

No. 612,927.

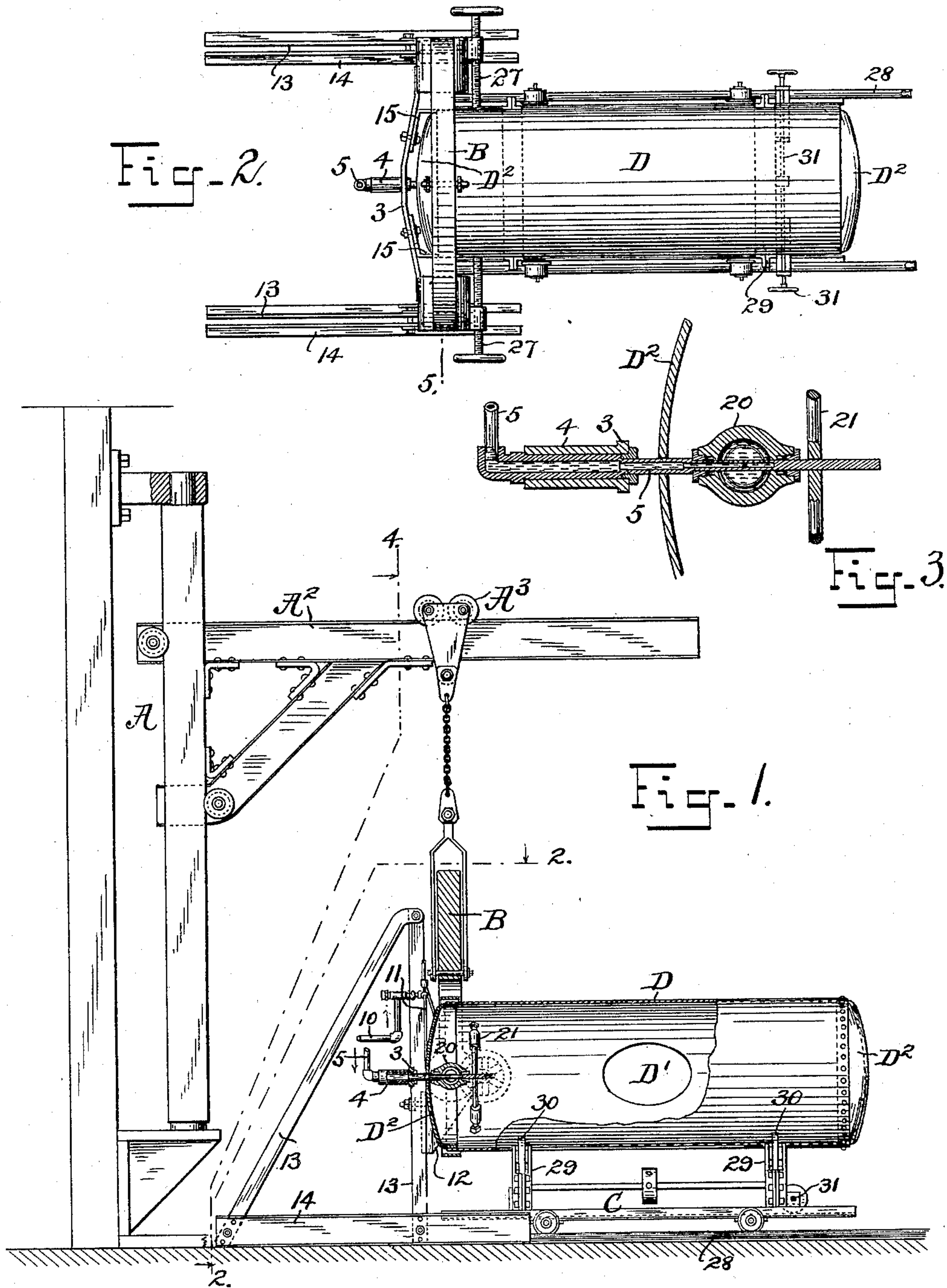
Patented Oct. 25, 1898.

