

No. 689,410.

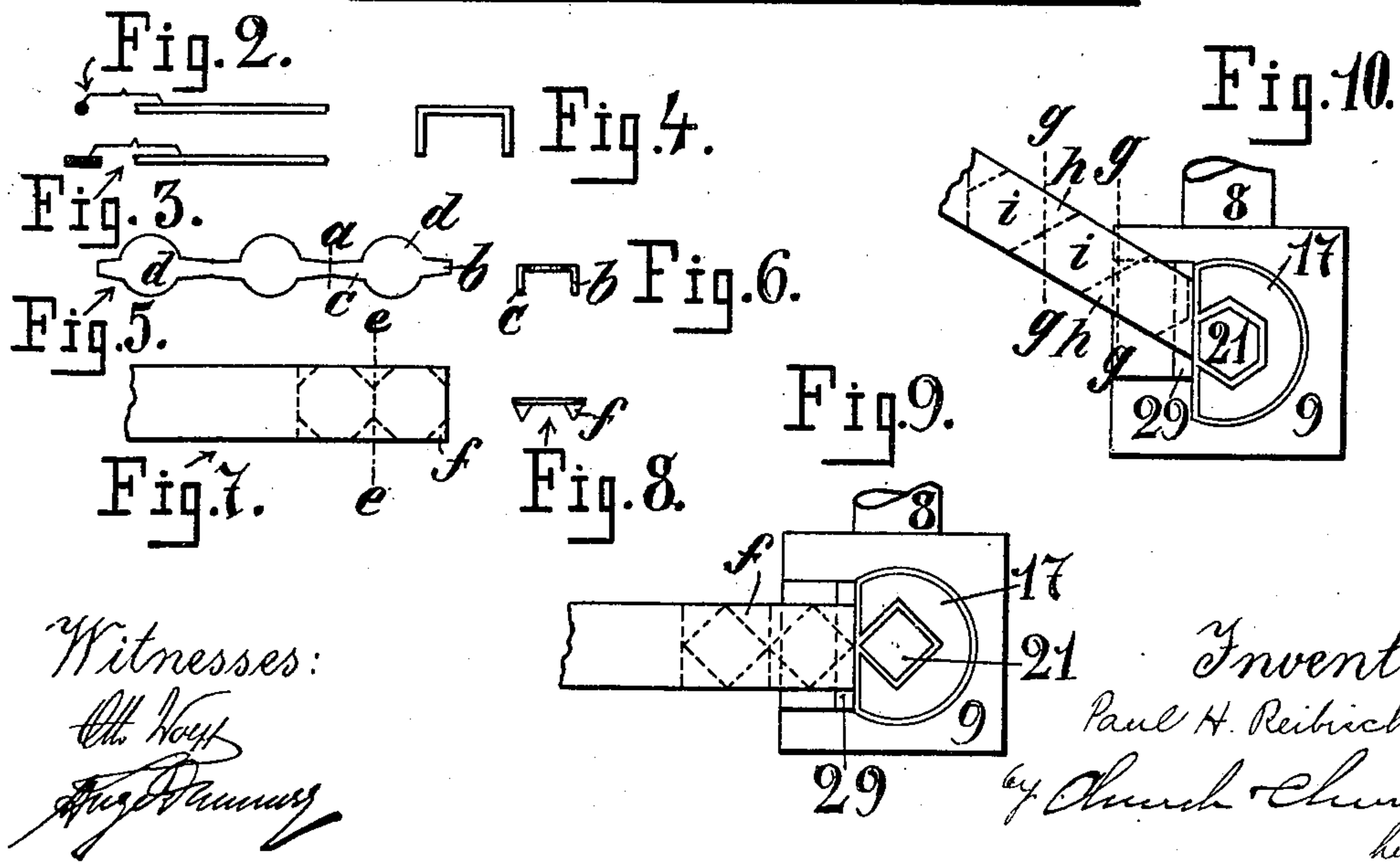
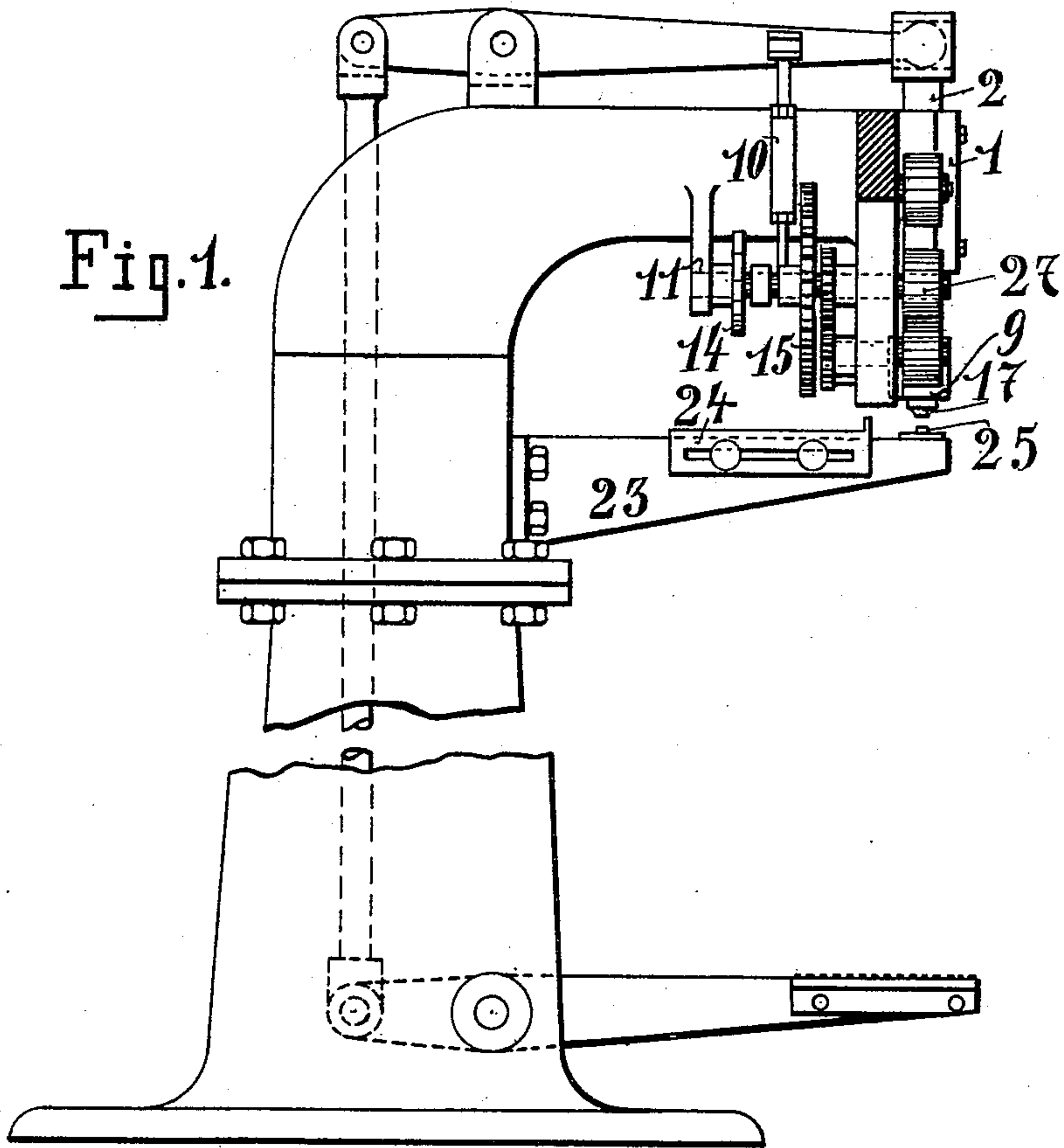
Patented Dec. 24, 1901.

