

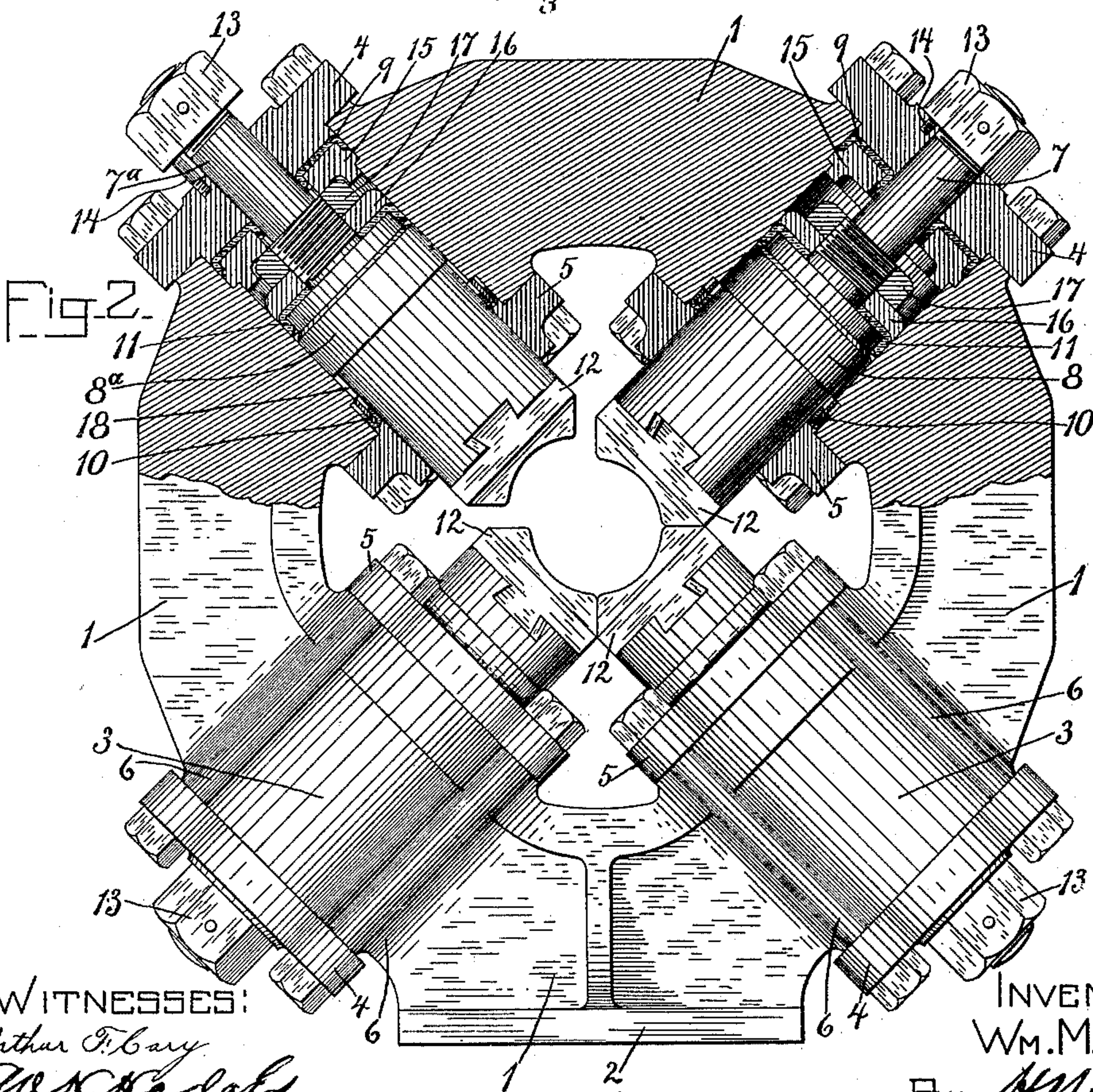
