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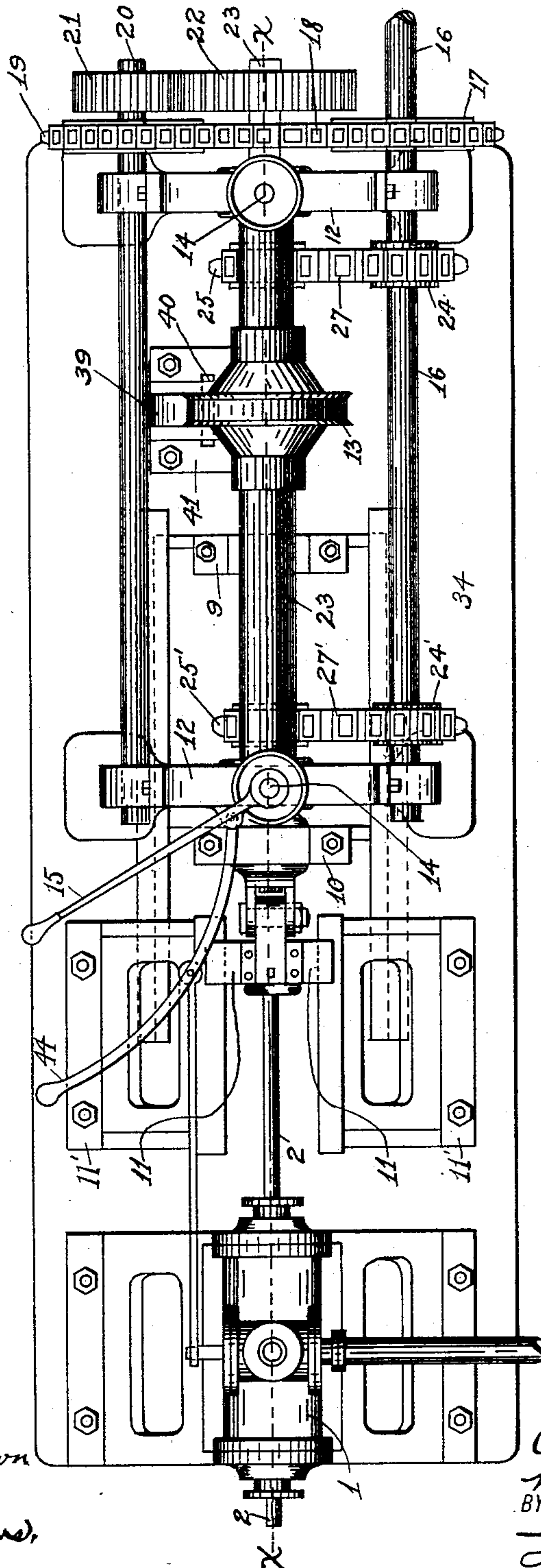
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C. D. DE FOREST & W. F. KENNA.
APPARATUS FOR ROLLING PIPE COUPLINGS.

No. 591,742.

Patented Oct. 12, 1897.

Fig. 1.



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(No Model.)

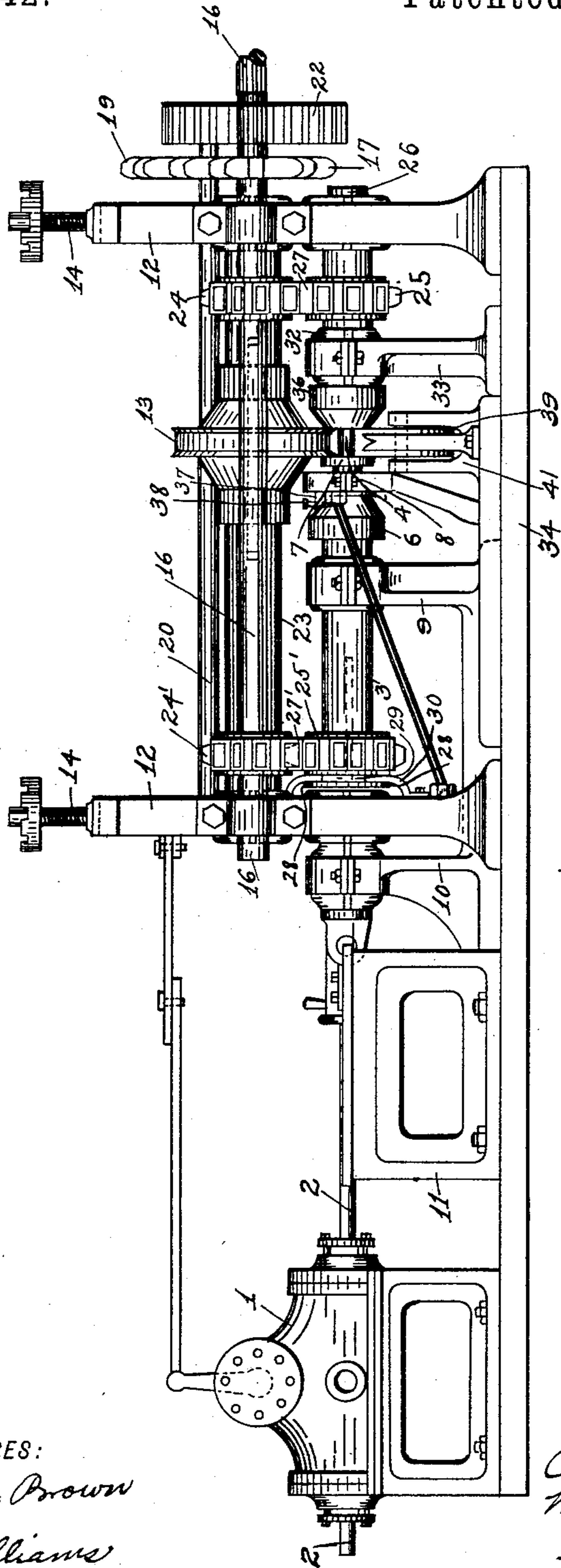
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Fig 2.