P. H. REIBISCH.
STAPLE FORMING AND SETTING MACHINE.

(Application filed Aug. 18, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:
Chas. Hays
Frederick J. Murray

Inventor:
Paul H. Reibisch
by *Church & Church*
his Attys

P. H. REIBISCH.
STAPLE FORMING AND SETTING MACHINE.

(Application filed Aug. 18, 1900.)

(No Model.)

3 Sheets—Sheet 2.

Fig. 11.

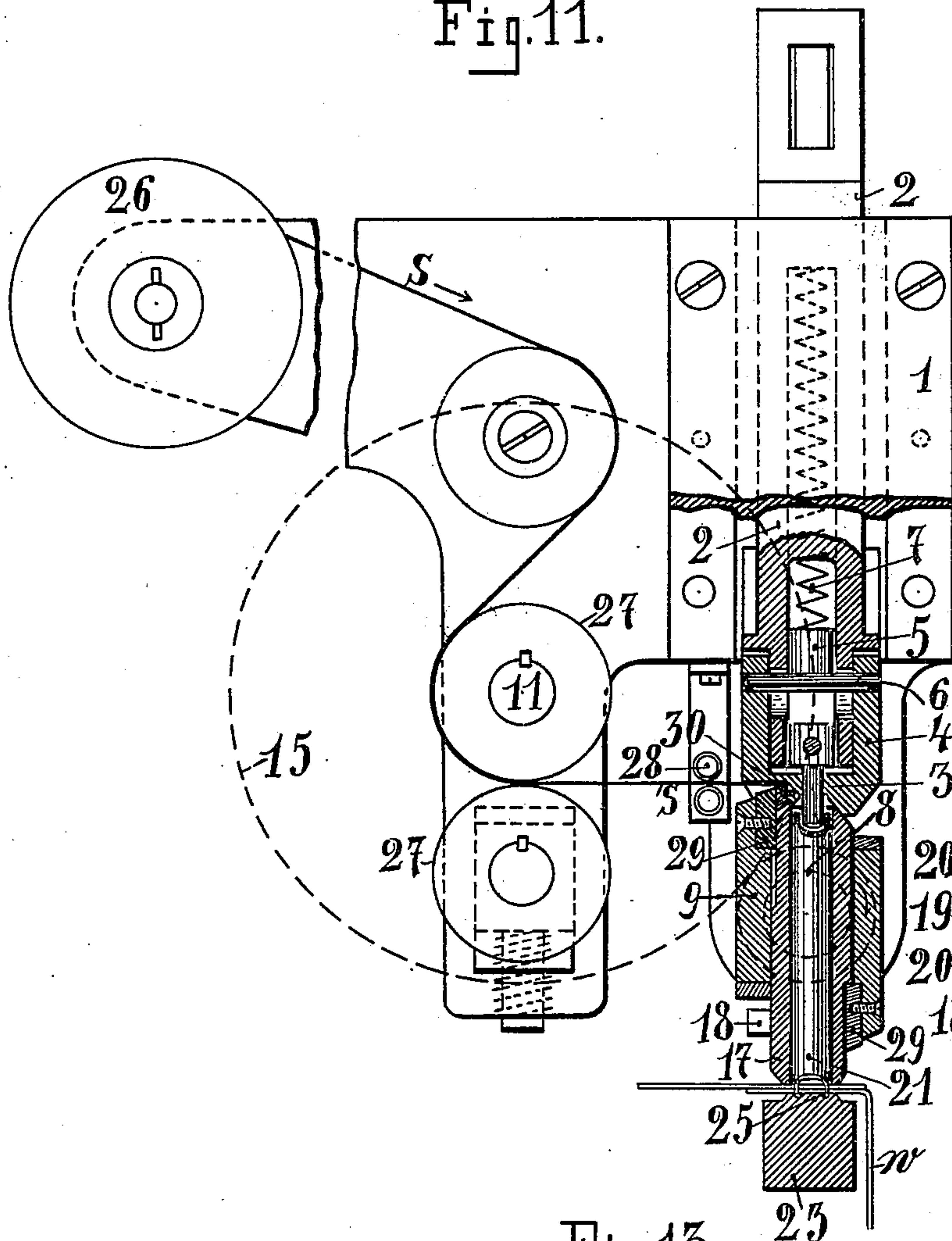


Fig. 12.