C. P. HIGGINS.
RIVETING MACHINE.

(Application filed Mar. 13, 1897.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
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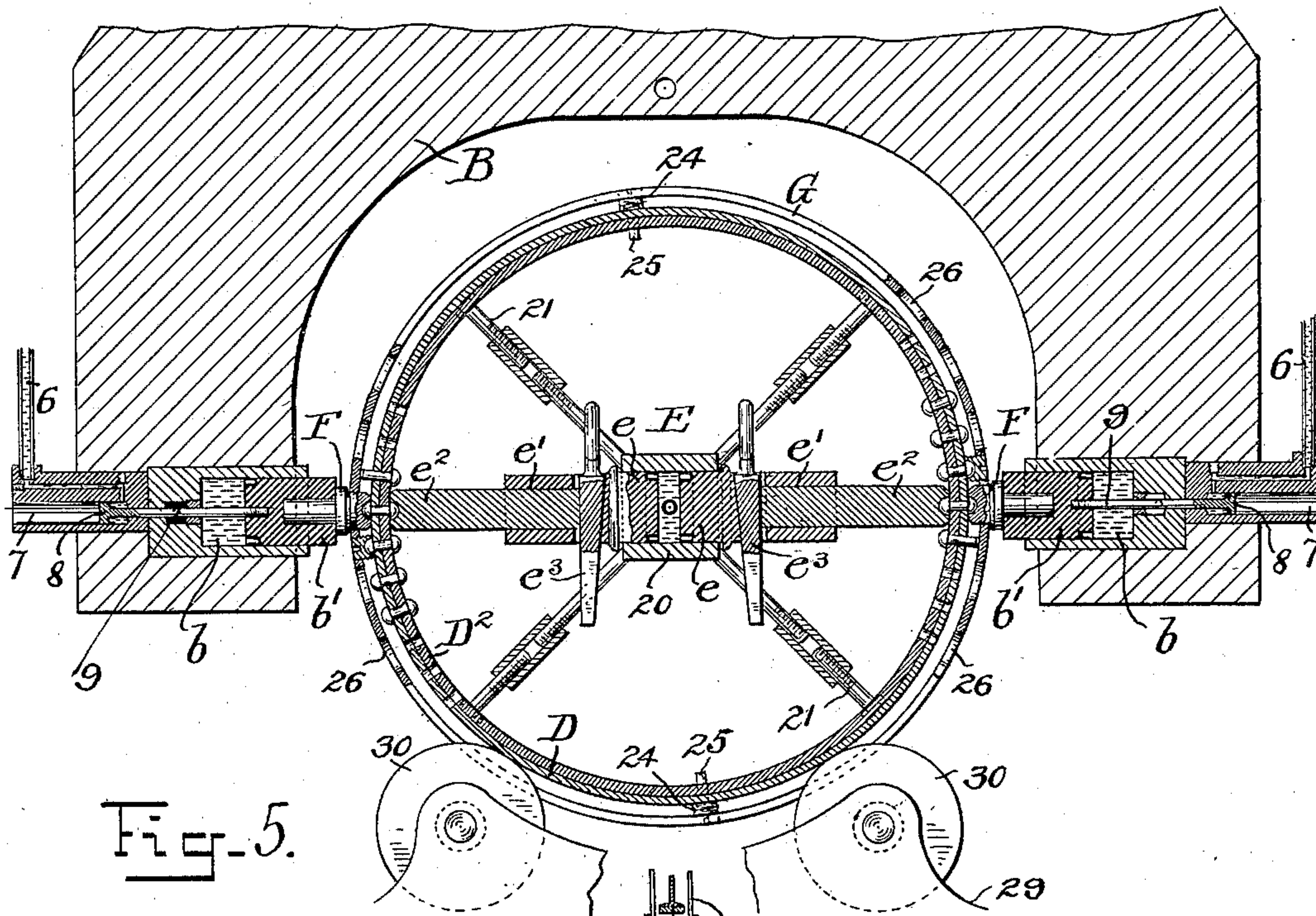
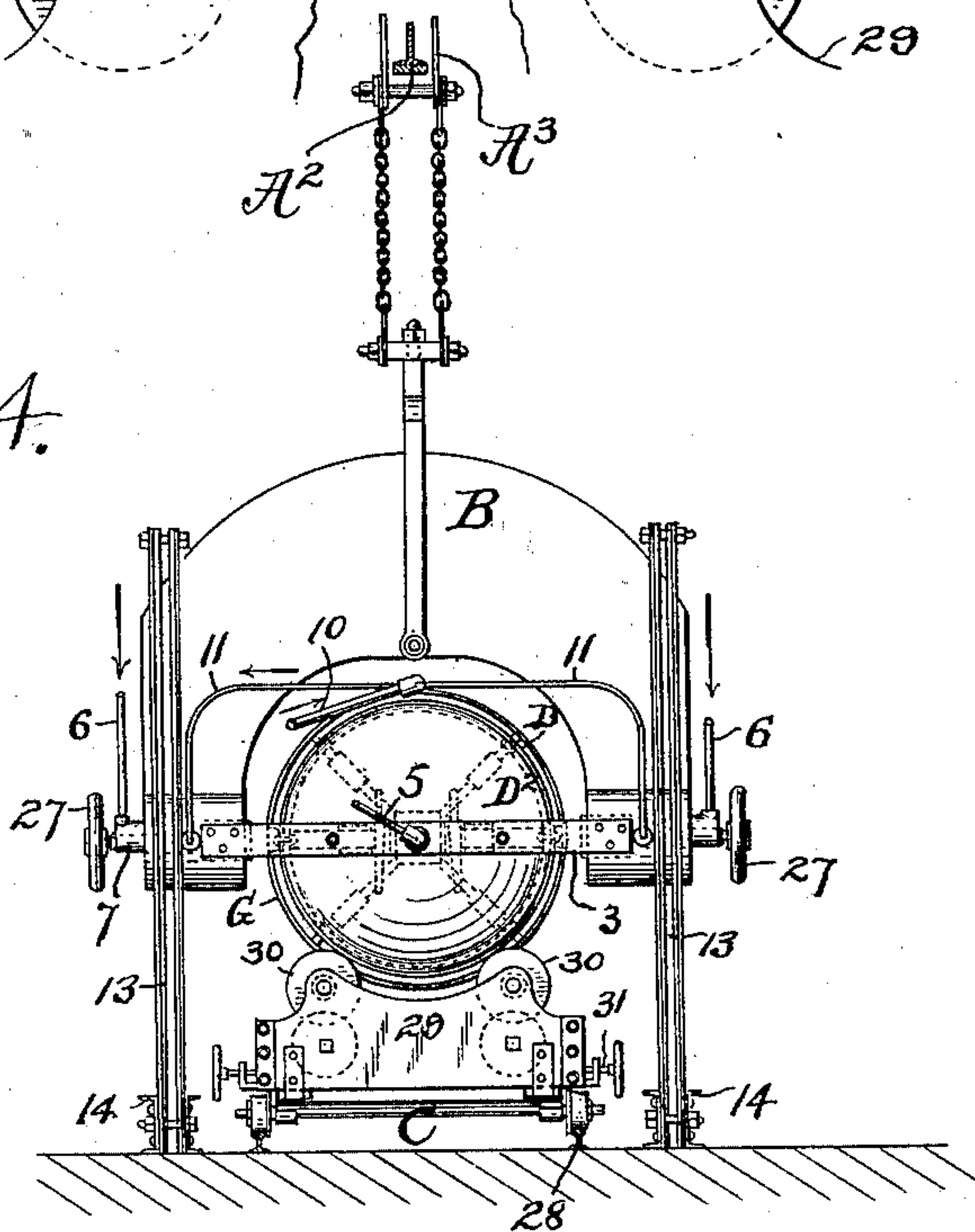


