

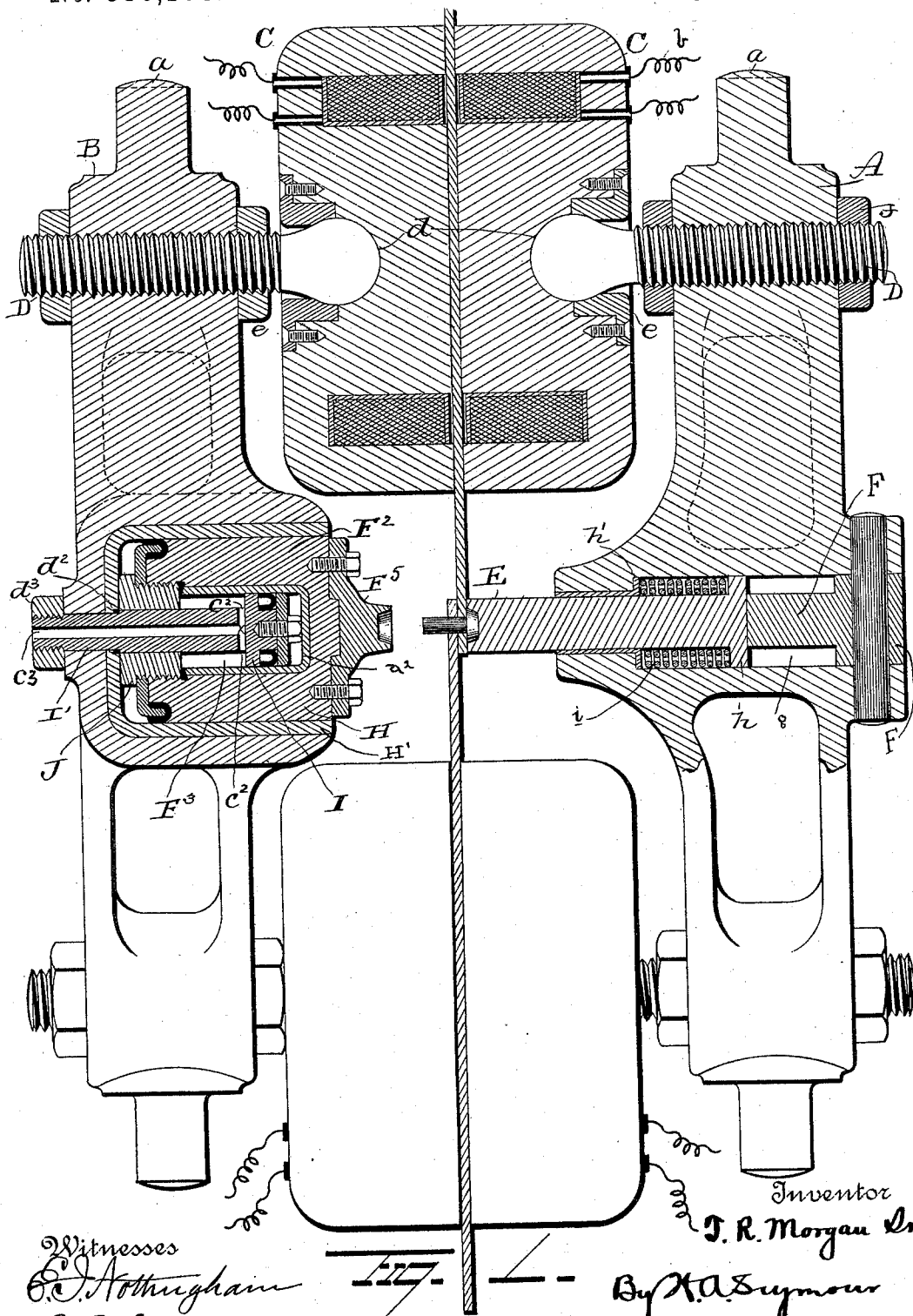
(No Model.)

5 Sheets—Sheet 1.

T. R. MORGAN, Sr.
HYDRAULIC RIVETER.

No. 586,198.

Patented July 13, 1897.



Witnesses
E. A. Nottingham
G. F. Downing

Inventor
T. R. Morgan Sr.

By *X. A. Seymour*
Attorney

(No Model.)