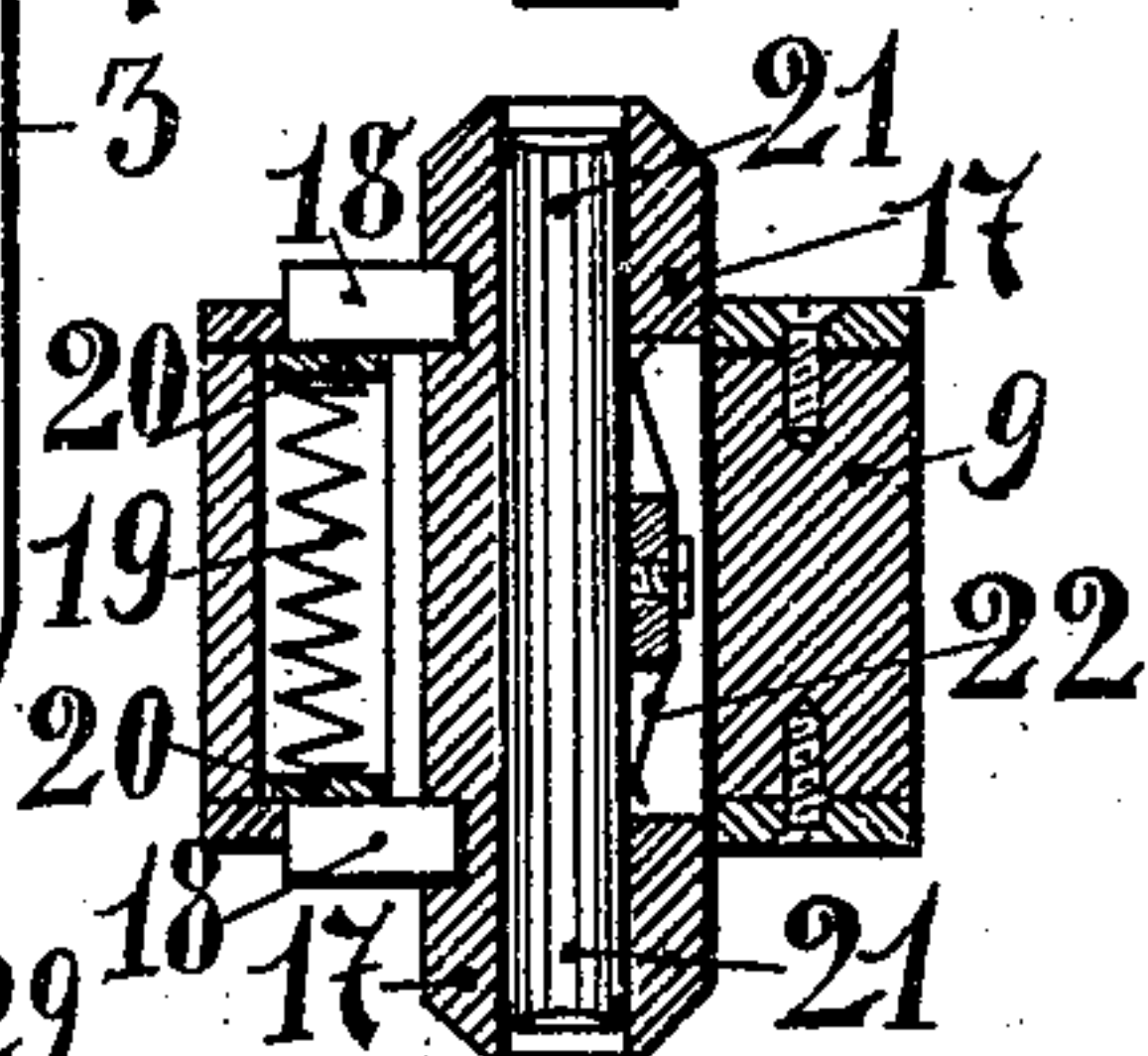
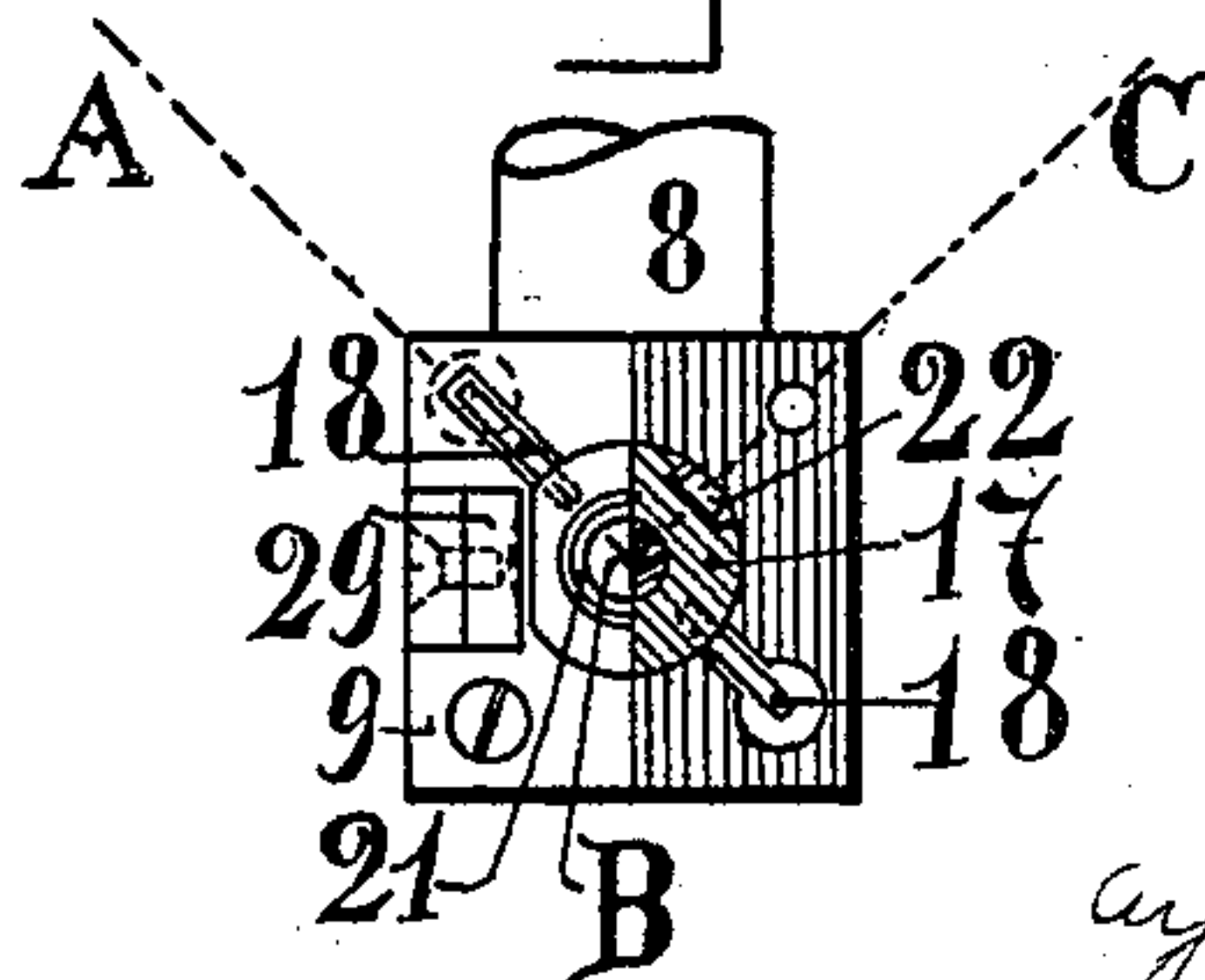


Fig. 13.



Witnesses:

Wm. H. Hays
Thos. J. Hays

Inventor:

Paul H. Reibisch
by Chas. H. Church
his atty

P. H. REIBISCH.
STAPLE FORMING AND SETTING MACHINE.

(Application filed Aug. 18, 1900.)