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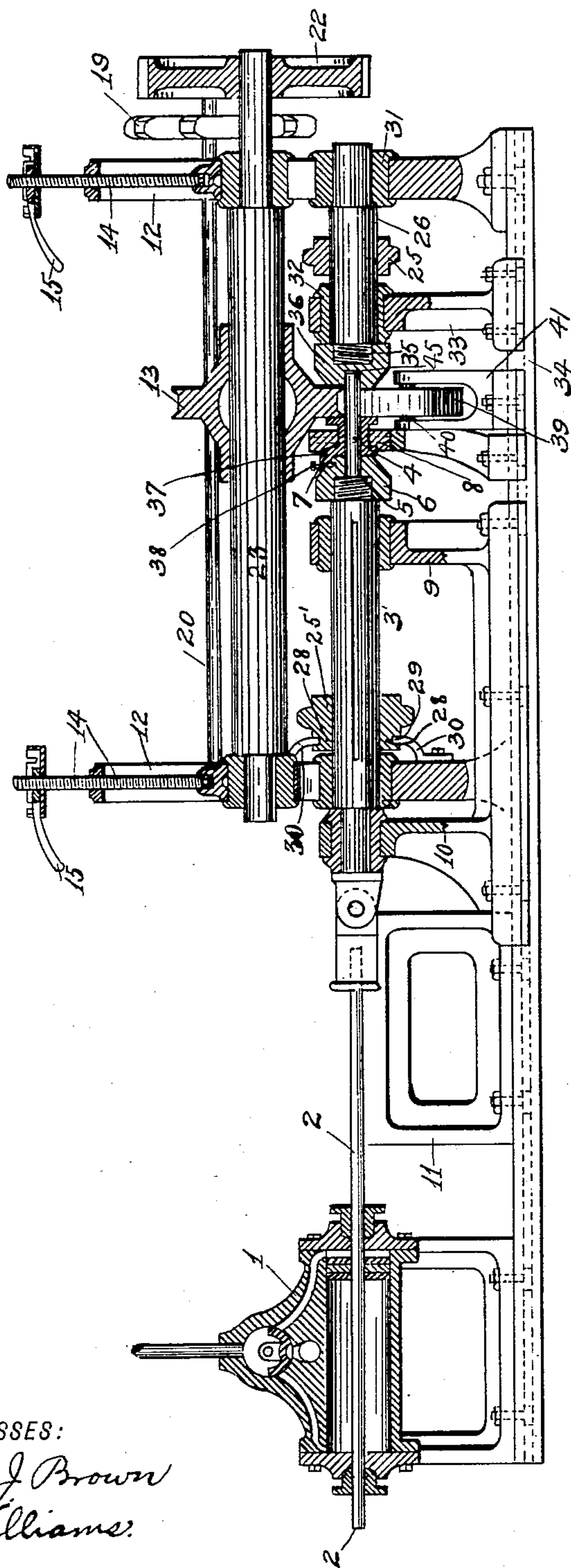
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Fig 3.