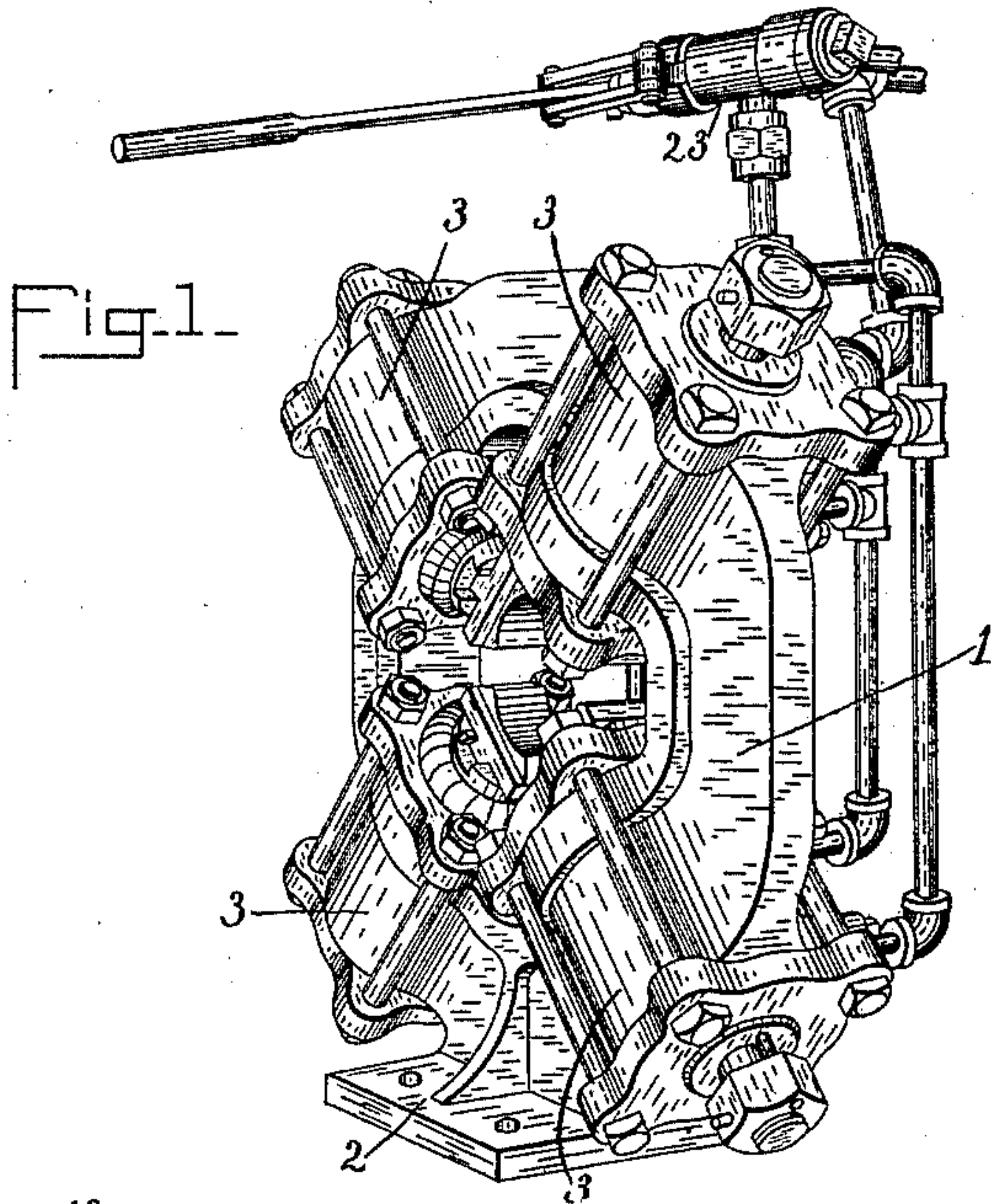
(No Model.)