(No Model.)

3 Sheets—Sheet 3.

Fig. 14.

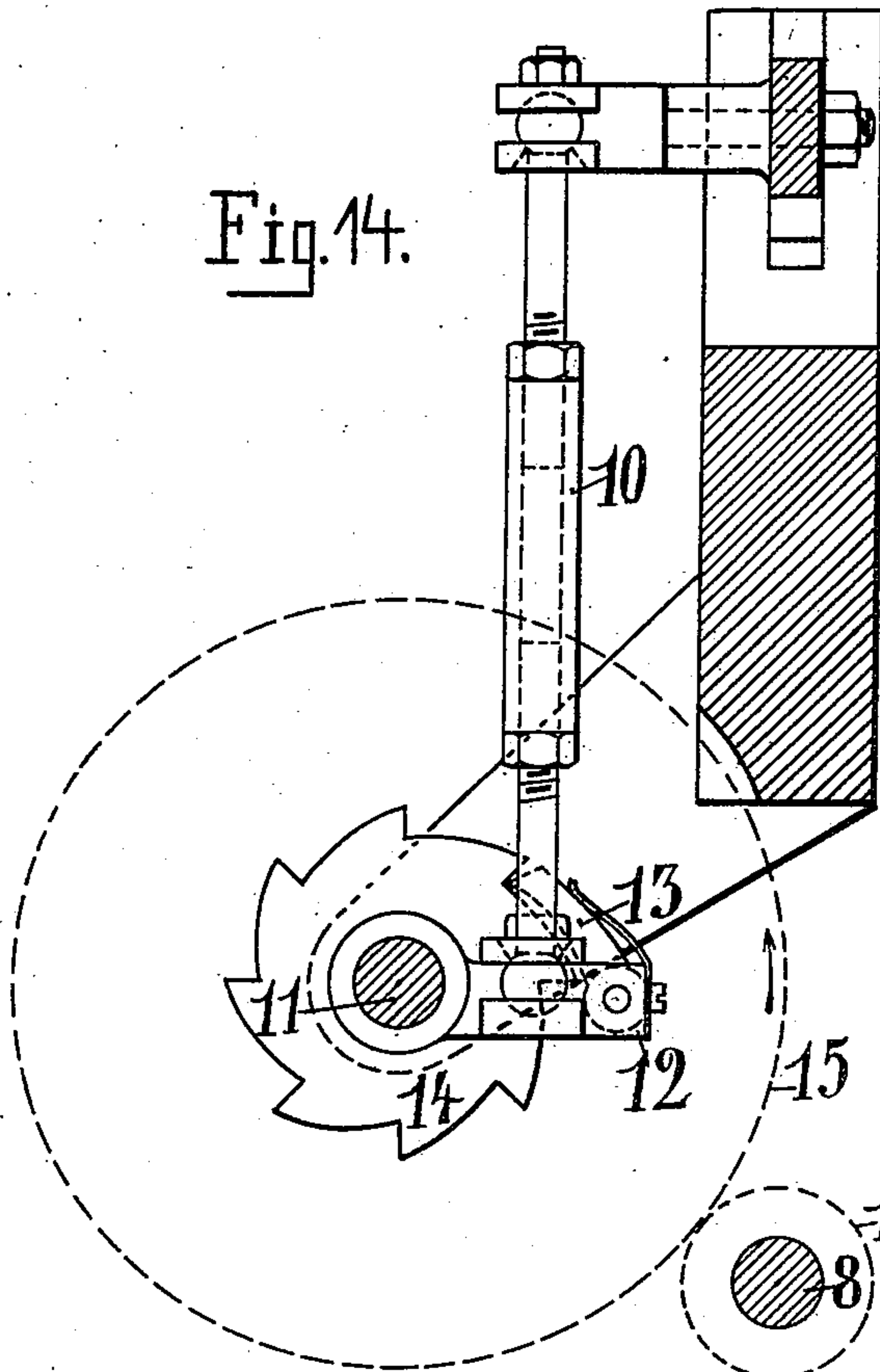


Fig. 15.

