"	"	"	24	"	6	"
	triple	"	"	"	36	"	15	"

When circumstances permit, the best speed for belts is about 5,000 feet per minute. The adhesion is then so good as to require less stretching of the belt, with less consequent loss of power by friction.

The smoother the surface of the pulleys and of the belt surface in contact with them the better the adhesion and the more driving power. It is therefore sometimes found of benefit in the case of low belt speeds or of pulleys of small diameter to cover the pulleys with leather or to make them of wood, polished, and to run the hair side of the belts in contact with the pulley faces.


YOUR
HAMMER
SINCE
1843

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