1697

JUNE '07. THESIS.

LATH HAMMER.

Designed and Modeled By

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A trite proverb, and one quite frequently quoted in modern mechanical literature, is, "By the hammer and hand all the arts do stand." These few words sum up a great deal of information concerning elementary mechanics.

If we examine some of the more elaborate arts of modern times, or give our attention to pursuits in which complicated mechanism is employed, we may at first be impressed that however correct this expression may have been at one time, it is not applicable at the present day. But if we pursue our investigation far enough, and trace the progress of the industry, whatever its nature, back to its origin, we find sooner or later that both hammer and hand have everything to do with its establishment and maintenance.

Take, as an example, textile fabrics. They are products of looms. In the construction of the looms, the hammer was used to a great extent; but back of them were other machines of varying degrees of excellence, in which the hammer played a still more important part, until finally we reach a point where the hand and hammer laid the very foundation of the industry. Even at the present time it would be necessary to go back to this same point if, by some unaccountable means, our present equipment of modern machinery should be blotted out of existence. This is the rule with no exceptions.

The first type of hammer is found in the clinched fist. A tool or weapon, as determined by circumstances and conditions, that man early learned to use with much effectiveness.

The fist, considered as a hammer, is one of the three tools of external use with which man is provided by nature. The other two being a compound vice and a scraping or scratching, both of which are also in the hand.

From useing the hand as a hammer our early inventor must have conceived the idea of making an artificial hammer. The fist was very effective upon substances softer than itself, but when used upon substances harder than itself the reaction of the blow was transferred back to the flesh of the operator of nature's hammer, much to his discomfort.

The first step along the line of improvement was that of a rounded stone, which could be easily held in the hand, the arm acting as the handle. This was a great improvement. In the course of time, some one conceived the idea that the momentum of the blow could be greatly increased if a wooden handle could be attached to the stone, and this was the next step in the improvement of the hammer. The handle was bound to the stone by wrapping. This means of fastening the handle to the hammer is seen to this day in half civilized countries. Evidences of a still further improvement are found in almost this same period, for in the geological records of the stone age are met double headed mauls with holes through their centers for the insertion of the handle. In some instances the holes are found coned and almost as well adapted for the reception of a handle as the best tools of modern times.

It is thus seen that the improvement on the hammer from the first has been rapid and important. When metal came into use it was substituted for the stone. From this meager beginning has developed the hammer of our present time. What a gulf between the hammer of the stone age and our modern "Maydol." What a range between the delicate jeweler's hammer and the ponderous steam hammer. We are very apt to look upon the hammer as a rude instrument. We over-look the scientific principles involved in its construction and use, and pay too little attention to the material of which it is fashioned, and the

forms into which it is made. We frequently look upon it as merely an adjunct to other tools, and forget that it is entitled to consideration as a sole independent, final tool of itself.

For ordinary use the present type of hammer answers the purpose fairly well, but for specific purposes it falls far short. Take lathing for example. Here the hammer is not well adapted. Owing to the small size of nails used in lathing, the work is slow and becomes intensely monotonous.

The object of the following discussion is to describe a hammer that may be used in lathing, shingling, or in any work where small nails are used, that will do away with all handling of nails.

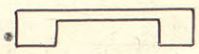
The hammer part is made of the best tool steel, much in the shape of an ordinary hatchet, except that the inner edge of the face is slightly rounded. A rather peculiar thing about it is, there is no eye to recieve the handle. It is modeled after the ancient type in this respect, the handle being strapped on around the hatchet.

The handle is made of aluminum, in the form of a "T" flange, and is fastened to the hatchet by a screw on either side.

The grip is composed of alternate layers of wood and metal, finely polished.