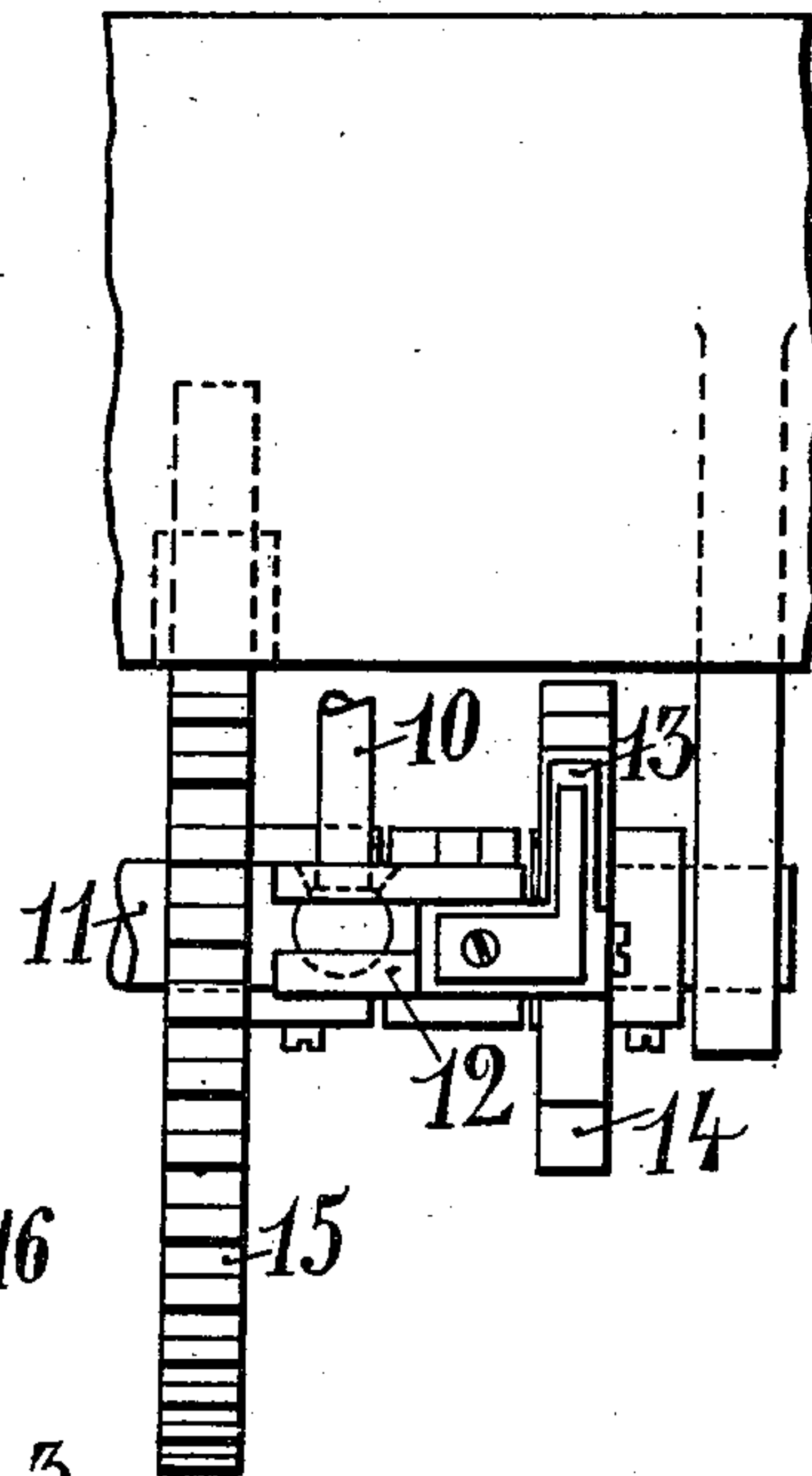


Fig. 16.

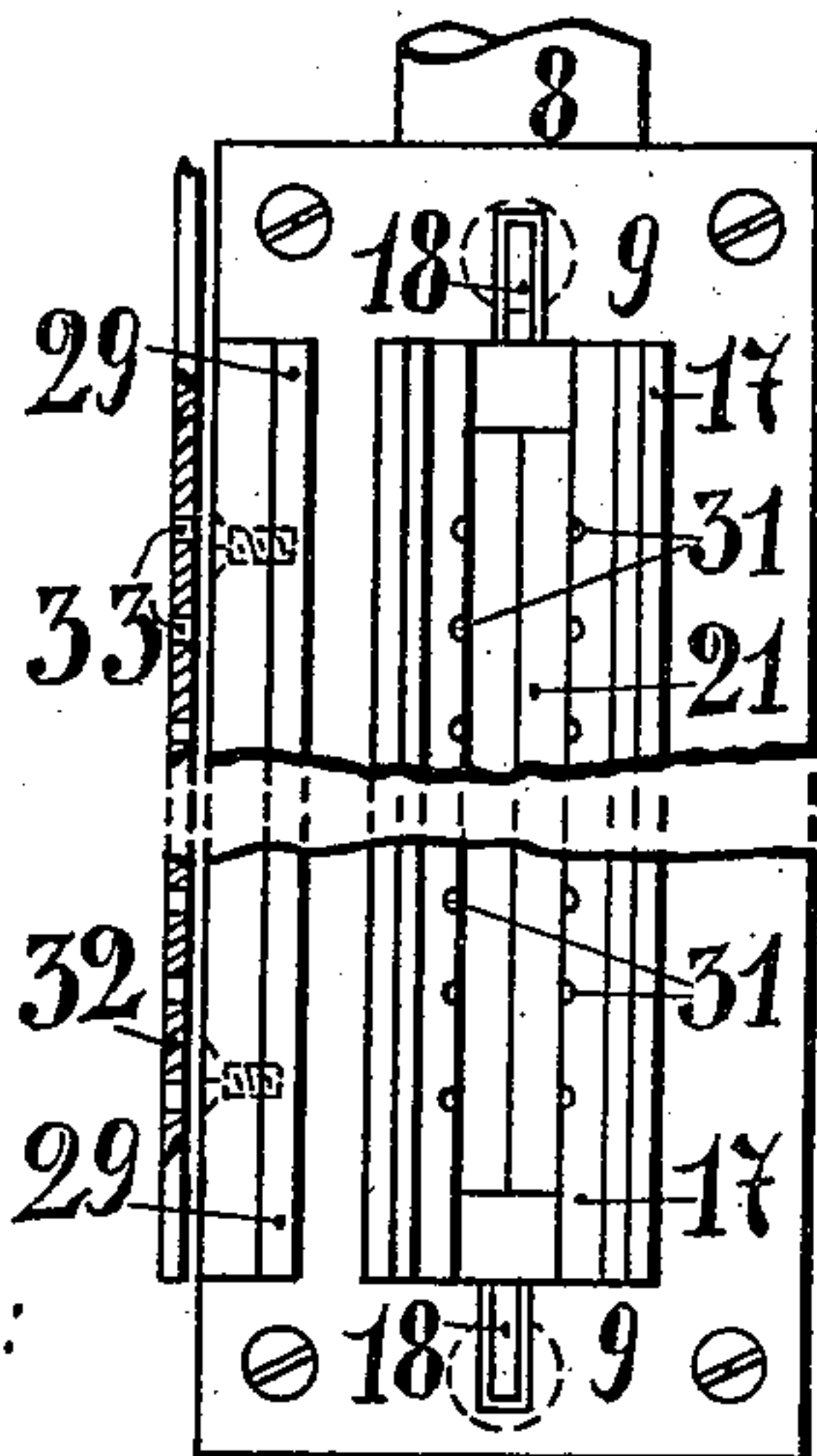
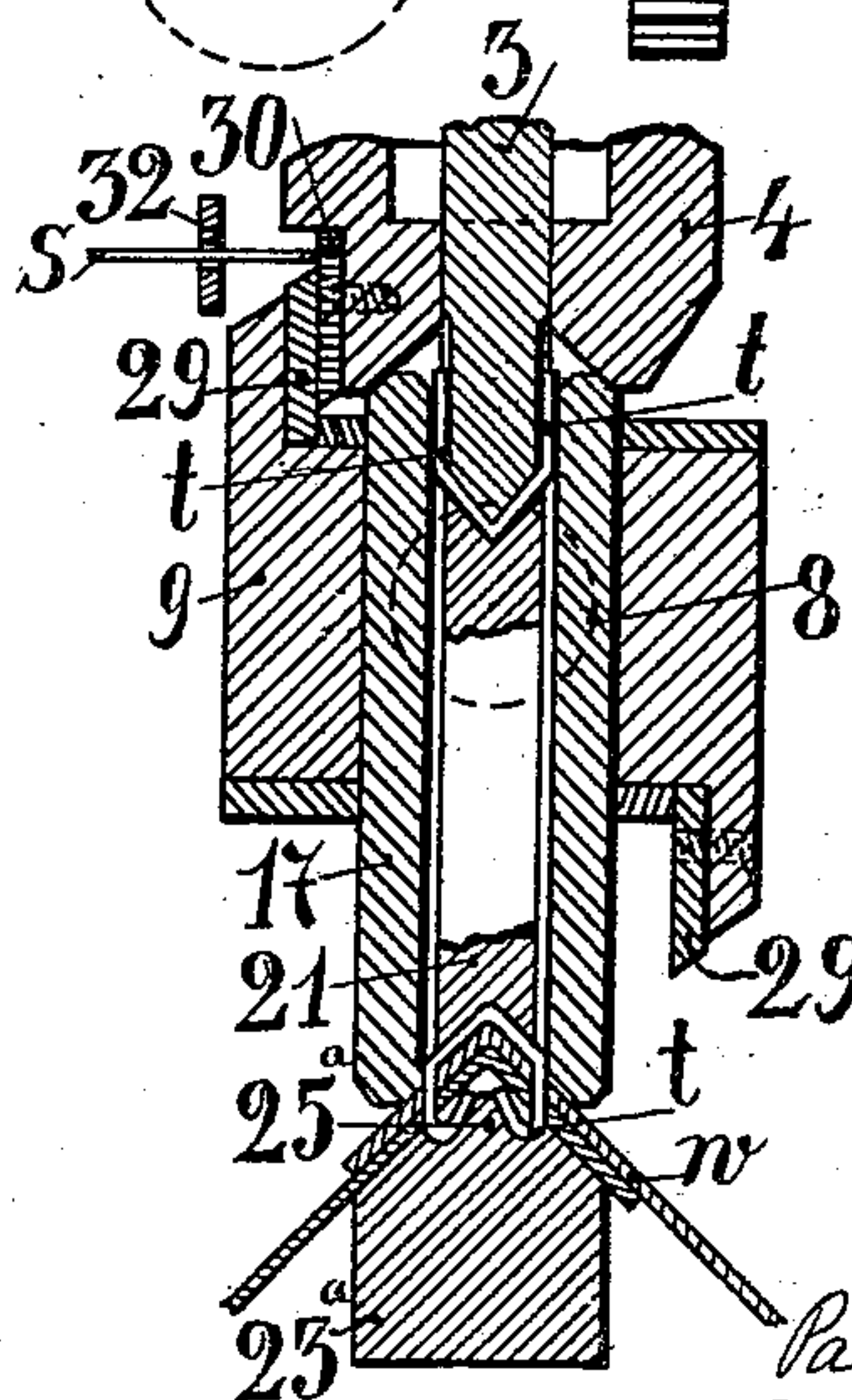