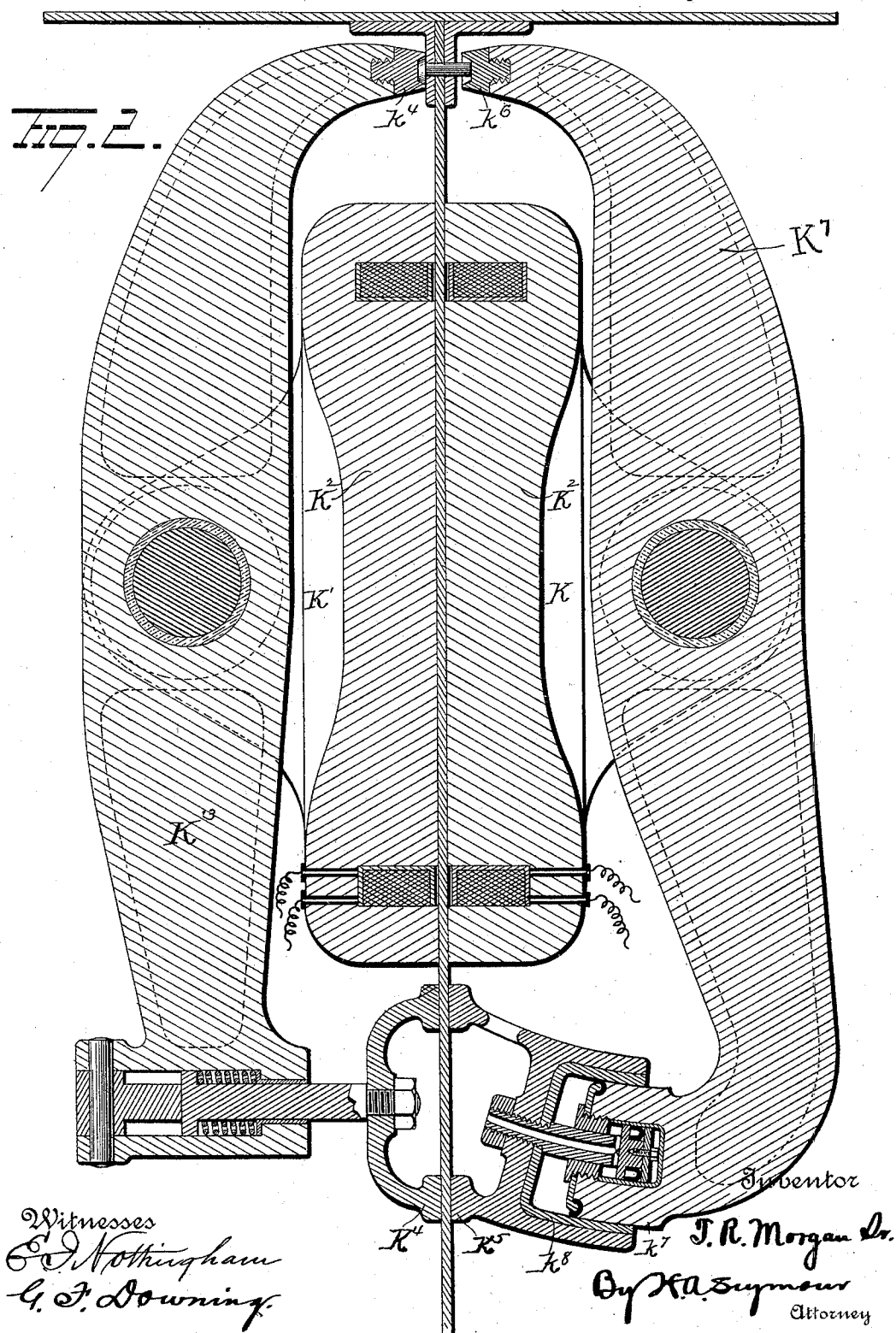
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Fig. 2.