Fig. 5.

Fig. 4.



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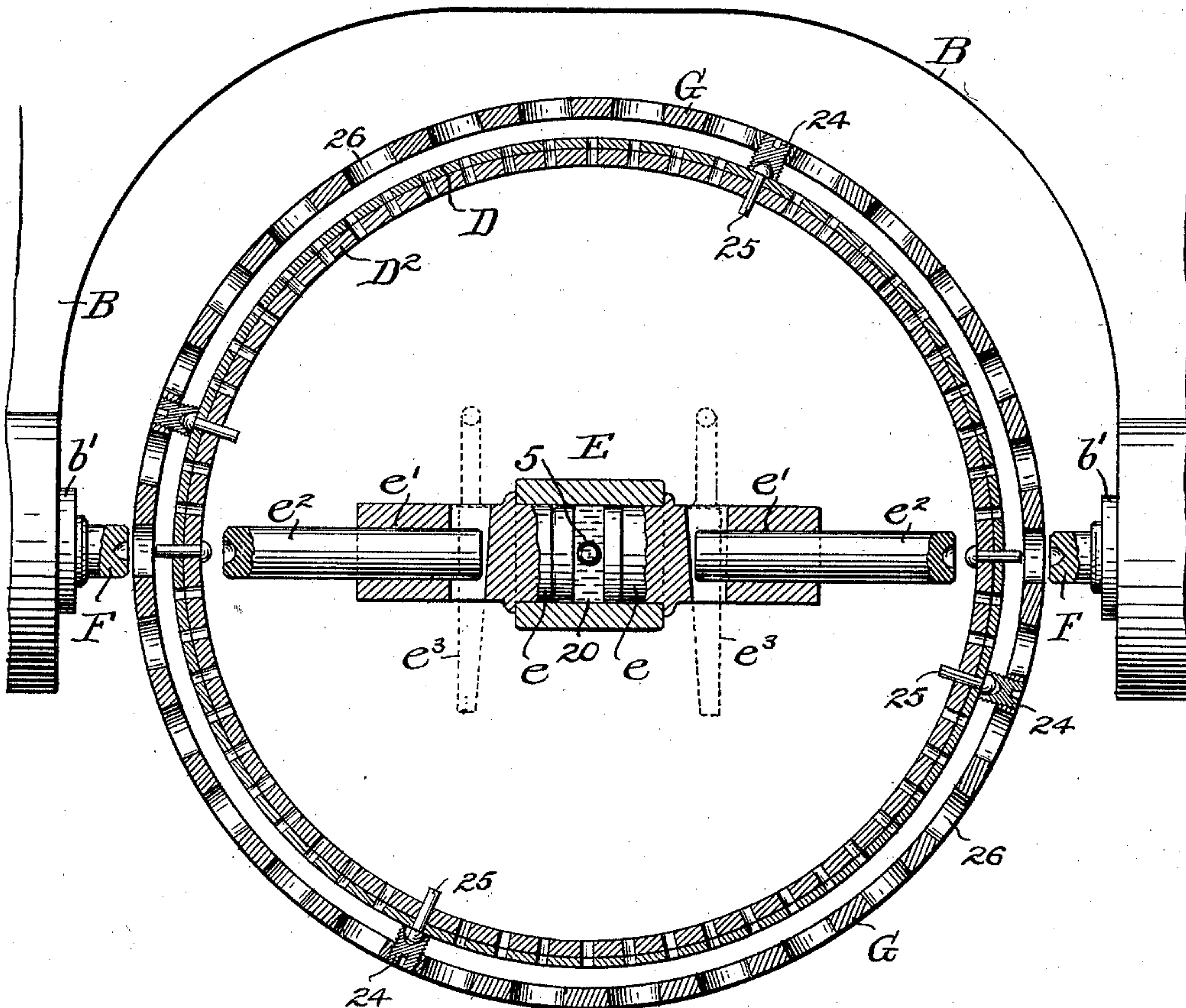


Fig. 6.

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UNITED STATES PATENT OFFICE.

CAMPBELL P. HIGGINS, OF ROSELLE, NEW JERSEY.

RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 612,927, dated October 25, 1898.

Application filed March 13, 1897. Serial No. 627,395. (No model.)

To all whom it may concern:

Be it known that I, CAMPBELL P. HIGGINS, a citizen of the United States, residing at Roselle, in the county of Union, State of New Jersey, have invented certain new and useful Improvements in Riveting-Machines, of which the following is a specification.