Fig. 17.



Witnesses:

Chas. Hoff
Aug. H. Reibisch

Inventor:

Paul H. Reibisch
by Church & Church
his atty

UNITED STATES PATENT OFFICE.

PAUL HERMANN REIBISCH, OF DRESDEN, GERMANY.

STAPLE FORMING AND SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 689,410, dated December 24, 1901.

Application filed August 18, 1900. Serial No. 27,335. (No model.)

To all whom it may concern.

Be it known that I, PAUL HERMANN REIBISCH, a subject of the Kingdom of Saxony, residing at Dresden, A, in the Kingdom of Saxony, Germany, have invented certain new and useful improvements in or relating to machines for applying and fastening rivets or fasteners to cardboard boxes and other articles to be joined or strengthened, (for which I have made application for Letters Patent in Germany, No. H. 24,071, III/11, dated May 18, 1900, and in England, No. 14,135, dated August 7, 1900,) of which the following is a specification.

The present invention relates to machines for applying and fastening rivets or fasteners to cardboard boxes and other articles to be joined or strengthened, the machine itself forming or shaping the fastening material, such as a wire or strip fed forward from a supply-reel or the like, into the form of separate fasteners, which are then driven into the material to be secured or strengthened. The machine carries out both parts of the work—*i. e.*, the forming or shaping of a fastener and the driving of a previously-formed fastener into the work—simultaneously or at one operation—that is to say, while a fastener formed or shaped by the previous operation of the machine is being driven into the work and by the same operation a fastener to be next driven is formed or shaped ready for driving. The desired result is obtained by the coöperation of suitable stamps and dies, the latter being reversed or turned through an angle of one hundred and eighty degrees between each two operations of the machine, whereby a fastener may be formed in one side of the die at the same time that a previously-formed fastener is discharged into the work from the opposite side, the fasteners being discharged in a direction opposite to that in which they are forced into the die.

Obviously the invention is a comprehensive one, and the particular form of fastener adapted to be shaped and driven, as well as the particular means for securing the proper relative movements of the stamps and dies, as well as the particular form of these parts, is immaterial; but the best results have been secured in a machine wherein a rotary head is provided with dies on opposite sides thereof, in one of which dies a fastener is formed

by a vertically-reciprocating stamp, and at the same time a fastener previously formed in the other die is discharged and driven by a secondary stamp operating in unison with the first-mentioned stamp, the work being held during the operation by a suitable workholder, which may where the work is thin constitute a counter-stamp for upsetting the penetrating portions of the fastener. When, as in the preferred construction, the workholder is fixed, the dies are movable toward and from the same, and this may be accomplished with a rotary head mounted in fixed bearings by providing dies in the form of a sleeve movable transversely through said head, all as will be hereinafter described, such construction being the specific embodiment of the invention adopted for illustration in the present application.

Referring to the accompanying drawings, Figure 1 is a side elevation of a simple form of machine embodying the present invention, a portion being broken away and the strip feed-gear omitted for the sake of clearness. Figs. 2 to 10 show some of the various forms of fastening material or devices which the machine may be adapted to shape and set. Fig. 11 is an elevation, partly in section and on an enlarged scale, of the principal working parts of the machine. Fig. 12 is a vertical section on the lines A B B C of Fig. 13. Fig. 13 is a plan view, partially in section, of the reversible head and dies. Figs. 14 and 15 are views of the gearing for imparting the turning movement to the reversible head. Figs. 16 and 17 are a top plan and vertical section, respectively, of a modified form of die and stamp.

Similar characters of reference in the several figures indicate the same parts.

In the head 1 of the machine there is mounted to slide vertically a stamp-shank 2, reciprocated by a treadle or machine-power. This stamp-shank is provided at the lower end with a pin or plunger 3, Fig. 11, constituting the effective part of the forming-stamp, the same being adapted to form or shape the fastener by driving or "drawing" the same into a suitable die. Surrounding and carried by the forming-stamp and its shank is a sleeve 4, having a limited movement independent of the shank or stamp, said sleeve being held

down with relation to the shank by a strong spring 7, located in the shank and transmitting its pressure to a cross-pin 6, carried by the sleeve and passing through a slot in the wall of the shank and beneath a bolt 5, on which the spring bears. The die with which the forming-stamp coöperates is in a rotary head 9, which in the present instance is carried by a horizontally-arranged spindle 8, Figs. 11, 13, and 14, journaled in fixed bearings in the frame and adapted to be rotated through an angle of one hundred and eighty degrees by gearing illustrated in Figs. 1, 14, and 15. This gearing preferably comprises an arm 12, carrying a pawl 13, loosely mounted on shaft 11 and actuated by a connecting-rod 10. A ratchet-wheel 14, adapted to be engaged by the pawl, is keyed on the shaft 11, and toothed wheels 15 and 16, Fig. 14, are keyed, respectively, on shafts 11 and 8 to transmit the movement to the latter and so to the head 9. The half-rotation is effected, as shown in Fig. 14, while the forming-stamp is ascending.