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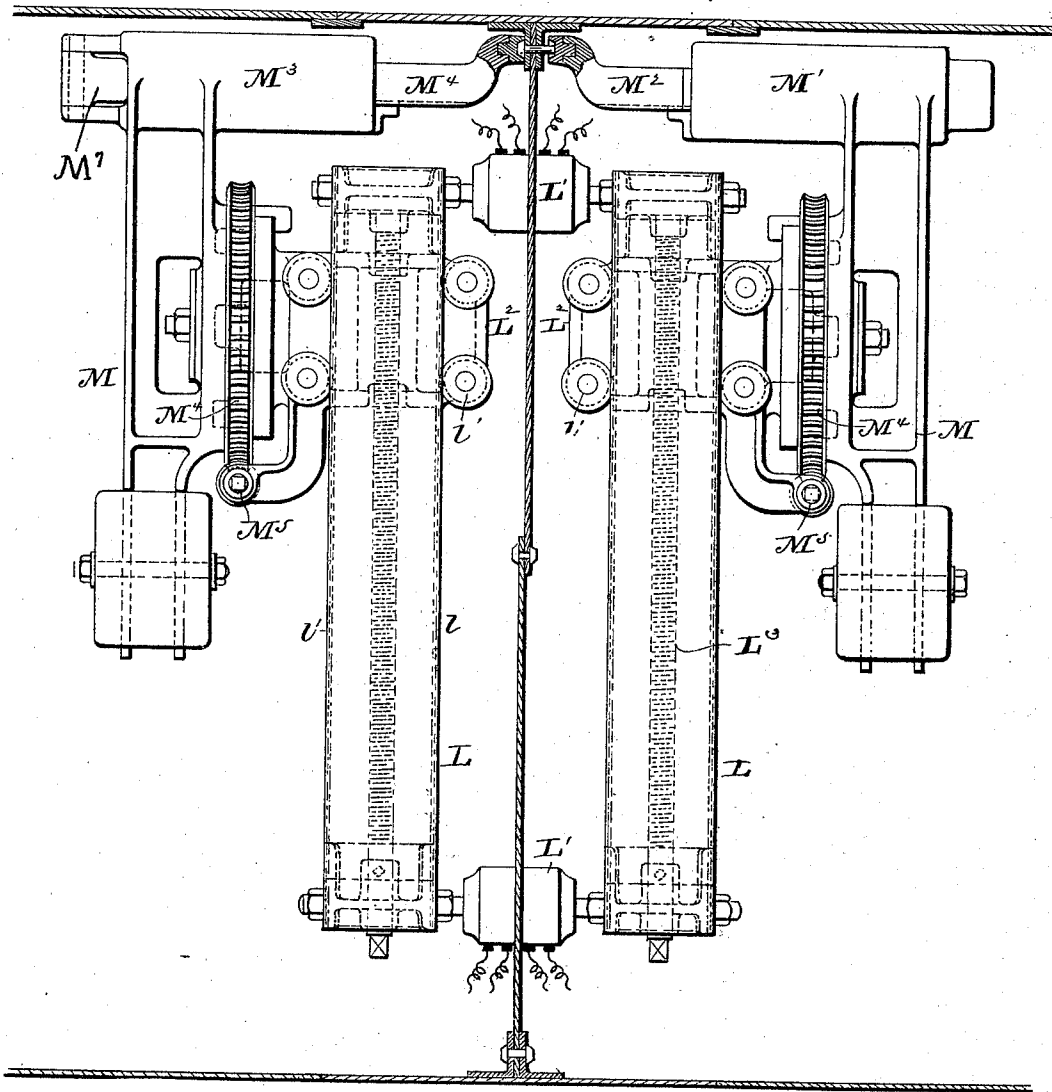
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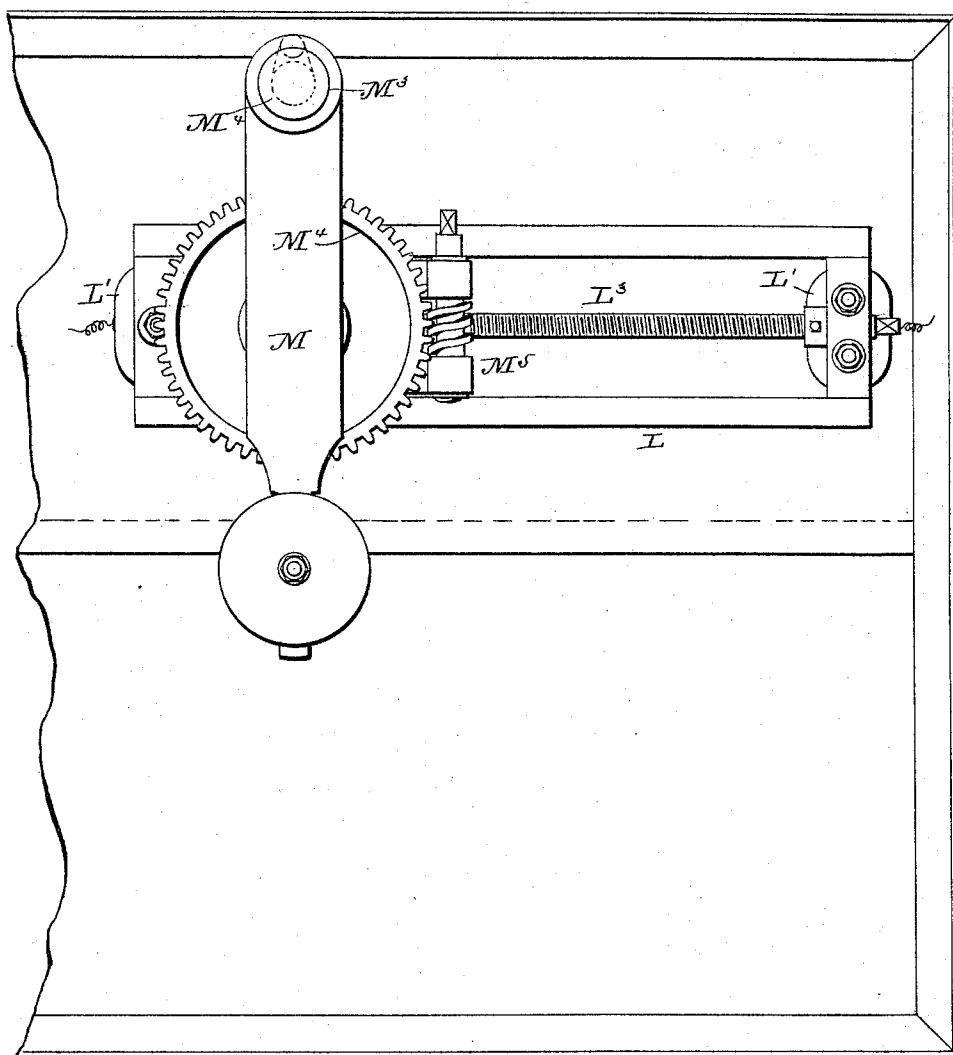
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Fig. 4.