The magazine is placed directly beneath the handle and runs its full length. It is capable of holding one hundred and fifty 3D fine wire nails. The magazine is a cylindrical tube. It is held in place by two spring clamps which screw into the handle. At the end of the magazine there is a brass cylinder. It has the same inside diameter as the outside diameter of the magazine, and is slotted with ten slots $1\frac{1}{4}''$ deep and $\frac{3}{32}''$ wide. These slots are to permit the nails being drawn through by the magnetized cylinder that rotates around this cylinder. When different sized nails are used, a steel band passing

around the foot of the slots serves to regulate their depth. The ends of the slots are slightly tapered from the inside diameter to the outside diameter. This tapering neutralizes the unevenness of the nails. The cap of the magazine holds a coil spring which is to serve the purpose of keeping the magazine well filled with nails wharever the position the hammer may be in.

The body part of the cylinder is of brass. This metal was used because of its rich color and its un-magnetic properties. Ten grooves have been cut in the outer surface, running lengthwise, to receive steel magnets of this shape.  (side view)  (end view) As the cylinder rotates, these magnets, which have the inner-surface grooved, come opposite the slots in the magazine, and a nail is drawn through into the groove in the magnet and is in a position ready to be thrown across to the face of the hammer. To one end of the cylinder is screwed an aluminum casting which rotates on a steel pin. This pin is fastened to the shank of the hatchet. To the other end of the cylinder is attached a kind of spur gear. It answers two purposes.
Ist. The spring that shoots the nails out of the cylinder is cocked by the slanting side of the spur as the cylinder is rotated.
2nd. The perpendicular side of the spur answers the purpose of a catch by which the lever rotates the cylinder.

The most serious of the difficulties that presented themselves to the inventor are here mentioned. Also the method by which they were solved. a, Weight. b, Clumsiness. c, Arrangement of the magazine so that the cylinder will shoot regardless of the position of the hammer. d, The placement of the magazine such that the change of weight caused by its discharge does not seriously affect its operation. e, Regularity of shooting. f, Un-uniformity of nails of same number. h, Arrangement of the nails in the magazine.

a. To keep an instrument of this kind within reasonable weight limits is a difficult thing to do. Skeleton work can not be used; each part must be of solid material. Aluminum is used wherever admissible, and the different parts are made as small as possible, but large enough to perform its function. Every particle of material that is not absolutely essential for strength or beauty is ground away. Much care is taken to have the weight properly distributed along the handle, giving the whole a balanced appearance.

b. By requiring each part to perform one, two, or even three separate functions, the appearance of the finished instrument has something of neatness and simplicity.

c. I can safely say that the greatest proposition of all was the arrangement and placement of the magazine and cylinder. In the first place they must be so arranged that the nails will be fed into the cylinder regardless of the position of the hammer. This is accomplished by the use of a coil spring and a tube shaped magazine. They must also be so placed that the change in weight caused by the discharge of the magazine does not seriously affect its operation. This was brought about by placing the magazine beneath the handle going its full length.

e. The jar that the magazine receives as the nail is set aids very materially in causing it to shoot regularly. The force of the spring from behind keeps the magazine well filled with nails, while the jar, plus the magnetic attraction, settles the nails into the slots ready to be received by the cylinder when rotated.

One might think that a nail is an easy thing to work with but it is not. In the first place, nails of the same number vary slightly in length. This objectionable feature was obliterated by having the slots in the brass projection of the magazine filed at an angle of

about 30° with the face of the magazine.

It is of vital importance that both ends of the nail slip through the slot at exactly the same time. If one end should precede the other it would be drawn into the groove in the cylinder, and would lock it from further rotation. The slanting face allows for 1/16 in. variation in the length of the nail and causes both ends to slip through the slot at the same time. The projections between the slots are filed to a ridge in the middle, running the full length of the slot. These aid in placing the nails in the proper position to be received by the cylinder.

f. All that is necessary in order to have a magazine that will carry nails of different number is to have a device with which to regulate the length of the slots. This is done by a steel band which is placed around the magazine.

h. The nails are uniformly placed in the magazine; that is, they all point toward the operator. They are prevented changing end for end by the diameter of the magazine being less than the length of the nails.