Inasmuch as the head 9 is mounted in fixed bearings and it is desirable that a fixed work-support or counter-stamp, such as indicated at 23, be employed, provision is made for bringing the dies into proper relation for coöperation therewith by making said dies movable in the head in the line of stamp movement. For this purpose the rotary head is provided with a boring or passage at right angles to its axis of rotation, and in this passage a longitudinally-movable sleeve 17 is mounted, said sleeve being, however, held against rotation and in its central position by side extensions 18, guided in slots in the head with springs 19, housed in cylindrical expansions of said slot between them. Said springs press against the two cover-plates of the head, Fig. 12, and simultaneously against the extensions 18 by small plates 20 at the ends of the springs. In this preferred arrangement the opposite ends of the sleeve 17 constitute the dies, in the upper of which the fastener is formed and from the lower of which the previously-formed fastener is driven into the work, the ejecting and driving of the formed fastener being performed by a driving-stamp, in this instance in the form of a plunger 21, located in the sleeve 17, but adapted to be operated by the shank 2 through the medium of the forming-stamp 3, which enters the uppermost die and forces the driving-stamp downwardly. The said driving-stamp is held in the position to which it is moved preferably by friction secured, for instance, by a spring 22, located in a groove in the sleeve and bearing against the stamp. The ends of the sleeve 17 or outer parts of the dies are made conical and the end of the sleeve 4 is correspondingly recessed. Thus when the shank or forming-stamp descends the sleeve 4 first coöperating with the sleeve 17 forces the same down onto the work, which is placed on the

work-holder 23, and then the forming-stamp descends and forces the driving or setting stamp down against the work. This work-holder may be in the form of a counter-die to upset the points of the fastener, for which purpose it may have suitable grooves 25 in its upper surface, as shown in Fig. 11, and at 25^a, Fig. 17.

The strip of fastening material S, Fig. 11, is preferably fed from a reel 26, the feed being a positive one secured by passing the strip between rollers 27, one of which is on the shaft 11 and is rotated thereby, while guide-rollers 28 are arranged in such manner that the strip enters between the forming-stamp and die. As the end of the strip advances into position it passes between the jaws of a cutter, one of said jaws, as 29, being preferably located on the head 9, while the other jaw is preferably located on the sleeve 4. Where the jaws 29 are on the reversible head, two jaws are provided, one for each die, as shown. In operation the end of the strip is fed in at the moment when the forming-stamp is ascending and the head reversing. Thus the head turns up under the end of the strip and moving in the same direction prevents any catching or buckling of the strip. One movement or feed of the strip advances it until it is in position over the die. Thus in the form of strip shown in Fig. 5 it is advanced until the point *a* is between the cutting edges of the cutter and the body *d* is directly under the forming-stamp. As the forming-stamp descends the sleeve 4, owing to the pressure of the spring 7, will first cut off the end of the strip, at the same time centering and holding the severed piece in position on the die, and by the same movement the dies are moved downwardly upon the work. Further movement of the stamp-shank forces the forming-plunger downwardly into the upper die to form or shape a fastener therein and at the same time forces the driving or setting stamp downwardly to discharge and drive the fastener previously formed or shaped in the lower die. The movements of the parts will be readily understood from Fig. 11, and from this figure it will be seen that in the present machine the movement is transmitted to the driving-stamp by the forming-stamp itself, this being a most convenient arrangement where the rotary head is journaled in fixed bearings.

It will be understood that the fastener formed or shaped at one operation of the machine remains in its position in the die after the forming-stamp has ascended, but the sleeve or die is returned to its medial position, while the driving-stamp retains its relative position in the die, owing to the frictional resistance to its movement. During the ascent of the shank and stamp the head is turned through an angle of one hundred and eighty degrees, and the strip is advanced into position for the end to be severed and formed

or shaped into a fastener. The penetrating ends of the fastener are always directed toward the outside of the die, the said fasteners being formed by pressure applied in one direction and discharged by pressure applied in the opposite direction.

It will be understood that the invention is susceptible of wide variation, nor is it limited to the forming and driving of any particular form of fastener nor to the formation and driving of a single fastener at each operation. Thus in Figs. 16 and 17 the construction illustrated is adapted for the working of wire fasteners, such as shown in Figs. 2 and 4, and also for the simultaneous formation and driving of several fasteners at each operation and for setting said fasteners in the corner or angular portion of the work. To effect the latter result, it is only necessary to form the faces of the stamps angular, as in Fig. 17, and to provide the work-holder 23^a with a similarly-formed upper side and, if desired, with a groove 25^a for upsetting this form of fastener.

The employment of round wire is rendered feasible by providing the forming-stamp or die with grooves, as at 31, Fig. 16, adapted to serve as guides for the shanks of the fasteners, and in order to form and fix several fasteners simultaneously the knife, dies, and stamps are elongated, as in Fig. 16, and several grooves 31 formed therein, all as shown in said last-mentioned figure. The wires from which the fasteners are formed are preferably fed through a guide-bar 32, Fig. 17.

Various forms of fastener may be employed, and as types in addition to those already described reference may be had to Figs. 7, 8, 9, and 10. In Figs. 7, 8, and 9 a metal strip is cut off squarely on the line *ee* and the corners bent down to form penetrating-points *a* at *f*, Fig. 8. In Fig. 10 the strip is cut diagonally on the lines *gg*, and the acute corners *h* are bent down, forming two penetrating-points and leaving a hexagonal body *i* to the fastener.

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

1. In an apparatus for preparing and setting fasteners the combination of the following instrumentalities, to wit, a reversible head having die-openings on opposite sides thereof, means for reversing the head at each operation of the machine, a forming-stamp mounted to reciprocate in a line at right angles to the axis on which the head rotates and cooperating with said die-openings alternately to form fasteners therein, a driving-stamp operating in unison with the forming-stamp cooperating with said dies alternately to eject and drive the previously-formed fastener by a movement the reverse of that of the fastener in entering the die, means for operating the stamps simultaneously and means for feeding a metal strip into position to be operated on by the

forming-stamp and dies; substantially as described.