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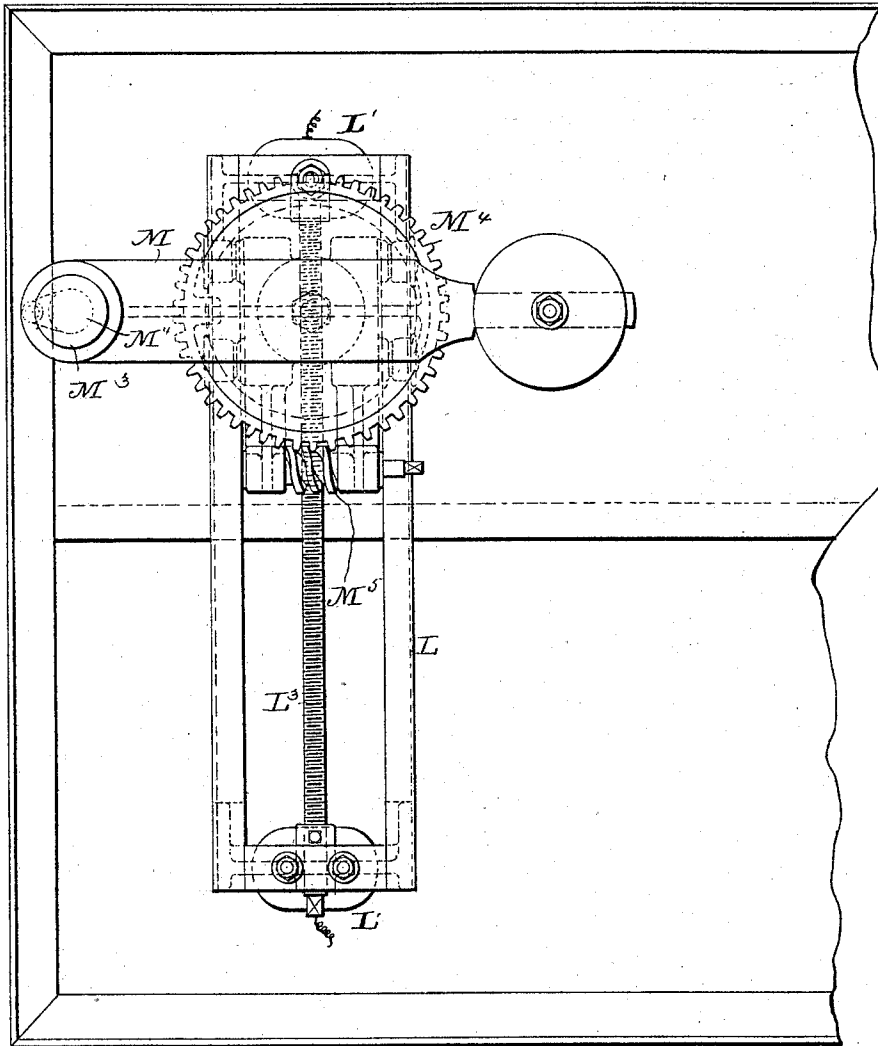
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Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS R. MORGAN, SR., OF ALLIANCE, OHIO, ASSIGNOR OF THREE-FOURTHS
TO THOMAS R. MORGAN, JR., JOHN R. MORGAN, AND WILLIAM H. MORGAN,
OF SAME PLACE.

