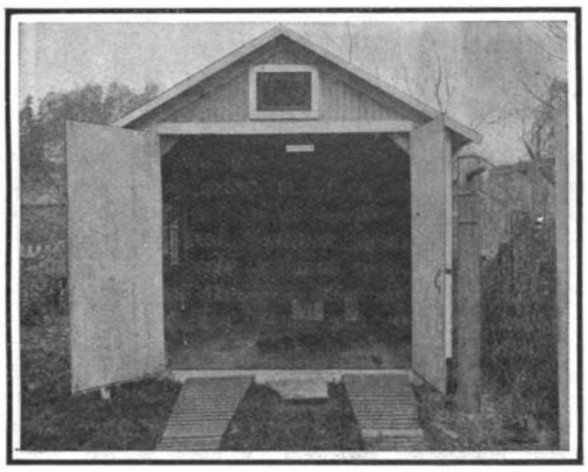
A PORTABLE AUTOMOBILE HOUSE.

BY W. M. BENNETT.

It is the purpose of this article to show how to build an automobile house which has the following advantages: It is portable, as all sections and other parts are held together with a minimum number of bolts and screws. It requires no special skill with tools. It is easily set up and taken apart. It is light and sufficiently strong, and presents a neat and finished appearance.



FRONT VIEW OF THE AUTOMOBILE HOUSE.

The complete bill of materials for the house as shown herewith costs $70. To this may be added about $10 for paint. Because of its ready portability, it may be set up by the lake shore or in the woods and used as a summer cottage. It makes but one easy wagon load for two horses. It has no masonry supports, and therefore does not revert to the owner of the land on which it is placed, but it can be moved whenever moving day comes. The open doorway gives almost seven feet clearance, which is sufficient to admit an auto with top up. It is large enough for a small touring car with room to work all around it, as well as for the storage of supplies. With a runabout it gives room for shelves and a bench for a convenient workroom at the end.

The frame is of hemlock, Fig. 1, and measures 15 feet 4 inches by 9 feet 6 inches by 7 feet 8 inches high. Above the floors the frame consists of only four corner posts, the plate frame, two pairs of rafters, two tie-pieces—not shown—across from plate to plate at the foot of the rafters, all of 2-inch by 3-inch hemlock dressed, and four roof boards, ⅞ inch by 4 inches. The gable sections serve also as rafters. The sills are held together at the corners by angle irons 6 inches by 6 inches, 3/16 inch thick and 1 inch wide, fastened with carriage bolts ⅜ inch by 2½ inches, Fig. 3. These should fit snugly in the sills, so that the square shoulders will prevent turning, and the heads are countersunk flush.

The floor joists rest on straps nailed to the side sills, Fig. 4. Two of the joists, Fig. 2, are fastened with lighter angle irons to prevent the sills springing outward. The rest are held in place by small cleats. Two mudsills, 2 inches by 3 inches, are laid under the joists to stiffen them for the load of the machine. These, as well as the whole frame, are blocked up and rest upon boards or plank pieces about 8 inches by 12 inches crossed and laid up under the sills at distances of four or five feet. If these supports settle by the action of frost, it is a simple matter to level up by adding more.

The corner posts stand on the sills, to be fastened later by corner boards, Figs. 3 and 5. The plate sticks are halved together at the corners, a hole is bored down through their ends into the top of the post, and a 24-penny wire spike is pushed into it. The plates are also held together by small angle irons at the corners. At this point the frame must be stayed up while the side and roof sections are put in place.

The side panels, Fig. 6, are of matched Georgia pine ceiling material, 7/16 inch thick, dressed and beaded one side, cleated with ⅞-inch dressed pine on the outside as shown, and cleated with a strip of the 7/16-inch material on the inside. They cover each 3 feet by 7 feet and are all interchangeable except that the corner sections are slightly modified to slip under the corner boards.

The window sections are made interchangeable with the rest, and the position of the windows may be varied to suit circumstances. The bevel on the cleats and on base and eaves boards, Figs. 7 and 8, aids in excluding the weather. The way in which the battens and cleats of the panels interlock to give tightness and strength is apparent from details of Fig. 6. Cleats, 2 inches by ⅞ inch, are fastened with 1⅜-inch package wire nails, clinched on the outside. The inside cleat is fastened with ⅞-inch nails clinched inside. In general, the nailing is done with nails just long enough, so that the sharp points prick through slightly. The nail is driven against an iron block, and is really bent within the wood instead of forming a clinch visible outside.