In lathing, speed is practically the only thing that counts for much. A boy may be taught the art of lathing in a few minutes and do as good work as a professional lather, the only difference being in the amount of work done. In order to obtain the highest speed limit possible, the lather will grab a handful of nails from his apron and throw them into his mouth and spit them out as he has use for them. This practise is very dangerous to good health. Aside from the rust particles, these nails have all kinds of bacteria and microbes clinging to them. Should the delicate membraneous lining of the mouth be broken, these cause serious disease. The trouble does not end with the mouth, however; the throat and lungs are many times subjected to

disease by this practise. Particles are dissolved by the saliva in the mouth and are carried to the stomach and sent out all over the system. The millions of microbes that reach the stomach in this same way are likewise sent out over the system and if they find it in a weakened condition the chances are that disease will follow.

By the present method of lathing, an ordinary lather will put on somewhere in the neighborhood of 375 yards per day. He gets about ¾ cents per yard. This is equivalent to $2.8I per day.

By the use of the "Ideal Hammer," any man can easily nail on I875 yards of lath per day. At the price quoted above, this is equivalent to $I4.05. Thus by the use of the "Ideal Hammer," one man can do the work of five with the ordinary hetchet. Besides, it does away with the bad practise of useing the mouth as a nail sack.

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SPECIFICATIONS.

Specifications of the material to be used in the construction of a Magazine Hammer. Designed and made by

P. H. Skinner. Arct.

The Hatchet.

The blade and foot of the hammer are to be made of the best tungsten steel. They must be well packed and properly tempered, magnetized, and nickle plated.

The blade, and every other part, must conform strictly to size and shape shown in detail drawings. A hole is to be drilled and threaded on the rear side of shank as indicated in drawings. All diameter dimensions given make no allowance for the cutting of threads. The dimensions given indicate the size of the rod to be threaded.

The Handle.

The handle is to be made of an alloy of aluminum, which shall consist of I5% zinc, 5% copper, and the remaining 80% of aluminum. The handle shall be in the shape of a "T" flange, and must conform strictly to size and shape indicated in the detail drawings.

The grip is to be built up of alternate layers of aluminum and wood, nicely polished.

The pin, marked "A" in the drawing, is to be of Bessemer steel, turned to size indicated and threaded.

The casting, marked "B", is to be of the same aluminum alloy as the handle.

The disk, "C", is to be made of brass and the pin of Bessemer steel.

The Cylinder.

The cylinder, "D", is to be made of brass. Must conform strictly to size and shape as indicated.

The piece at "E" is to be made of steel and case hardened. It forms the face of the cylinder "D", and is to be grooved as indicated.

The magnets, shown at "F", are to be made of tungsten steel, properly magnetized, and of dimensions to fit in the notches that have been milled in the cylinder "D".

The Magazine.

The magazine is to be made of sheet copper, in form as shown at "H". One end is to be neatly fitted with a cap which contains a coil spring capable of extending 6 in. At the other end is fitted a brass cylinder "G".

The clamps used to fasten the magazine to the handle are to be of Bessemer steel.

All springs are to be made of best spring steel.

The lever is to be made of brass, also the tips for the grip.

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Wherever dimensions are given they must be taken rather than scale measure.