2 Sheets—Sheet 1.

W. M. WOOD.
BANDING MACHINE.

No. 467,657.

Patented Jan. 26, 1892.



WITNESSES:
Arthur P. Cary
W. M. Wood

INVENTOR:
Wm. M. Wood,
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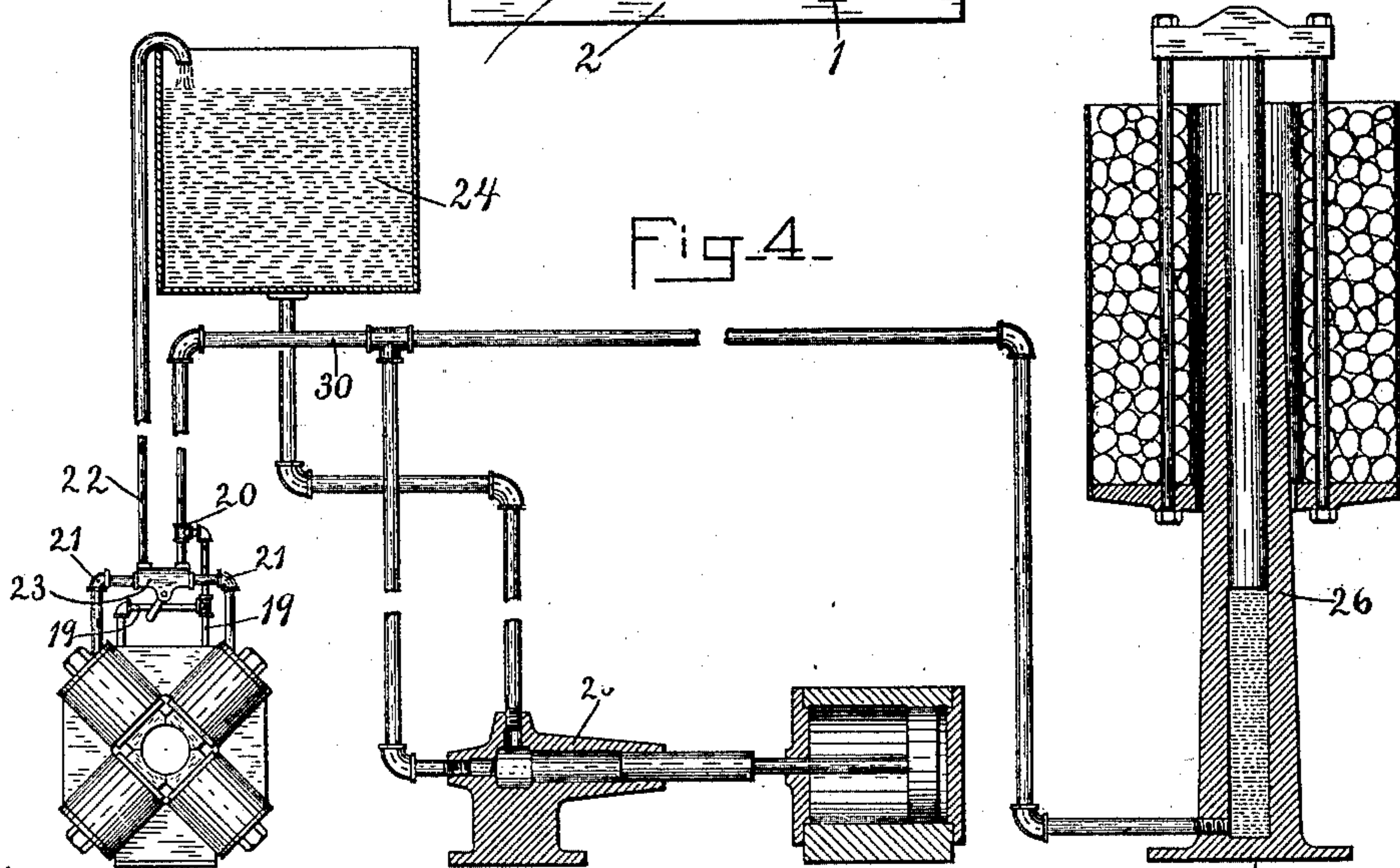
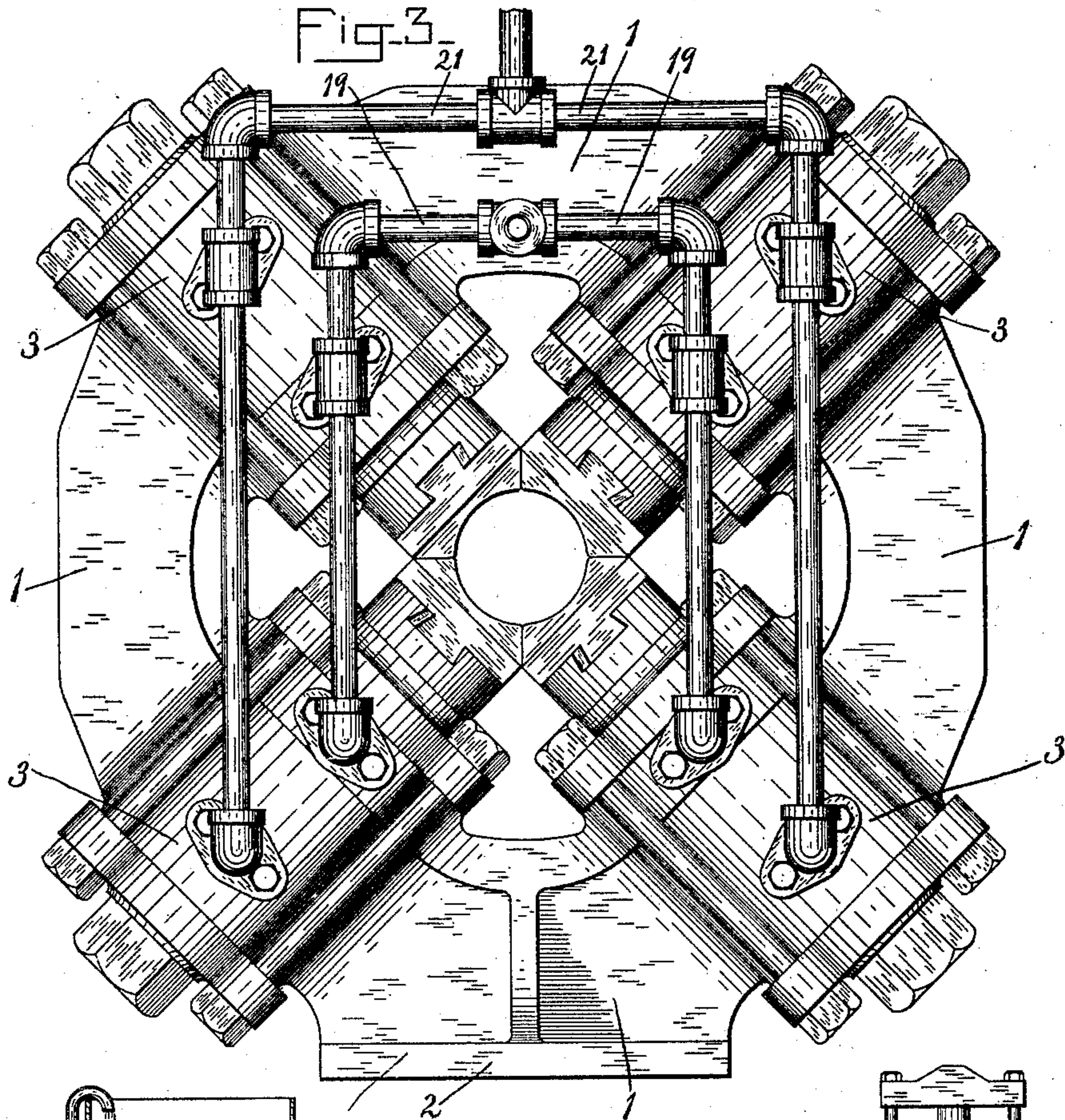
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2 Sheets—Sheet 2.