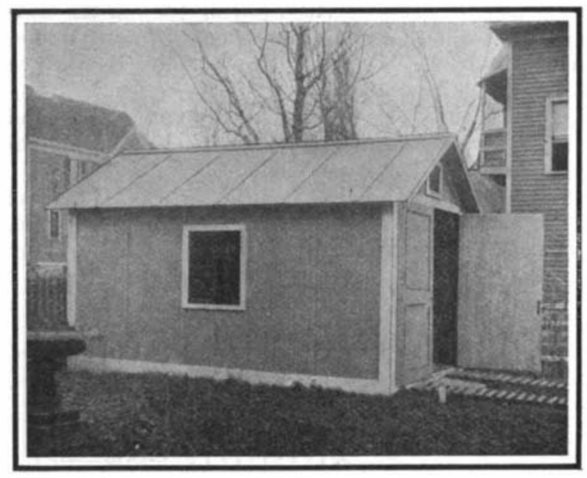
In the window panel the frame is slotted on the sides to admit the battens. This panel is further stiffened inside by a frame of ⅞-inch stuff around the window opening. The double casement windows are factory made, sash 1⅜-inch thick, and cost $1.50 per pair or window. They are hung with parliament butts—separable—swing inside, and shut against the outside frame about ⅜ inch. The sill is beveled outside of foot of window sash, and a small square bead is run on the sill for them to shut against. The windows are rabbeted together with a simple L rabbet, and are then fastened inside with small bar bolts top and bottom.

The front gable section is framed of ⅞-inch pine, with the 7/16-inch siding nailed to it. The bottom board of this frame overhangs the front plate 1½ inches, and the matched stuff rests on top of the plate. This leaves the lower ½ inch of the plate for the doors to shut against. The gable window opening is framed around with ⅞-inch stuff outside, and with 7/16-inch stuff inside. The gable window sash are home-made of ⅞-inch pine, and are hinged with separable butts to swing up for ventilation The rear gable is slightly modified by narrowing up the bottom board and beveling it to overhang the plate ¾ inch, and by fastening a beveled trim board to the plate to retain the panels below the plate in the same way, the side panels are held by eaves boards.

The floor is made in three sections strongiy cleated underneath with cleats passing two inches beyond the section edges to stiffen the joints between sections. The floor serves to retain the rear panels on the sill, but stops flush with the front face of front sill.

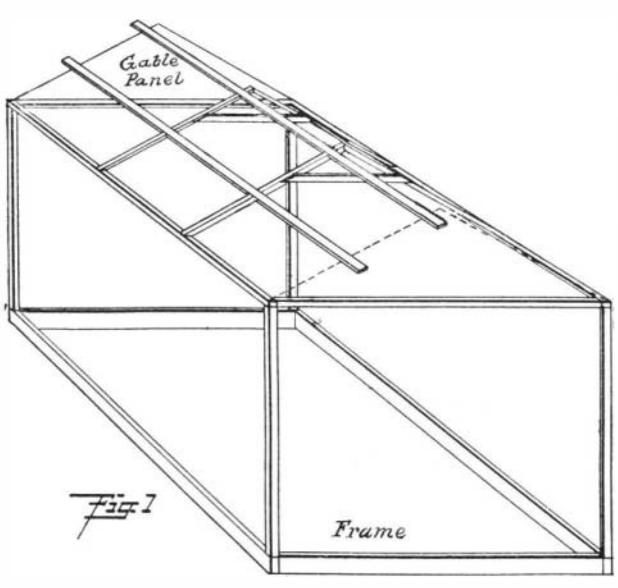
The front door is constructed of ⅞-inch pine. The top boards shut against the plate ½ inch, while the bottom boards shut against the ends of the floor. The matched stuff stands between the plate and the floor.