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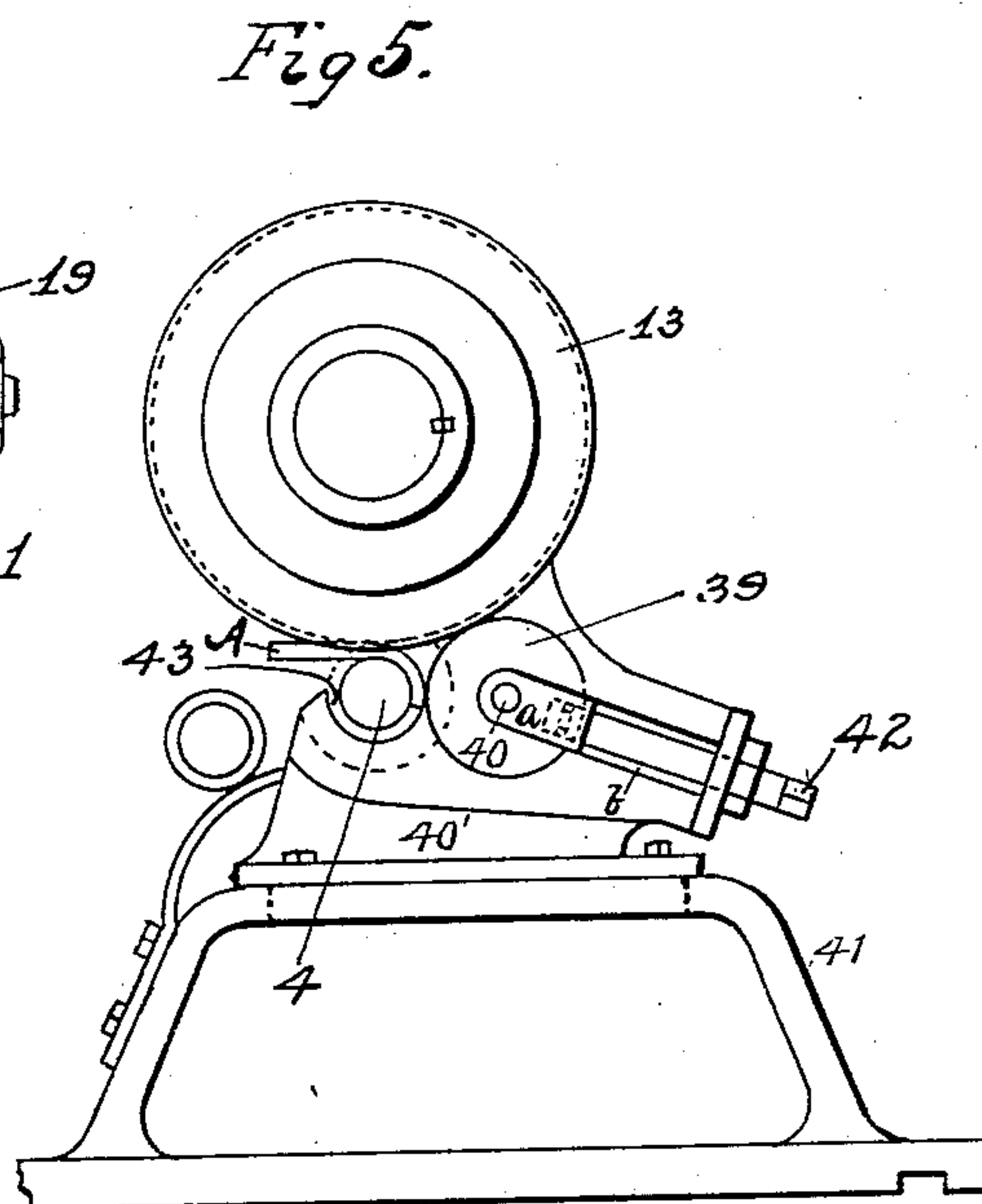
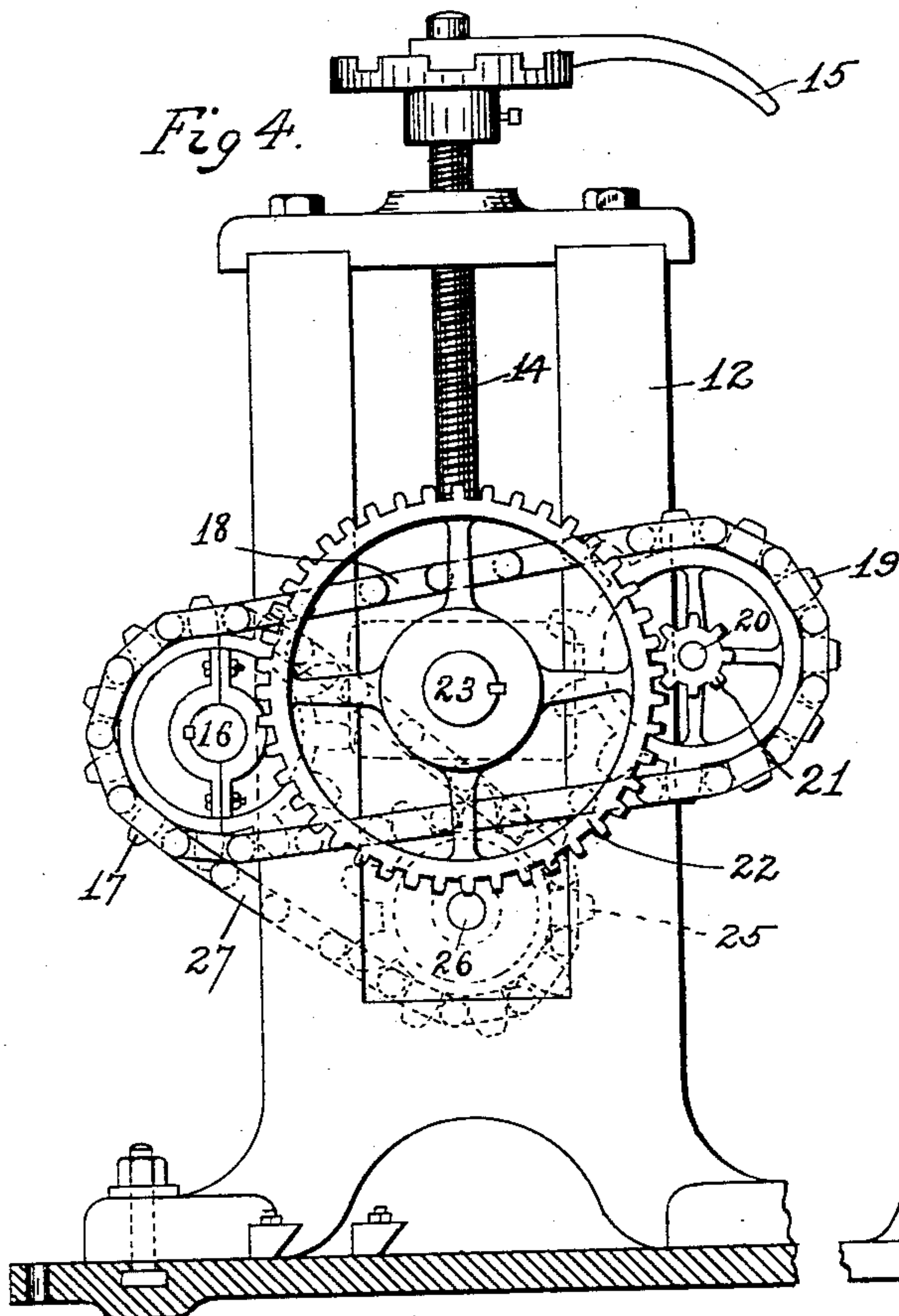