The present invention is applicable to the riveting of solid ends or heads to a drum or cylinder—that is to say, for use with an end or head having no opening sufficiently large to introduce the riveting-die or its support; and it has for its object to provide an apparatus embracing interior rivet-dies capable of being operated from the exterior of the drum being riveted, to adapt two otherwise independent riveting devices for simultaneous coöperation, to provide means for accurately controlling the position of the drum and its rivets with the riveting-dies, and to generally adapt such apparatus for effective and conjoint operation.

To these ends the improvements embrace interior riveting-dies working in opposite directions, with which coact exterior riveting-dies carried by a suspended head, the dies of which work in opposition to the interior dies to simultaneously head two rivets at diametrically opposite points in the drum.

The improvements also embrace various novel features and details of construction hereinafter fully set forth.

A practical embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the improvement, the suspended head carrying the exterior riveting-dies, the interior devices and a portion of the drum being in section. Fig. 2 is a sectional plan view, the crane for supporting the suspended head being omitted, the section being taken on the line 2 2 of Fig. 1. Fig. 3 is an enlarged central section of the interior devices, with a portion of the drum end, as seen in Fig. 1. Fig. 4 is an end elevation of the apparatus shown in Fig. 1, a portion of the horizontal arm of the crane only being indicated and shown in section on the line 4 of Fig. 1. Fig. 5 is an enlarged cross-section on the line 5 of Fig. 2. Fig. 6 is a still further enlarged cross-section of a

portion of the apparatus shown in Fig. 5, the dies being in their withdrawn position.

The apparatus (referring particularly to Fig. 1) consists of a carriage C, adapted to support the drum D being riveted and to carry it into and from riveting position, and a crane or like structure A, providing a horizontal arm or track A², on which a trolley A³ is supported and from which is suspended an external head B, bifurcated to straddle the drum, with its ends carrying oppositely-acting exterior riveting-dies F, which coöperate with interior riveting devices E, supported in alinement therewith within the drum. The drum D is provided with a side manhole D' for access to its interior, and its ends D² to be riveted thereto are solid, with the exception that the center of the said end is provided with a small perforation to admit a pipe for conveying the fluid-pressure to the interior devices E, and which perforation is afterward plugged in any suitable manner.

The opposite jaws or ends of the suspended head B are each provided with a hydraulic cylinder b, in which works a plunger or ram b', carrying the riveting-die F, the two dies being diametrically opposed to one another and capable of working simultaneously toward each other in the riveting operation and from each other for a succeeding operation. Fluid under pressure is admitted to both cylinders behind the rams to force them outwardly toward each other from a supply-pipe 10, from which the branch pipes 11 lead to each cylinder. Each ram b' is provided with a stem 9, having a small piston 8, that works in a cylinder 7, to which fluid-pressure is supplied by a pipe 6, leading to the inner side of said piston to draw the rams inwardly, and hence move the dies F backward from contact with the rivet-heads to permit a rotation of the drum to bring another pair of rivets into position.

The interior riveting devices E consist of a central hydraulic cylinder 20, having a pair of oppositely-projecting plungers or rams e, the outer end of each of which has a socket e' to receive the inner end of the interior rivet-die e². A removable wedge e³ is carried by each ram e and being interposed between said inner end of the die e² and the head of

the ram holds the die to duty and upon being removed permits the die to be moved by hand backward in its socket, as in Fig. 6, to carry it from contact with the completed rivet and permit the rotation of the drum to bring another pair of rivets into position. Fluid-pressure is admitted to cylinder 20 by a pipe 5, which passes through the perforation in the end D^2 of the drum and thence into and through the center of the cylinder, as in Fig. 3, the latter having suitable glands to prevent leakage of pressure therefrom, said pipe being perforated within the cylinder to admit pressure thereto and terminating in a solid portion projecting beyond the cylinder to engage a spider 21, the adjustable ends of the radial arms of which, resting against the inner surface of the drum, provide with the central hole in the drum end a suitable support and brace for the interior riveting devices. Exterior of the end B^2 the pipe 5 is supported by a tubular bearing 4, carried by a cross-bar 3, secured to the sides of the jaws of the suspended head B.