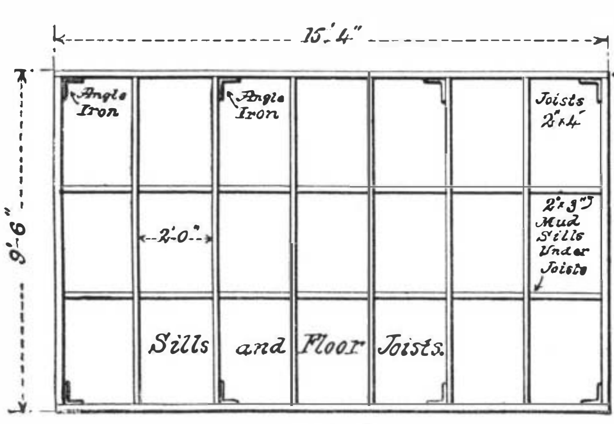
The roof sections have an overhang at the eaves of about 9½ inches, and the same overhang at the gable ends. Ten sections cover 3 feet by 6 feet 4 inches each, and two sections cover 2 feet by 6 feet 4 inches. They have each three cleats of the same 7/16-inch material, the bottom cleat being only one inch wide. They are first cleated together (Fig. 9) with the end of a strip of unbleached factory cloth under the bottom cleat, which is nailed from the outside with all nails well clinched. The cloth is smoothed loosely over the section and cut off, and then the face of the section is given one or two coats of white lead mixed thin with raw oil and turpentine. After this dries the cloth is brought over, laid smooth without stretching, and tacked thoroughly at top and sides. Then a batten strip is nailed on at the left edge to cover the joint, as in the side panels. Care must be taken not to stretch the cloth, but to leave it as loose as possible without actual wrinkles, as it will shrink in the subsequent painting. The finished panel must now be given repeated coats of good paint until the cloth is filled and a glossy, weatherproof deck surface is formed. On each slope of the roof two roof boards of hard pine, 4 inches by ⅞ inch by 17 feet, are let into and flush with the rafters and gable sections and fastened with long screws.



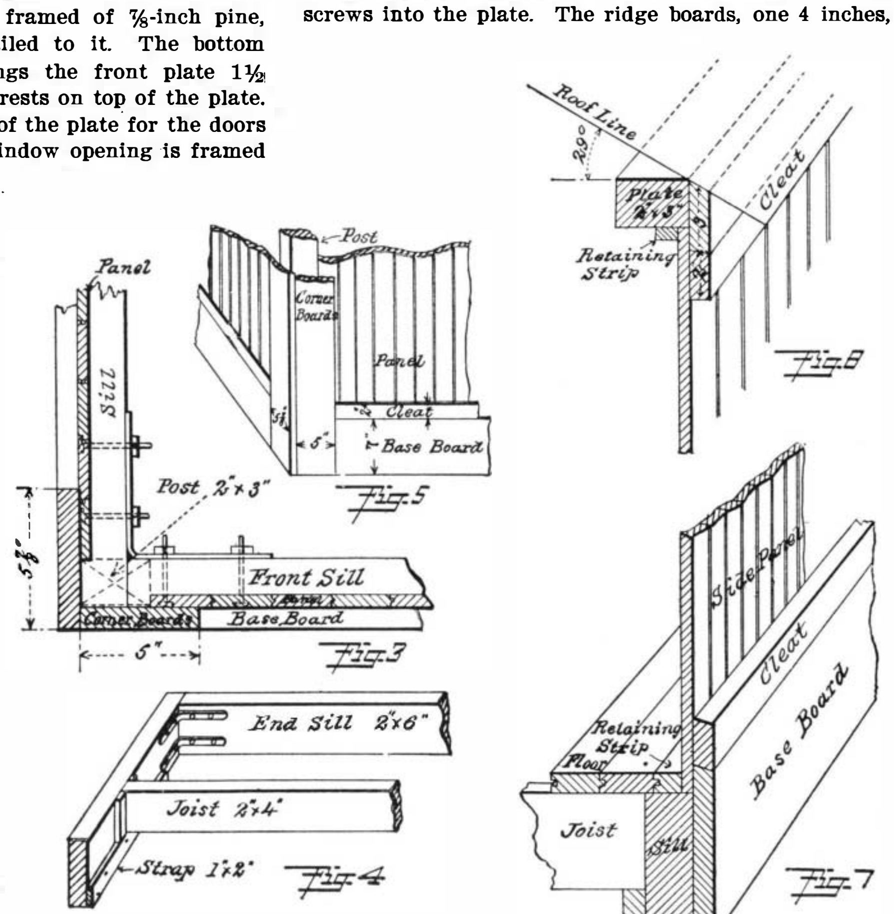
A SIDE VIEW OF THE PORTABLE AUTOMOBILE HOUSE.

After the frame is up, the base boards and eaves boards are temporarily tacked in place; then the panels are put in place from the inside, bottom end first; then the base and eaves boards are permanently adjusted and fastened to sill and plate with long screws. The corner boards are set together with screws, and then fastened in place with long screws into sill and post and plate. The panels next the corner boards are bolted to the corner boards at the middle cleat with roundhead stove bolts, using washers. The roof sections are held in place by stove bolts through the loose edge of the battens and the roof boards, and by screws into the plate. The ridge boards, one 4 inches,





THE FLOOR PLAN AND FRAME.