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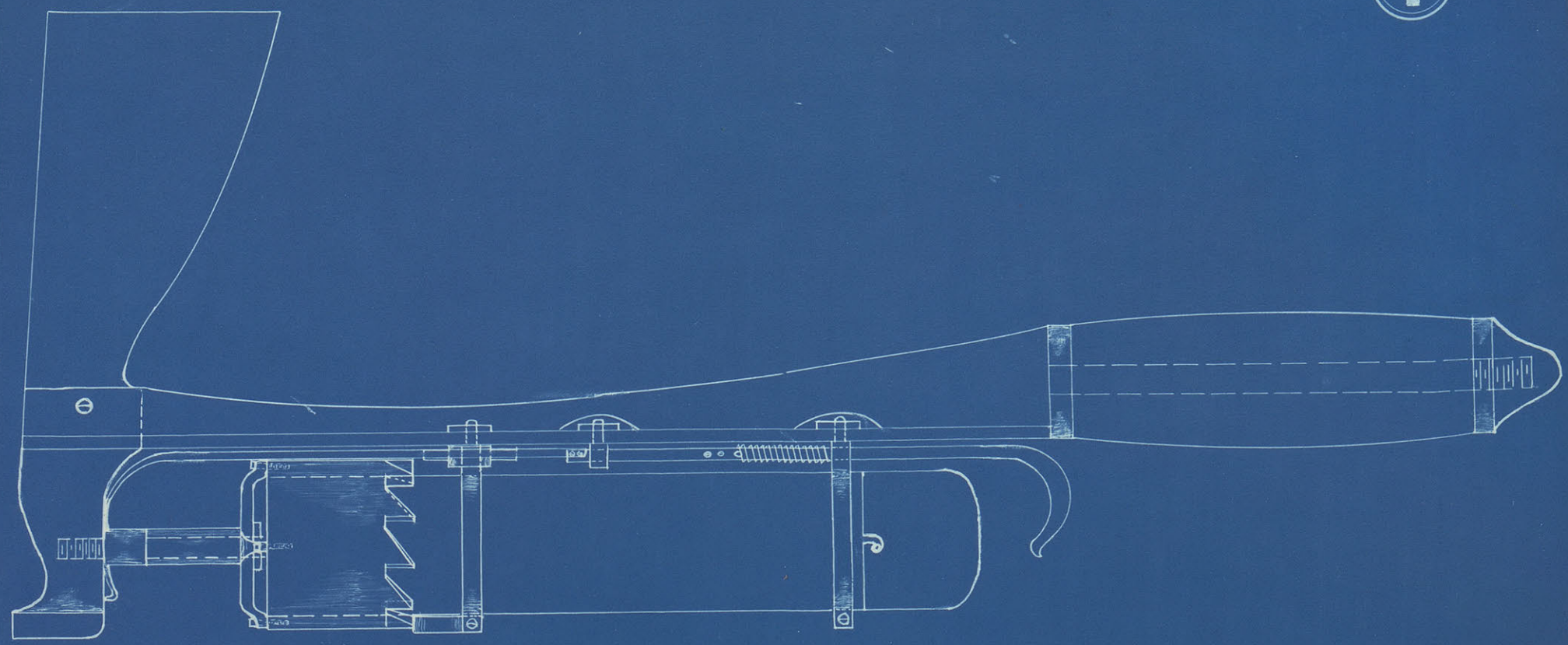
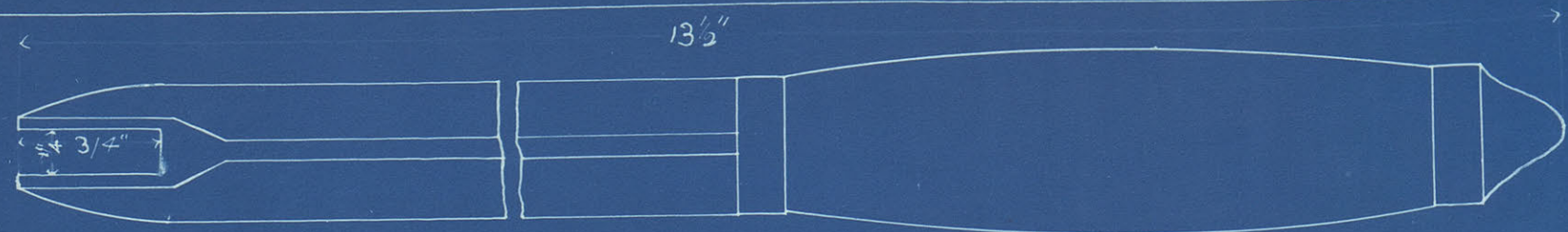


— MAGAZINE HAMMER —

SIDE ELEVATION,

SCALE 3/4 FULL SIZE.

DESIGNED · BY · P. H. SKINNER.