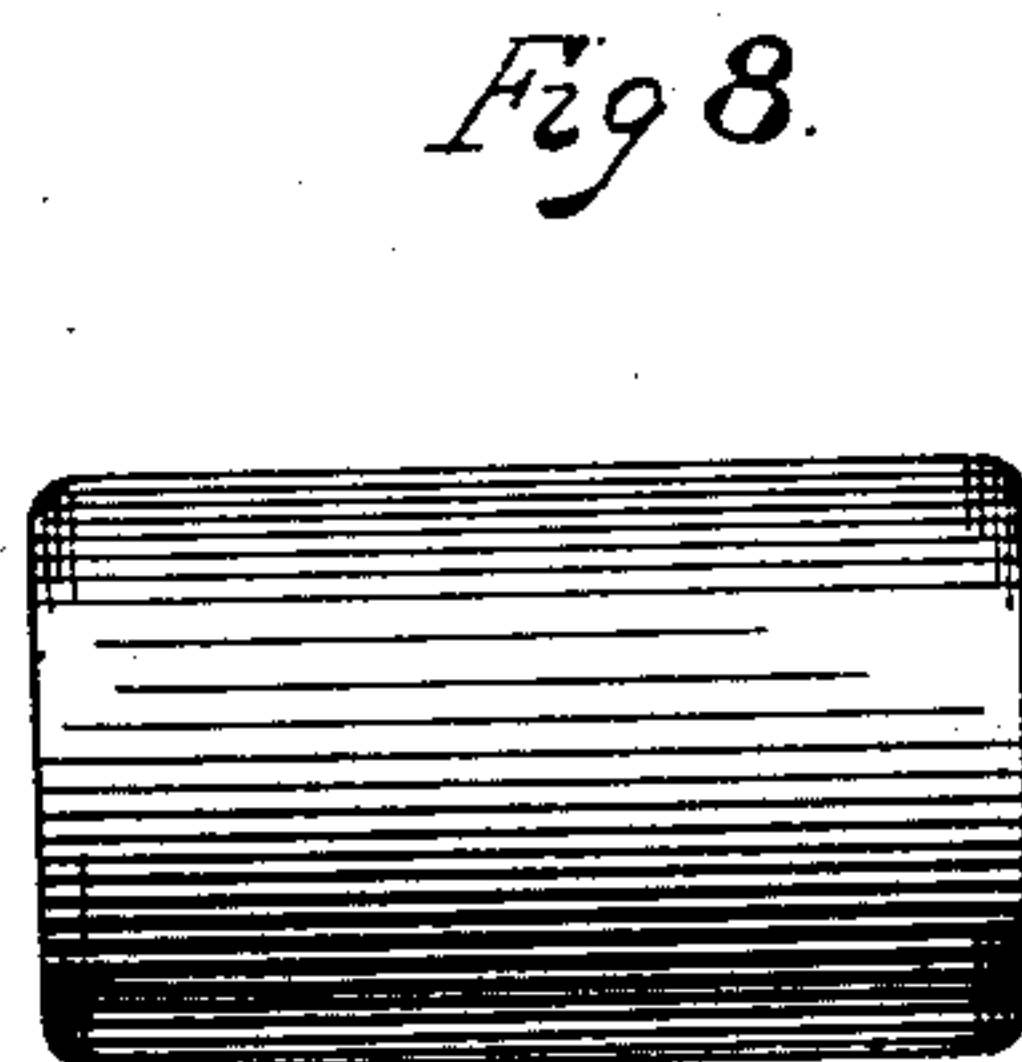
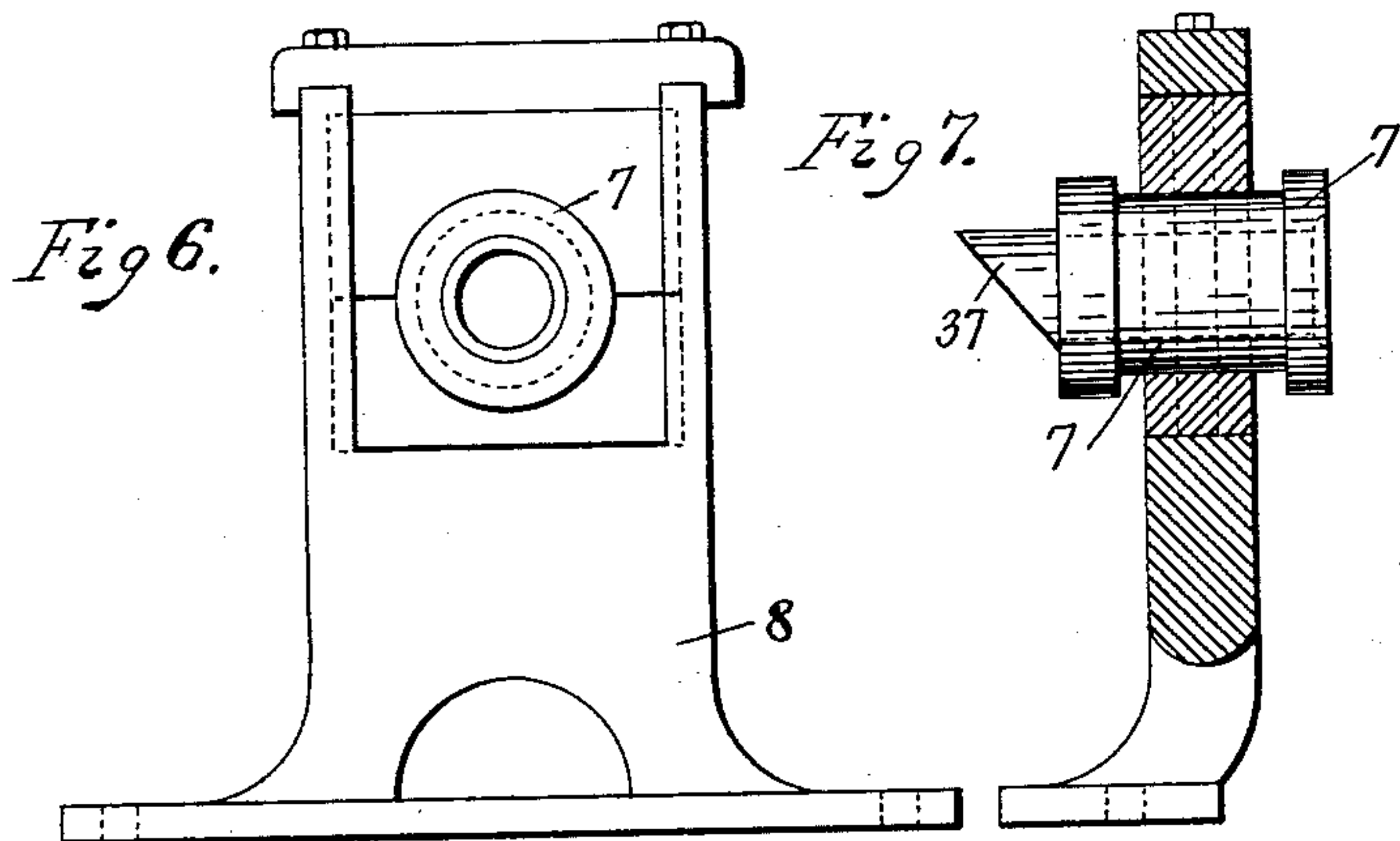
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UNITED STATES PATENT OFFICE.