VARIOUS DETAILS OF CONSTRUCTION.

the other 5 inches wide, are beveled and put together with long wire nails. They are then put in place, and pieces of the 7/16-inch siding, 2 feet 9½ inches long, are slipped under the ridge boards to level up between the battens, and stove bolts are put through the ridge board, understrip, and roof section. This fastening adds much to the strength of the roof. Finish boards of the 7/16-inch material should be cut and fitted at the gable edge of the roof to give a neat appearance. To stiffen the door opening, brace boards should be put across inside from plate to post at the upper corners of the opening.

In the work of erecting the building no fastenings are to be used but bolts and screws, and to facilitate the work, provide two bitstocks, one for a screwdrive bit, the other for a proper size gimlet. After the house is finished, it should have three coats of paint well brushed into the grooves in the beading, etc. The inside of the doors should also be painted, since they are frequently exposed to the weather.

The panels, and all parts requiring time in the making, can be put together in a shop of limited space, and given a coat of priming paint before erecting the building. This coat should be of white lead and oil, possibly shaded with lampblack ground in oil, and thinned well with turpentine, so that it will strike into the pitchy surface of Georgia pine.

The house shown has been in use for a year, and has proved both tight and strong, in contradiction to the critics of the plan, who thought it would do all sorts of undesirable things under the heat and rains of summer. It is most essential that it be well painted before the weather acts upon it, and that it be kept well painted.

LUMBER BILL.

Side Panels and Roof Panels.—Matched and beaded Georgia pine ceiling stuff, 7/16 inch by 2½ inches by 14 feet. Lengths to cover 700 square feet; add ¼ for matching.......... 875 square feet

Sills, Mudsills, and Joists.—Rough hemlock, 2 sticks 2 inches by 6 inches by 16 feet; 1 stick 2 inches by 6 inches by 20 feet; 4 sticks 2 inches by 4 inches by 19 feet; 2 sticks 2 inches by 3 inches by 16 feet.......... 119 feet

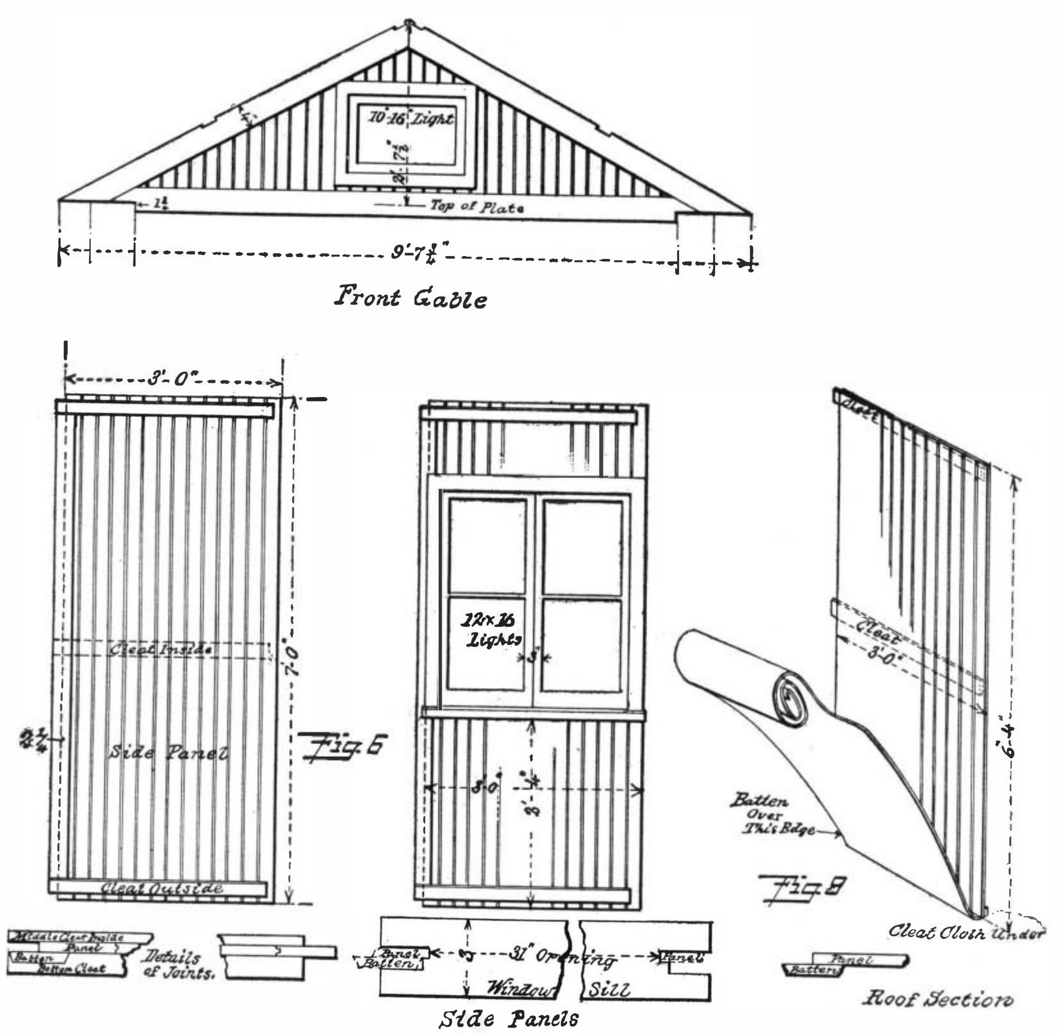
Upper Frame.—2 inches by 3 inches dressed hemlock, posts, 2 sticks 14 feet; rafters, 2 sticks 12 feet; plates, 2 sticks 16 feet; 2 sticks 20 feet (1 for plate ties).......... 62 feet