HYDRAULIC RIVETER.

SPECIFICATION forming part of Letters Patent No. 586,198, dated July 13, 1897.

Application filed October 1, 1894. Serial No. 524,626. (No model.)

To all whom it may concern:

Be it known that I, THOMAS R. MORGAN, Sr., of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Hydraulic Riveters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in devices for supporting metal-working tools, and is designed more particularly for use in connection with riveting-tools.

My invention consists in the parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the present application I have described my improvements in connection with a riveter; but it is evident that it might be employed for supporting drills, punches, or other metal-working tools.

In the accompanying drawings, Figure 1 is view in elevation, partly in section, of one form of device embodying my invention. Fig. 2 is a view in section of another form. Fig. 3 is a view of a modified form of riveter-supporting frame, and Figs. 4 and 5 are side views of same.

This improvement is adapted more particularly for use in constructing prisons and compartments of the modern naval vessels, which are composed of sheet-metal plates riveted together at the joints. In the construction of these compartments the sheets of steel or iron, as the case may be, are placed in position and secured temporarily and are subsequently permanently secured by hand-riveting. This method of construction as now practiced is very expensive, and one object of my invention is to lessen this expense and at the same time secure more perfect riveting by substituting machine-riveting for the defective hand-riveting.

In the construction shown in Fig. 1 A and B represent two frames, each of which is provided with trunnions *a* at its ends, which latter rest in bearings carried by a supporting device, such as chains, or by a portable derrick of any kind.

The frames A and B each carry two electromagnets C, each of which consists of a disk of soft iron provided on its inner face with a groove, preferably circular in form, to receive the bobbin carrying the wires *b*. The wires of each bobbin or magnet are connected to wires leading from a generator, and hence when the magnets are energized and brought into contact with a metal plate the frames are held solidly in position to perform the work, which will be hereinafter described.

The magnets C are connected to the frames A and B by the bolts D, which are provided with rounded ends or heads somewhat greater in diameter than the bolts. Each magnet is provided with a correspondingly-shaped recess *d* to receive the head and with a collar *e* to lock the magnet and bolt together, thus forming a universal joint. The collars *e* are secured to their magnet by screws, and the inner edges thereof are curved to correspond with the curvature of the recesses *d* and form in effect continuations of the recesses *d*.

The shanks of the bolts are screw-threaded and pass through the frames A and B near the ends thereof and are locked by the nuts *f*. By this arrangement the magnets can be adjusted so that they will rest solidly and flatly on the plates on opposite sides of an overlapping joint and still hold the tool accurately at right angles to the face of the joint.

The two frames A and B are independent of each other, and when used as a riveter one frame carries the holding-die E, while the other carries the riveting-die F⁵.