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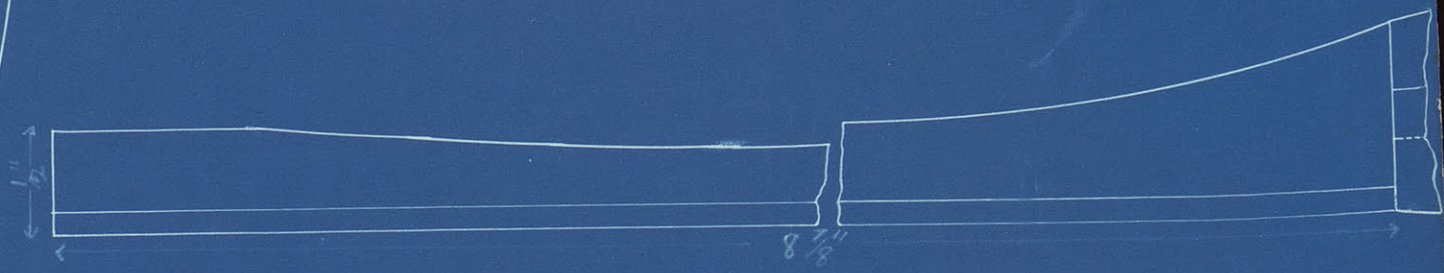
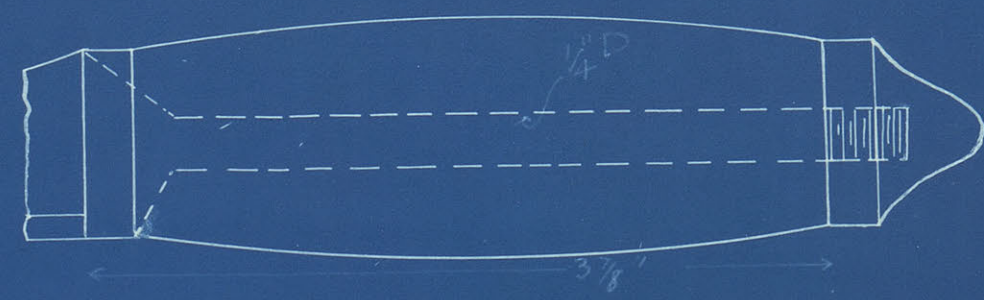
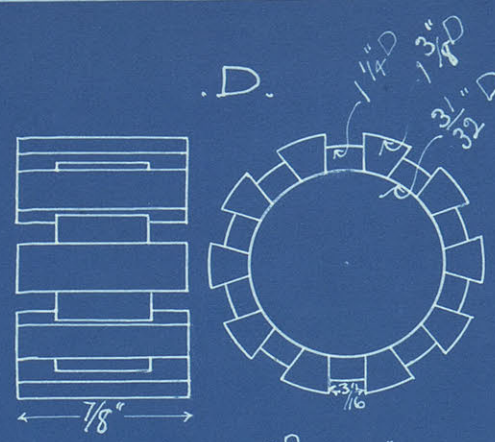
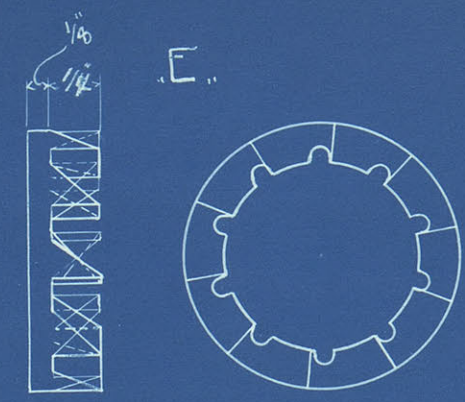
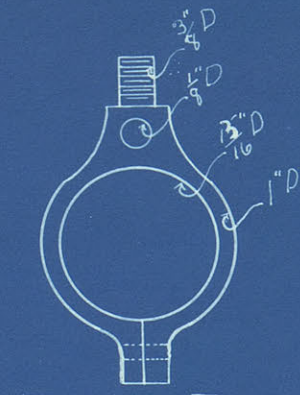