CHARLES D. DE FOREST AND WILLIAM F. KENNA, OF PITTSBURG,
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APPARATUS FOR ROLLING PIPE-COUPPLINGS.

SPECIFICATION forming part of Letters Patent No. 591,742, dated October 12, 1897.

Application filed October 31, 1895. Serial No. 567,566. (No model.) Patented in France August 7, 1896, No. 258,710.

To all whom it may concern:

Be it known that we, CHARLES D. DE FOREST and WILLIAM F. KENNA, citizens of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Rolling Pipe-Couplings, (for which we have obtained Letters Patent in France, No. 258,710, dated August 7, 1896;) and we 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, in which—

Figure 1 indicates a plan view of our machine for rolling sockets, pipe-couplings, &c. Fig. 2 is a front elevation of the same. Fig. 3 is a longitudinal section through line xx of Fig. 1. Fig. 4 is an end elevation of the same. Fig. 5 is an end view, partly in section, of the mandrel, the roll, the guide, and former and showing also a piece being formed into a pipe-coupling. Fig. 6 is an enlarged end view of adjustable housing or bearing for the stripper. Fig. 7 is a side or end view of the same, partly in section. Fig. 8 is an elevation of socket or coupling.

Our invention relates to apparatus for rolling pipe socket and couplings, &c.

Heretofore, so far as we are aware, pipe sockets and couplings have been made by hammer, it being necessary to heat and bend the same in substantially the shape required, place the same on a mandrel, and weld the ends by hammer. This operation is expensive, requiring the aid of a number of men, and consuming a considerable period of time.