In practice the supply-pipes 10 and 5 will be controlled by the same valve, (not necessary to show here,) so that fluid-pressure may be simultaneously admitted to the two cylinders 6 and cylinder 20, so that the interior dies will form a solid abutment against the rivet-heads on the interior of the drum at the instant the exterior dies move against the ends of the rivets on the exterior of the drum.

The drum D will preferably carry an alining ring or band G, removably supported on the drum by a plurality of screw-studs 24, arranged to embrace the head of a like number of rivets 25, which may have been entered into the holes in the drum and its end for the purpose. The ring G is provided with a number of suitably-spaced holes 26, each pair of holes diametrically in line and sufficiently large to allow the dies F to enter snugly, thus bringing the rivet ends into proper alinement for the riveting operation. The holes 26 in the alining ring, as shown, are less by one-half the number of rivets to be headed, and hence the drum and ring will be rotated a distance of two rivets after each riveting operation. After all the rivets that are exposed through the openings 26 have been headed, leaving one half of the whole number still to be headed, the alining ring is shifted to expose the remaining rivets and the riveting operation repeated.

To better steady the suspended head B during the riveting operation, each of the lower ends of the head rest in a bracket 12, carried by a braced framing 13, rising from floor-beams 14. To steady and aline the drum D, the cross-bar 3 may carry adjustable knee-pieces 15, with their ends abutting against the extreme end of the drum and against the circumference of the drum end D^2 . The drum may be further steadied and locked in place

by clamp-screws 27, carried by the opposite lower ends of the suspended head B.

The carriage C, supporting the drum, is a wheeled one traveling on a track 28 and has bearings 29, having rolls 30, which directly support the drum and on which the drum is rotated. To further adjust the drum and bring it into proper alinement, one of the bearings 29—the outermost one—on the carriage is arranged for transverse adjustment, as by means of a screw 31, engaging the bearing.

What I claim is—

1. In a riveting-machine, the combination with a hydraulic cylinder adapted to the interior of a drum and having a pair of oppositely-projecting rams carrying interior riveting-dies movable longitudinally relative to the rams, and means for locking the dies when moved outwardly on their rams, of a head carrying oppositely-projecting exterior dies, one opposed to each of the interior dies, and means for moving the exterior dies in the riveting operation; substantially as described.

2. In a riveting-machine, the combination with a hydraulic cylinder adapted to the interior of a drum and having a pair of oppositely-projecting rams, interior riveting-dies slidably mounted in the rams, and removable wedges for locking said dies against movement, of a head carrying oppositely-projecting exterior dies, one opposed to each of the interior dies, and means for moving the exterior dies in the riveting operation; substantially as described.

3. In a riveting-machine, the combination with a hydraulic cylinder having oppositely-projecting rams provided with the interior riveting-dies, a feed-pipe extending through said cylinder and lying in the plane of the central longitudinal axis of the drum to be riveted so as to pass through a central aperture in the head being riveted, a support for the pipe exterior to the drum-head and a spider on the inner closed end of the feed-pipe, of exterior riveting-dies, one opposed to each of the interior dies; substantially as described.

4. In a riveting-machine, the combination with a carriage for the drum to be riveted, and a vertically-suspended bifurcated head to straddle the drum and provided at its lower end with horizontally-alined external hydraulic riveting devices, and a framework having brackets supporting the lower ends of the said head, of a feed-pipe supported on said frame and provided with a hydraulic cylinder having oppositely-operating die-carrying rams in line with the external riveting devices, and a spider for supporting the inner end of the feed-pipe centrally in the drum; substantially as described.

5. In a riveting-machine, the combination with suitable riveting-dies, of an alining ring or band adapted to be secured to the drum being riveted and having alining holes with

which the riveting-dies coact; substantially as described.

6. In a riveting-machine, the combination with suitable riveting-dies, of an alining ring or band adapted to encircle the drum being riveted, and having alining holes with which the riveting-dies coact, and screw-studs car-

ried by the ring for engaging rivet-heads on the drum; substantially as described.

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