— DETAIL · OF · HAMMER —
SCALE · FULL · SIZE.
— DESIGNED BY — P. H. SKINNER. —







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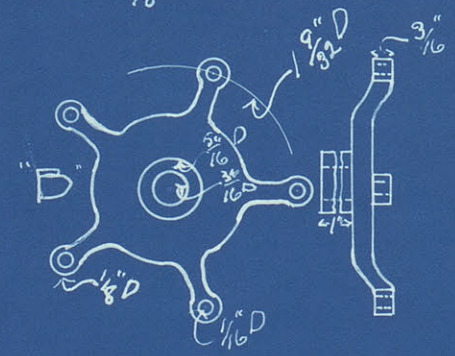

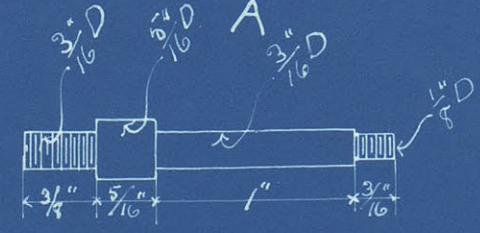

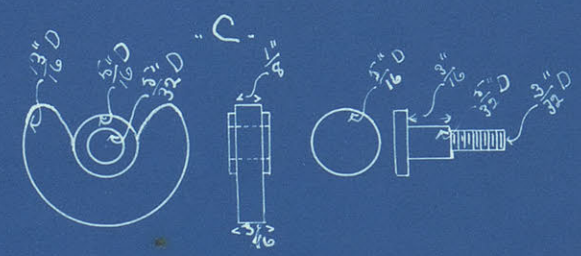

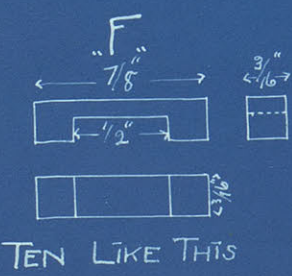

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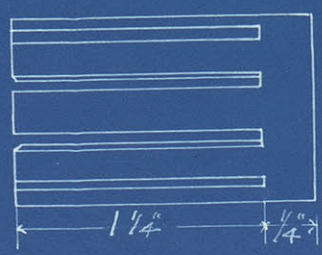

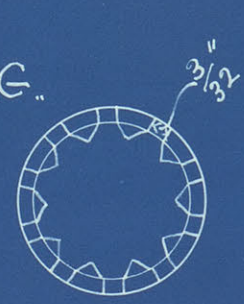

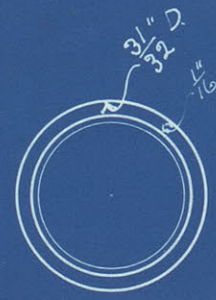

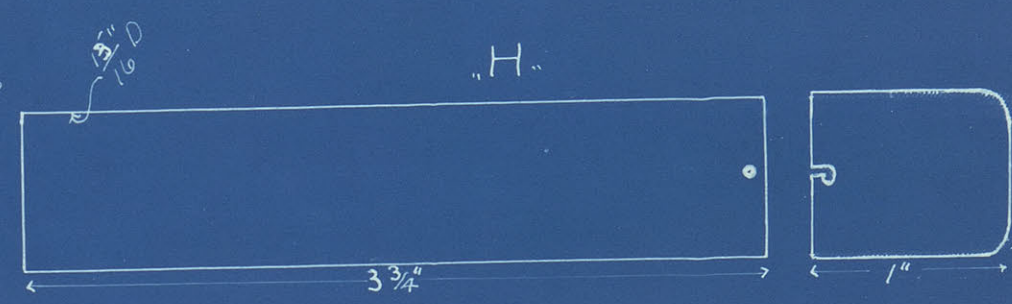

— DETAILS —
SCALE · FULL · SIZE.
DESIGNED · BY — P. H. SKINNER —