The object of our invention is to produce a device or apparatus by the use of which a bar or plate of metal of the requisite size, when properly heated, may be rolled into a pipe socket or coupling; and to this purpose it consists of the novel construction and arrangement of parts hereinafter described, reference being had to the accompanying drawings, forming part hereof, in which like letters and numerals indicate like parts wherever they occur.

Referring now to said drawings, 1 indicates

a cylinder having a piston 2 projecting through both ends of the same, the ends or heads of said cylinder having stuffing-boxes to admit of this. The outer end of said piston terminates in or carries a rotary plunger or shaft 3, which terminates in or carries a mandrel 4, the outer end of which is screw-threaded at 5 to enable the cone or beveled cap 6 being secured thereto, the mandrel 4 being driven into or otherwise suitably secured in the outer end of said cap. Said mandrel projects through the stripper 7, which is journaled in bearings 8. Said shaft or plunger 3 is journaled in bearings 9 and 10, which are adapted to slide backward and forward by the reciprocation of the piston, plunger, and mandrel, as hereinafter specified, the slide 11, formed in the top of the standards 11' 11', supporting the outer end of said plunger.

12 12 are housings in which are supported the roll 13, said roll being adapted to be adjusted therein by the screws 14 14, operated by the levers 15 15, and to be driven by power transmitted through a power-shaft 16, having a sprocket-wheel 17 mounted thereon, which communicates power by means of a sprocket-chain 18 to a similar sprocket-wheel 19 on the outer end of the shaft 20, which is journaled in bearings formed in the sides of said housings. On the outer end of said shaft 20 is a small cog-wheel 21, which is rigidly secured thereon and meshes with and transmits power to the large cog-wheel 22, rigidly secured to the shaft 23, whereon said roll 13 is likewise rigidly secured, whereby said roll is caused to rotate. 24 and 24' are sprocket-wheels mounted on said power-shaft 16 at the ends, respectively, of the same, and transmitting power to similar sprocket-wheels 25 and 25', respectively, mounted on the shafts 26 and 3, respectively, by means of the sprocket-chains 27 and 27', whereby said shafts are rotated in unison. The outer end of said sprocket-wheel 25' is provided with a collar 28, having recesses 29 therein for the reception of the ends of the clutch bars or springs 30 30, the other ends of which are respectively secured to the inner sides of the housings 12, in which the shaft 3 is mounted, for the purpose of securing said sprocket-wheel rigidly upon said shaft. One end of said shaft 26 is journaled

in the bearings 31, formed in the lower end of the outer housing, the other end being journaled in bearings 32, formed in the standard 33, which is bolted or otherwise secured upon the bed-plate 34. The inner end of said shaft 26 is provided with a screw 35 for the purpose of securing thereto the bevel or cone-shaped cap 36, the inner face of which is grooved correspondingly with the opposite face of the stripper 7. The outer face of said stripper 7 is provided with an inclined projection or lug 37, which is adapted to impinge against a pin 38 on the face of the cone-shaped cap 6, whereby said stripper is clutched by the shaft 5 and caused to rotate therewith.

Immediately beneath the roll 13 is secured a guide or deflecting roll 39, mounted on the shaft 40, which is journaled in the adjustable bearings *a*, secured in the slot *b* in the upper side of the standard 40', which is likewise adjustably secured to the top of the standard 41, which is suitably secured upon the bed-plate 34. The outer ends of the slidable bearings *a* are secured to the screws 42, whereby said deflecting or guide roll may be advanced toward or withdrawn from the mandrel and welding-roll to suit different thicknesses of blanks A being formed between the same.

The standard 40' is adjustably secured upon the top of the standard 41, having slots in flanges forming the base of the same, in which screw-bolts project to admit of this.

43 is a guide-groove formed in the face of standard 40', in which said deflecting or guide roll is mounted, whereby, when the blank or piece A is inserted between the mandrel and welding-roll, the rotation of the same carries said blank against the deflecting-roll and causes said piece to follow said guide-groove and coil around said mandrel until the adjacent ends are brought beneath the welding-roll and the mandrel, when they are welded.

By reversing the lever 44, which controls the valve or cut-off, the piston, the plunger, shaft 3, connected thereto, the bevel-cap 6, and mandrel connected thereto are caused to move a distance sufficient to withdraw the mandrel from the socket 45, formed in the cap 36, and from beneath the roll, whereby the mandrel is pulled out of the coupling formed, which, coming in contact with the stripper, is held until the mandrel is entirely withdrawn, thus permitting the coupling to fall upon any suitable chute, as shown in Fig. 5.

The deflecting-roll and guide-groove may be dispensed with, as we have produced sockets and couplings without the use of either, the more rapid rotation of the mandrel than the welding-roll being sufficient to coil the blank around the mandrel, but we preferably employ at least the deflecting-roll.