Floor.—Third quality pine flooring, matched and dressed, 16 feet long, cover 180 square feet, add ¼.......... 225 feet

Framing Boards.—Of same stuff, 8 4 inches by 14 feet, 2 8 inches by 16 feet; cleats, 2 6 2¼ inches by 3 feet; next to doors, 1 8 inches by 16 feet; joist supports, 2 2 inches by 14 feet. approximate.......... 150 feet

Finish Boards.—Second quality pine, ⅞ inch dressed and ripped, corner boards, 2 5 inches by 14 feet, 2 6 inches by 14 feet; base and eaves, 2 7 inches by 16 feet, 2 3½ inches by 16 feet; base and rear plate, 2 7 inches by 16 feet, 1 2½ inches by 12 feet.......... 76 feet

Roof and Ridge Boards.—Georgia pine, ⅞ inch dressed, 5 4 inches by 18 feet, 1 5 inches by 18 feet; window sills, white pine dressed, 1 2 inches by 3½ inches by 7 feet.......... 44 feet



THE GABLE AND SIDE PANELS.

AN INTERESTING EXPERIMENT AND ITS EXPLANATION

BY ALFRED P. MORGAN.

Ordinarily, the precipitate produced by mixing two chemicals in solution is formed more or less slowly. But in the following experiment we have a case where two different speeds of reaction are shown. The first takes several seconds before it is complete, while the second is quicker than a flash. The experiment also shows just when that action takes place.

When iodine is added to a starch solution, or *vice versa*, the solution is colored blue. This is a well-known test for either free iodine or starch.

Prepare a solution, A, of starch in water, and add to it some sulphurous acid. Prepare a separate solution, B, of potassium iodate, and add to it a little sulphuric acid. These last two substances form potassium sulphate and iodic acid, in accordance with the following reaction:

$$2KIO_3 + H_2SO_4 = K_2SO_4 + 2HIO_3.$$

The iodic acid is the only constituent which plays any part and need be considered in the experiment proper. Pour A + B together quickly into a glass vessel and watch it closely. In a few seconds the solution will change like a flash to a deep blue. The explanation and reactions are as follows:

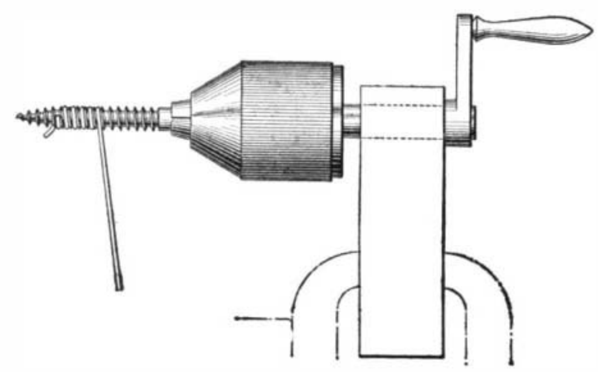
$$HIO_3 + 3SO_2 + 3H_2O = HI + 3H_2SO_4$$
$$5HI + HIO_3 = 5I + 3H_2O$$
$$SO_2 + 2H_2O + I = H_2SO_4 + 2HI.$$