The frame A, carrying the holding-die E, is enlarged centrally, and is provided at such enlarged portion with a chamber or cavity *g*, preferably cylindrical in cross-section, for the reception of the holding-die E. This cavity *g* is of two diameters, the larger rear section being for the head *h* of the die E, while the smaller section is for the shank of the die.

Between the head *h* and shoulder *h'* of the chamber *g* is the spring *i*, which latter bears against the head *h* and tends to move the die E rearwardly or away from the rivet.

Mounted in the frame A behind the die E is the lever F, provided with a cam F', adapted

to bear against the rear face of the head h and move the same against the action of the spring and hold its outer end in a position to receive the rivet-head when the magnets carried by the frame are in contact with the plate. In other words, the magnets must be so adjusted relative to each other and to the plates that when in contact with the plates the die E (when in its operative position) will rest solidly against the head of the rivet with its axis in line with the axis of the rivet.

The frame B is also enlarged centrally, and is provided at such enlarged portion with a chamber forming a hydraulic cylinder H . This cylinder is preferably provided with a removable lining H' and carries the hydraulic plunger F^2 , to which the riveting-die F^3 is secured. Water under pressure admitted behind this plunger forces it outwardly, and the die thereon coming in contact with the hot rivet upsets the end thereof in the usual manner.

The plunger F^2 is provided with a cylinder F^3 , also lined, as at a^2 , for the reception of the piston I , fast on the end of the hollow stem I' . This rod is provided with openings c^2 , communicating with the central passageway c^3 , for the admission of water into the cylinder F^3 . Stem I' is provided at d^2 with a shoulder, which bears against the lining in cylinder H , while the outer end thereof is threaded for the reception of the nut d^3 , which latter locks the stem and the piston or plunger thereon solidly in place. The rear end of cylinder F^3 is closed by the nut J , which latter is open centrally to receive the stem I' .

From the foregoing it will be seen that by opening cylinder F^3 for the escape of water therein and admitting water behind plunger F^2 the latter, with the die F^3 thereon, is moved outwardly, thus upsetting the rivet. By now permitting the water behind plunger F^2 to escape and admitting water under pressure to cylinder F^3 , between the nut J and the plunger or piston I , the plunger F^2 is moved rearwardly into its cylinder.

The frames A and B are practically alike, each carrying two magnets and each a tool. Each is designed to be supported on its trunnion a independent of the other and can be raised or lowered to bring the holding-die and riveting-die in alinement with the rivet, and when so placed on opposite sides of plates the magnets of one frame rest opposite the magnets of the other frame, and when energized each operates to attract the other, and hence both are held firmly in position.

The form of riveter just described is designed particularly for riveting joints between plates, as in the plates forming the partitions between compartments of a metal boat or prison, while the riveter to be now described is designed more particularly for riveting the ends and edges of the plates to the angle-irons at the sides, top, and bottom of the compartment. In this construction, which is disclosed in Fig. 2, each frame K

and K' carries a single electromagnet K^2 somewhat larger in proportion than the magnets of the frames A and B . Mounted on frame K' is the lever K^3 , provided at one end with the holding-die k^4 and at the other end with the movable stem and cam, the latter being constructed as in Fig. 1. The stem, however, instead of carrying the holding-die, as in Fig. 1, carries the yoke K^4 , which latter is adapted to bear against the plate and securely hold the holding-die in contact with the head of the rivet. Lever K^7 is mounted on frame K and is provided at one end with a riveting-die k^6 and at its opposite end with plunger k^7 . This plunger moves in cylinder k^8 , integral with yoke K^5 , which latter is located diametrically opposite yoke K^4 , so that when the riveter is upsetting a rivet the pressure on both sides of the plate is equalized and damage to the plate prevented. The construction of the cylinder and plunger is identical with the corresponding parts of Fig. 1, except that in the construction shown in Fig. 2 the cylinders, plungers, and stem are formed in the arc of a circle concentric with the axis of the lever K^7 , so as to permit the yoke K^5 to rest solidly and flatly on the plate while the lever K^7 , carrying the riveting-die, is making its full stroke.

The principal difference between the construction just described and that shown in Fig. 1 is that in Fig. 1 the cylinders, plungers, and dies are located centrally between the ends of the frame, whereas in the construction disclosed in Fig. 2 the holding devices and dies are located at the ends of the apparatus and are carried by levers mounted on the main frame.