The operation of our device is as follows, viz: Power being applied to the mechanism the roll 13 is caused to rotate, also the shaft 3, the shaft 26, and the cap 36, carried thereon,

are likewise rotated in the same direction, but much more rapidly than the roll. The engineer by operating the lever 44, which controls the valve or cut-off, causes steam to be admitted at the outer head of the cylinder, which causes the piston, plunger, and mandrel, together with their bearings, to slide toward the rim or edge of the roll 13 a distance sufficient to bring the mandrel immediately beneath the same. The blank A, being heated in any suitable heating-furnace, is seized by a pair of tongs and is thrust between the mandrel and roll 13, and is carried rearwardly until the same is deflected by the roll 39, and is caused to coil around the mandrel until the rotary action of said roll and mandrel welds the ends thereof. The engineer or person operating the machine, by reversing his lever, and slightly releasing the housings of the rolls, causes the piston, plunger, and mandrel to be withdrawn from beneath the roll 13, and in such withdrawal the socket or coupling formed is pressed against the inner face of the stripper and is thus withdrawn or released from the mandrel and enabled to fall onto the guide and thence into a trough along the side of the machine.

It is obvious that by changing the shape of the mandrel, the roll, and the sizes thereof and the size of the gear-wheel 17 on the power-shaft different-sized articles may be formed by our method without departing from this invention.

We are aware that prior to our invention it has been proposed to roll metal bars into links by passing the bars between a mandrel and a roll, the former of which was divisible at the middle into two sections, each section being supported at one end of a short shaft, which shafts were separately and independently geared to a common driving-shaft. Such a construction is not, however, at all adapted for work of the character accomplished by our improvements—namely, for rolling relatively long pipe sockets, couplings, and similar articles. It is practically impossible to force the adjacent faces of the sections of the divisible mandrel or forming-roller into such close contact as not to leave a slight peripheral groove midway of the length of said roll. The presence of such a groove causes the forming of a fin or rib on the inner surface of the finished article, which renders it unsuited for use.

It will be seen that in our construction the mandrel is made integral with the power-shaft and continuous from end to end, and also that by connecting the plunger-shaft with the piston we are able to hold the same firmly in operative position. The ends of the blank extending into the grooves formed in the adjacent faces of the stripper 7 and cap 36 insure that the blank will be held securely against the mandrel. By having the mandrel fitted into a socket, as at 45, in a bearing or support like that at 36 we not only can hold the man-

drel in alinement under the powerful pressure that is exerted, but can also form a finished end upon the coupling or socket being rolled.

It is generally desirable to have the ends of the couplings or sockets rounded or tapered slightly, as shown in Fig. 8. To provide for this, we form suitably-shaped cavities in the two parts at 7 and 36, these being around the mandrel apertures or cavities in the same parts. Some of the heated metal at the end is crowded into each of these cavities. Then in order to allow the article to escape after the welding action one of the said parts at 7 and 36 is permitted to move somewhat longitudinally. We at present prefer to have the stripper 7 thus move, provision being made for it to move, as shown in Fig. 7. At the proper time it is stopped in some suitable way, as by having its end flange impinge on the stand 8 or the box therein, and then as the mandrel continues moving backward the end of the stripper engages positively with the end of the coupling or socket and forces it off the mandrel. The pin 38 can escape entirely from the clutch-jaw 37 and from the stripper as the mandrel recedes, but when it moves forward at the next action there will be another engagement effected between the pin and the stripper.

It will be seen that the stripper at 7 and the part at 36 are of the nature of abutments situated at the ends of the socket or coupling being welded, serving not only as supports for the mandrel, but as walls for properly shaping the ends of the article, which abutments are both during the welding operation held stationary relatively to the longitudinal axis of the article being welded, but of which at least one is movable longitudinally of said axis after the welding has been effected.

We do not wish to be limited to the use of a supplemental stand, as at 8, to serve as a support and a stop for the stripper, though we prefer such construction.

We do not claim as of our invention the combination, in a device of the character described, of a compressing or welding roll, a mandrel or roll arranged oppositely to the first said roll, means for rotating said roll, and means for reciprocating the mandrel to remove the finished article therefrom, as that forms the subject-matter of an application, Serial No. 551,756, filed by Charles D. De Forest.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a machine for rolling pipe sockets, couplings and similar articles, the combination with a compressing or welding roll, and power devices for rotating said roll, of a rotary mandrel, means for holding the mandrel below the welding-roll, a stripper extending around the mandrel adjacent to the welding-roll and adapted to form a side guide for the article being rolled, and means for reciprocating the mandrel longitudinally through said stripper, substantially as and for the purpose set forth.

2. In a machine for rolling pipe sockets, couplings and similar articles, the combination of the welding-roll, the mandrel, two abutments situated respectively at the ends of the socket or coupling when in position for welding, and means for varying the relative positions of the mandrel and said abutments, to cause one of the latter to engage positively with the socket or coupling to force it from the mandrel, substantially as and for the purpose set forth.

3. In a machine for rolling pipe sockets, couplings and similar articles, the combination of the external compressing or welding roll, the interior mandrel adapted to extend through the socket or coupling being welded, means for reciprocating said mandrel, a support for the free end of the mandrel when in the operative position, and means supplemental and adjacent to the mandrel for engaging positively with the end of the coupling or socket and forcing it from the end thereof, substantially as and for the purpose set forth.