2. In an apparatus for preparing and setting fasteners the combination of the following instrumentalities, to wit; a work-holder, a reversible die having die-openings on opposite sides and movable toward and from the work-holder at right angles to its axis of rotation, means for reversing said die whereby the die-openings may be presented to the work alternately, two stamps, one cooperating with one die-opening to eject and drive a fastener and the other cooperating with the other die-opening to form a fastener therein, means for operating said stamps simultaneously and means for advancing and holding the die advanced toward the work-holder during the formation and driving of the fasteners; substantially as described.

3. In an apparatus for preparing and setting fasteners, the combination of the following instrumentalities, to wit; a work-holder, a reversible die movable toward and from the work-holder at right angles to its axis of rotation and having two die-openings; a forming-stamp cooperating with the die-opening remote from the work-holder and a driving-stamp cooperating with the die-opening next to the work-holder, means for operating said stamps simultaneously whereby a fastener is formed and a previously-formed fastener driven at each operation of the machine, means for feeding a strip to the forming-stamp and die, means for moving the die toward the work-holder at each operation of the machine and means for severing the strip during the excursion of the die toward the work-holder; substantially as described.

4. In an apparatus for forming and setting fasteners the combination with a reversible die-head having dies on opposite sides, and strip-cutting edges adjacent and reversible with the dies, of a reciprocatory stamp-shank, stamps moved thereby and adapted to cooperate with either of the dies, a strip-cutting edge also moved by said shank and adapted to cooperate with either of the cutting edges, means for feeding a strip intermittently and means for reversing the dies and cutting edges; substantially as described.

5. In an apparatus for forming and setting fasteners, the combination with a work-holder, a reversible die having die-openings on opposite sides and movable toward and from the work-holder and stamps cooperating alternately with said die-openings, of a reciprocatory stamp-shank adapted to move the dies toward the work-holder and to advance the stamps to form a fastener in one die-opening and simultaneously drive a previously-formed fastener from the other die-openings, means for feeding a strip of fastener material and means for reversing the dies at each operation of the machine; substantially as described.

6. In an apparatus for forming and setting fasteners, the combination with a reversible

head having die-openings on opposite sides and means for reversing said head, of a setting-stamp mounted in and working through said head, a work-holder below and a forming-stamp above said head, said stamps being adapted to cooperate with either of the die-openings, whereby a fastener may be formed and a previously-formed fastener set at one operation; substantially as described.

7. In an apparatus for forming and setting fasteners, the combination with a reversible head having forming-dies on opposite sides and means for reversing said head, of a setting-stamp extending through the head and having oppositely-arranged operative faces working in the forming-dies, respectively, a work-holder below and a forming-stamp above said head adapted to simultaneously cooperate with the setting-stamp to form a fastener and set a previously-formed fastener; substantially as described.

8. In an apparatus for setting fasteners the combination with a stamp and work-holder with means for giving the same a relative movement toward and from each other, of a head located between said stamp and work-holder and mounted on an axis at an angle to the line of relative movement of the stamp and work-holder, means for reversing the head, fastener-holding dies at diametrically opposite points in said head and a setting-stamp working transversely through said head and adapted to cooperate simultaneously with the work-holder and upper stamp whereby a fastener is inserted in one die and a previously-inserted fastener discharged from the other die and set against the work-holder; substantially as described.

9. In an apparatus such as described the combination with a work-holder and stamp with means for giving the same a relative movement toward and from each other, of a head mounted between the work-holder and stamp, means for reversing the head, a die-sleeve mounted to slide in said head in line with the line of stamp movement and a setting-stamp mounted to slide in said sleeve, whereby at each movement of the work-holder and first-mentioned stamp toward each other, a fastener may be inserted in one end of the sleeve and a previously-inserted fastener discharged and set; substantially as described.

10. In an apparatus such as described, the combination with the oppositely-disposed work-holder and stamp, movable one toward and from the other and a reversible head located between said dies with means for reversing said head, of a straight fastener-holding sleeve working transversely through said head and in line with the stamp movement, a setting-stamp working in said sleeve and springs for holding said sleeve and setting-stamp in position within the head; substantially as described.

11. In an apparatus such as described, the

combination with the reciprocatory forming-stamp and fixed work-holder, of a reversible head located between said stamp and work-holder, means for reversing the head, a sleeve working through said head in line with the stamp movement, a spring cooperating with said sleeve to return it to central position, a setting-stamp working in the sleeve and a friction-spring cooperating with the plunger to retain it in the position to which it is moved; substantially as described.

12. In an apparatus such as described, the combination with the oppositely-disposed forming-stamp and work-holder, of a reversible head located between said stamp and work-holder, means for reversing the head, a setting-stamp working through said head in alinement with the stamp movement, a fastener-strip feed, strip-severing knives on opposite sides of the head and a cooperating knife moving with the forming-stamp; substantially as described.

13. In an apparatus such as described, the combination with the oppositely-disposed forming-stamp and work-holder, the reversible head located between said stamp and work-holder, means for reversing the head and the setting-stamp working through said head in alinement with the forming-stamp and work-holder and adapted to cooperate with both simultaneously, of a severing-knife moving with the forming-stamp and oppositely-located severing-knives on the head, one located in proximity to each end of the setting-stamp and adapted to cooperate alternately with the knife moving with the forming-stamp; substantially as described.

14. In an apparatus such as described, the combination with the reciprocatory forming-stamp, work-holder, the reversible head having the dies and setting-plunger mounted therein and means for reversing the head, of a severing-knife on the reversible head, a spring-pressed sleeve carried by the forming-stamp and a cooperating severing-knife on said sleeve; substantially as described.

15. In an apparatus such as described, the combination with the reciprocatory forming-stamp, the work-holder, the reversible head between said stamp and work-holder and means for reversing the head, of the die-sleeve mounted in said head to move in alinement with the forming-stamp and work-holder, the setting-stamp in the sleeve and the spring-pressed sleeve carried by the forming-stamp and cooperating with the sleeve mounted in the head; substantially as described.

16. In an apparatus for forming and setting fasteners, the combination with a work-holder, a reversible die movable toward and from the work-holder, and having oppositely-arranged die-openings, said die-openings being adapted to receive a fastener when in one position and to form a setting-guide when in

the reverse position and means for reversing
the die, of a setting-stamp, a reciprocating
forming-stamp, and a spring-pressed sleeve
moving with the forming-stamp and coöper-
5 ating with the die to move the same toward
the work-holder in advance of the forming-
stamp; substantially as described.

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

PAUL HERMANN REIBISCH.

Witnesses:

OTTO WOLFF,

C. F. HUGO DUMMER.