In the construction in Figs. 3, 4, and 5 I have disclosed devices for supporting the riveter, the supporting devices carrying the magnets and the riveting devices movable thereon, so that the riveting devices can be moved from one rivet to another throughout the lengths of the frames without moving the frames or deenergizing the magnets.

L represents the frames, each of which is provided at its ends with magnets L' , preferably oblong in shape, as shown in Figs. 4 and 5. These electromagnets are like those shown in Fig. 1, and when energized and placed against a metal plate hold the frames solidly in position. Each frame consists, essentially, of two sides and ends, and is open at its front and rear for the passage of the carriers L^2 . Each carrier is provided, preferably, with eight wheels, four to a side, the four wheels l' at one end thereof resting against the flat edges l of the sides of the frames, and the four wheels near the opposite end resting against the flat edges l' of the opposite sides of the frames. Centrally mounted in each frame and running approximately the length thereof is a screw L^3 , the lower end of which terminates beyond one end of the frame, for the attachment of a hand-wheel, lever, or wrench. This screw passes through the car-

riers L^2 , the latter having a screw-threaded way for the passage of the screw. Hence by turning the screws the carriers can be moved toward either end of the frames.

5 Suitably journaled to each carrier L^2 is a frame M , one of which is provided with the cylinder M^1 , carrying the riveting-plunger and die M^2 , while the other frame M is provided with the cylinder M^3 , carrying the holding-plunger and die M^4 , the cam M^7 by which the holding-plunger and die are moved toward the rivet, and spring (not shown) for moving the die away from the rivet.

Each frame is provided on its end opposite 15 its cylinder with a weight for counterbalancing the weight of cylinder, and each is also provided with a worm-wheel M^4 , located concentrically with the axis of the frame. These worm-wheels are each engaged by a worm-shaft M^5 , mounted in a bracket M^6 , depending from its respective frame A .

By turning the worm-shaft it will be seen that the frames carrying the riveting and holding tools can be turned to the positions 25 shown in Figs. 4 and 5. As shown in Fig. 5, a line of rivets can be riveted without disturbing the frames L , and as shown in Fig. 4 after riveting the plates to the angle-iron the riveter can be turned to the overlapping edges 30 of the plates without disturbing the frames.

This device is particularly applicable for riveting together the plates and angle-irons from which the compartments of the modern vessel are now constructed, and besides lessening the cost of such work is much more rapid and effectual than the ordinary hand-riveting which has universally been employed on work of this kind.

While I have described the improvements 40 as applied to a riveter, it is evident that they can be employed with other metal-working tools, such as drills. Hence I would have it understood that I do not confine myself to the details of construction of the parts nor to the 45 uses of same herein referred to, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what 50 I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a frame and magneto-electric devices connected thereto and adapted when energized and placed against a metal plate to adhere to said plate, of a 55 metal-working tool and means for turning the tool to either side and locking it against movement after it has been adjusted, substantially as set forth.

2. The combination with a frame and magneto-electric devices connected to said frame and adapted when energized and placed against a metal plate to adhere to said plate, of a metal-working tool, means for moving 60 said tool lengthwise the frame, and means for turning it to either side of the frame.

3. The combination with a frame, magneto-electric devices adjustably connected therewith and adapted when energized and placed against a metal plate to adhere thereto, of a 70 metal-working tool, means for moving said tool lengthwise the frame and means for turning it to either side of the frame.

4. The combination with a frame, magneto-electric devices connected to said frame, and adapted when energized and placed against a metal plate to adhere thereto, a screw lengthwise the frame, a carrier carried on said frame and engaging the screw and a worm-shaft carried by the carrier, of a frame mounted on 80 the carrier and carrying a riveting-tool and a worm-wheel also on said latter frame and engaging the worm-shaft on the carrier.

5. The combination with two main frames each provided with magneto-electric devices 85 adapted when energized and placed against a metal plate to adhere thereto, of a movable frame carried by each main frame, a riveting-tool carried by one movable frame, a holding-tool carried by the other movable frame, 90 and means for moving said movable frames, and for locking them against movement after they have been adjusted, substantially as set forth.

In testimony whereof I have signed this 95 specification in the presence of two subscribing witnesses.

THOMAS R. MORGAN, SR.

Witnesses:

W. H. RAMSEY,
A. C. STRONG.