W. M. WOOD.
BANDING MACHINE.

No. 467,657.

Patented Jan. 26, 1892.



WITNESSES:

Arthur F. Cary.
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INVENTOR:

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UNITED STATES PATENT OFFICE.

WILLIAM M. WOOD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE
AMERICAN PROJECTILE COMPANY, OF SAME PLACE.

BANDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 467,657, dated January 26, 1892.

Application filed October 31, 1891. Serial No. 410,520. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. WOOD, a citizen of the United States, and a resident of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented a new and useful Banding-Machine, of which the following is a specification.

My invention relates to hydraulic apparatus designed for compressing metal rings and similar articles, and is especially applicable to the upsetting or compressing of copper rotating bands on projectiles.

My invention consists of a combination of hydraulic jacks or presses and certain details of construction, which will be hereinafter fully described, and set forth in the claims.

In the accompanying drawings, Figure 1 is a view in perspective of a hydraulic banding-machine embodying my invention. Fig. 2 is a front elevation of the same, partly in section, to more clearly show some of the details of construction. Fig. 3 is a rear elevation of the same machine, showing the hydraulic connections. Fig. 4 is a general view of my improved banding-machine, together with the complete hydraulic plant for operating the same.

Similar numerals indicate similar parts throughout the different figures.

The frame of my machine consists of a heavy casting 1, provided with a base portion having suitable holes, as shown, for securely attaching the machine to a bench or other support by means of lag-screws. This casting is provided with four enlarged portions 3, forming cylinders equidistant from each other and so arranged that lines drawn through their axes meet at a common center.

In Fig. 2 the details of construction are shown. 4 and 5 are cylinder-heads, secured in position against the cylinder ends by means of bolts 6. Suitable perforations are provided in the cylinder-heads 4 and 5 to permit the free movement of the pistons 7 and 7^a and piston-heads 8 and 8^a therethrough. Packing of special form, as shown at 9, 10, and 11, is used to prevent leakage at the joints and also serves as packing for the pistons. The piston-heads 8 are provided with dovetail slots, carrying the forming-dies 12, which are so

made as to be easily replaceable, as a variety of dies are required for different sizes and shapes.

Particular attention is directed to the stop-nuts 13, which limit the inward throw of the pistons at a predetermined point. Each nut is securely pinned in position and provided with holes at one side to permit it to slide freely on its guide 14, by means of which all axial movement of the pistons is prevented, thus keeping the forming-dies in the desired position.

15 is a collar fitting closely in the outer portion of the cylinder and supported against inward movement by a shoulder, as shown in the drawings. This collar is so shaped as to allow the ring or packing material to fold over its edges and inward, forming an excellent joint. A similar joint is formed by the packing 11 and metal washer 16, secured in position by the nut 17, which fits a thread on the inner portion of the piston-rod near its head.

Upon examination of the drawings it will be seen that the piston-head is reduced in diameter at its outer end, where it passes through the cylinder-head 5, so as to form the small annular chamber 18. This is connected direct with the main pipe, so that a constant pressure is maintained on the under side of the piston sufficient to keep the same at its extreme outward position, as shown by 8^a. The packing 10 consists of a flat metal ring, over the edges of which the packing material is folded, as shown.

In Figs. 3 and 4 the hydraulic connections are shown. The pipes 19 are connected with the main pipe 30 at 20 and lead to the inner ends of the four cylinders supplying the necessary pressure in the chambers 18, Fig. 2, to support the pistons at their outward limit when the working pressure is not applied to the opposite side of the piston-head. Pipes 21 lead to the outer ends of the cylinders, supplying the working pressure, and are connected with the main pipe 30 at 22 by an ordinary slide-valve, as shown at 23 in Figs. 1 and 4.

To more clearly illustrate the apparatus, the steam-pump 25, accumulator 26, and tank 24, with the various pipes connecting the same,

have been added, but require no special description, as the details are fully shown by the drawings.

The operation of my invention is as follows:

5 The pump is operated until the weights of the accumulator have been raised, as shown in the illustration, the constant pressure in 18 keeping all the pistons in the extreme outward position away from the work. By throwing 10 the valve-handle to the left water enters the working space of the four cylinders simultaneously, and the pistons move forward toward the common center, where the work is placed, the stop-nut 13 being adjusted to limit 15 the stroke, as desired. The pistons being independent of each other and limited in throw, a perfectly circular band is obtained and the shell itself is not subjected to an excess of pressure. By the banding-machines now in 20 use the projectiles are often so crushed as to be entirely useless, owing to slight irregularity in the operation of the different parts and from the fact that the inward pressure is not checked at all.

25 My invention overcomes the faults inherent in the old machines and has the further

advantage of being very durable, and is so simple as to be easily and cheaply constructed.

What I claim for my invention is—

1. A band-compressing machine consisting 30 of hydraulic cylinders having pistons carrying forming-dies, which move on lines meeting at a common center and the inward movement of which is limited, substantially as and for the purpose described.

2. A band-compressing machine consisting 35 of independent hydraulic cylinders having pistons carrying forming-dies and limited in throw by a stop-nut, substantially as and for the purpose described.

3. A machine for compressing bands on projectiles, consisting of hydraulic jacks or presses radially arranged about the work, the pistons of which have a limited throw, substantially as and for the purpose described. 40 45

Signed at Boston, in the county of Suffolk and Commonwealth of Massachusetts, this 27th day of October, A. D. 1891.

WILLIAM M. WOOD.

Witnesses:

W. E. SYMONDS,
M. BACHELDER.