4. In a machine for rolling pipe sockets, couplings and similar articles, the combination of the exterior welding or compressing roll, the interior longitudinally-movable mandrel, the detachable support for the end of the mandrel on one side of the central transverse vertical plane of the welding-roll, the cylinder for steam or equivalent agent, the piston therein, and means connecting said piston with the mandrel and adapted to move the free end of the latter into and out from the said support, substantially as and for the purpose set forth.

5. In a machine for rolling pipe sockets, couplings and similar articles, the combination of a welding-roll, a mandrel, a rotary carrier for the mandrel, a rotary support for the free end of the mandrel, and means adapted to positively engage with the end of the socket or coupling to force it from the mandrel, substantially as set forth.

6. In a machine for rolling pipe sockets, couplings and similar articles, the combination of a welding-roll, the mandrel, the two abutments each situated at an end of the socket or coupling which is being welded, and one of which is adapted to move along the axis of the welding article, and means for holding both of said abutments stationary as to said axis, substantially as set forth.

7. In a machine for rolling pipe sockets, couplings and similar articles, the combination of a welding-roll, the mandrel adapted to support the metal for forming the socket or coupling, means for adjusting the mandrel longitudinally, and the intermittently-rotating stripper, adapted to positively engage with the socket or coupling on the mandrel, substantially as set forth.

8. In a machine for rolling pipe sockets,

couplings and similar articles the combination of a welding-roll, the mandrel for supporting the socket or coupling while welding, means for moving the mandrel, and the stripper adapted to move longitudinally of the coupling or socket, substantially as set forth.

9. In a machine for rolling pipe sockets, couplings and similar articles, the combination of a welding-roll, the mandrel for supporting the coupling or socket while welding, and the sliding intermittingly-rotating stripper, substantially as set forth.

10. In a machine for rolling pipe sockets, couplings and similar articles, the combination of a welding-roll, the mandrel for supporting the coupling or socket while welding, the stripper mounted loosely upon the mandrel, and means for detachably connecting together the mandrel and stripper, substantially as set forth.

11. In a machine for rolling pipe sockets, couplings and similar articles, the combination of the welding-roll, the mandrel for supporting the coupling or socket while welding, the sliding stripper, and a standard or projection carried by the frame to stop the stripper, substantially as set forth.

12. In a machine for rolling pipe sockets, couplings and similar articles, the combination of a welding-roll, the longitudinally-reciprocating rotary mandrel, and the longitudinally-reciprocating non-rotary carrier or advancing devices for the mandrel, substantially as set forth.

13. In a machine for rolling pipe sockets, couplings and similar articles, the combination of a welding-roll, the longitudinally-reciprocating mandrel, the standards, at 9, 10, which support the mandrel, the stripper, and a supplemental bearing or standard for the stripper, substantially as set forth.

14. In a machine for rolling pipe sockets, couplings and similar articles, the combination of a shaft or plunger terminating in a mandrel, and having near the outer end thereof a cap; said shaft being adapted to be reciprocated longitudinally; a roll suitably mounted in housings, and located immediately above said mandrel, and adapted to be elevated and lowered in its housing; a stripper suitably mounted between the cap on said reciprocating shaft and the edge or rim of

said roll, and adapted to rotate and slide backward and forward in its bearings; a cap or head mounted upon an auxiliary shaft opposite and in line with said mandrel, said cap impinging upon the edge or rim of the roll opposite to that impinged upon by the stripper; means to rotate said roll and said last-mentioned shaft, and means to reciprocate said mandrel, substantially as described.

15. The combination of a cylinder, a piston therein connected with a shaft, the end of which terminates in a mandrel adapted to be rotated, and provided with a bevel-cap; a power-shaft geared with said last-mentioned shaft; shaft 20 suitably geared with said power-shaft; shaft 23 parallel with and between said before-mentioned shafts, and suitably geared to shaft 20; shaft 26 geared with said power-shaft; said shaft 26 having a grooved cap 36; a stripper suitably mounted between the bevel-caps, mounted respectively upon the shafts 3 and 26, the inner face of said stripper being correspondingly grooved with the inner face of the bevel-cap 36 on the shaft 26, substantially as herein described.

16. The combination of a cylinder, a piston therein connected with a shaft, the end of which terminates in a mandrel adapted to be rotated, and provided with a bevel-cap; a power-shaft geared with said last-mentioned shaft; shaft 20 suitably geared with said power-shaft; shaft 23 parallel with and between said before-mentioned shafts, and suitably geared to shaft 20; shaft 26 geared with said power-shaft; said shaft 26 having a grooved cap 36; a stripper suitably mounted between the bevel-cap, mounted respectively upon the shafts 3 and 26, the inner face of said stripper being correspondingly grooved with the inner face of the bevel-cap 36 on the shaft 26, and a deflecting or guide roll to the rear of and beneath the welding-roll and mandrel, substantially as herein described.

In testimony that we claim the foregoing we hereunto affix our signatures this 24th day of October, A. D. 1895.

CHARLES D. DE FOREST. [L. S.]
WILLIAM F. KENNA. [L. S.]

In presence of—

ALBERT J. WALKER,
C. A. WILLIAMS.