The iodic acid unites with the sulphurous acid to form hydriodic acid and sulphuric acid. The iodic acid then unites with some of the hydriodic acid and forms iodine. But the iodine does not get a chance for existence, because it is immediately taken up by some of the sulphurous acid and formed into iodic acid. This process keeps on as long as there is any sulphurous acid present, and the solution remains clear, for there is also no free iodine present. But just as soon as the last molecule of sulphurous acid disappears, the whole solution turns blue so quickly that one looks twice before believing. The blue color generally flashes in from 20 to 40 seconds, depending upon the concentration and strength of the solutions. With a little experimenting the solution may be made to change in a predetermined time. It is a good idea to use a small part of the solution, and time it before mixing the remainder. Care should be taken not to use too much sulphurous acid.

HOME-MADE SPRING WINDER.

BY J. O. BROUILLET.

Not long ago the writer was called upon to replace a broken spring in a machine. It had to be done at a moment's notice, as the work could not be held up.



HOME-MADE SPRING WINDER.

The supply of springs was exhausted. The writer was given a piece of No. 60 wire, but no one had such a thing as a winder, so he was obliged to make one, and had a spring within a half hour.

In a junk pile was found a piece of soft steel, 4 x 1½ x ½ inch wide, with a ½-inch hole in one end. A ½-inch lag screw was placed in a brace, a pinhole was drilled in the gimlet end of the screw, then putting the screw through the hole in the steel, which was held in a vise, the spring was easily wound.

This suggested the construction of the spring winder illustrated herewith. A piece of soft steel, 4 x 1¼ x 1¼ inch, forms the body. A ½-inch shank, fitted with a chuck taking from 0 to ½ inch, was run through the hole at the top and provided with a crank handle.

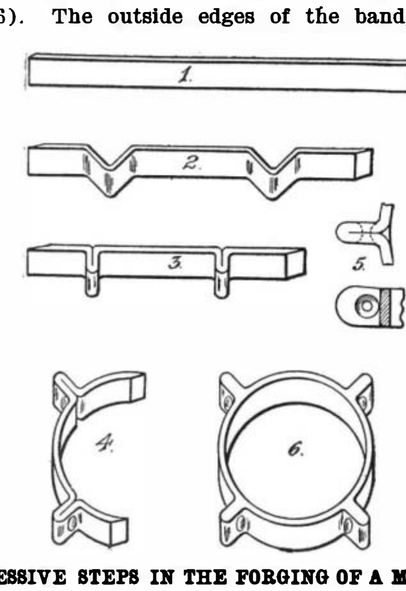
An assorted lot of lag screws serves for the open springs, and rods are used for the close springs and springs of oval or odd shapes.

FORGING A MASTHEAD OR BOOM RING.

BY I. G. BAYLEY.

On account of the severe strains to which the lugs on a masthead are subjected, they and the ring are usually made from one and the same piece of iron, instead of the former being welded on after the ring is made. The ring is made in two halves, the iron being cut sufficiently long to make two lugs, and go half way round the masthead or ends of main or jib boom. The comparative length of the iron is given in Fig. 1. The diameter of the bands, of course, varies, and the section of iron used is in proportion. The position of the lugs is marked out, and the bar heated and bent into shape (Fig. 2), the ends being shaped for welding, when the two halves are brought together, to form the circle. The lugs are closed and welded in the next heat (Fig. 3). Fig. 4 shows the half band, a similar one being made in the same manner. The holes for the wire ropes are countersunk on both sides, and are made at the roots of the lugs, close up to the bands. They are flattened out when being welded, their depth being a little more than the depth of the band, to give more metal in the direction of the pull.

To give a smooth surface on the inside of the band, a piece of metal called a "fish" is welded in the "gutters" formed at the roots of the lugs. These several details are shown in Fig. 5. The two halves are next welded, as shown in the completed band (Fig. 6). The outside edges of the band, top and bottom, are rounded off, and all sharp corners on the lugs removed, to prevent any accidental wear on the ropes. The top of the mast or ends of the booms are cut down to a shoulder, the thickness of the bands in width, and the bands driven on.



PROGRESSIVE STEPS IN THE FORGING OF A MASTHEAD.