J. H. RONEY.

APPARATUS FOR MAKING PIPE COUPLINGS.

APPLICATION FILED OCT. 21, 1903.

1,017,322. Patented Feb. 13, 1912.

3 SHEETS—SHEET 1.

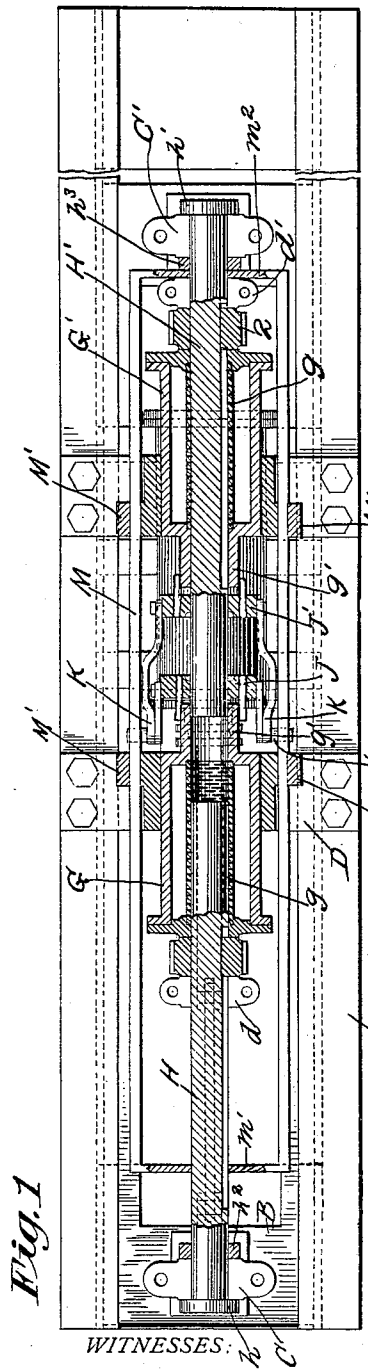

Fig. 1

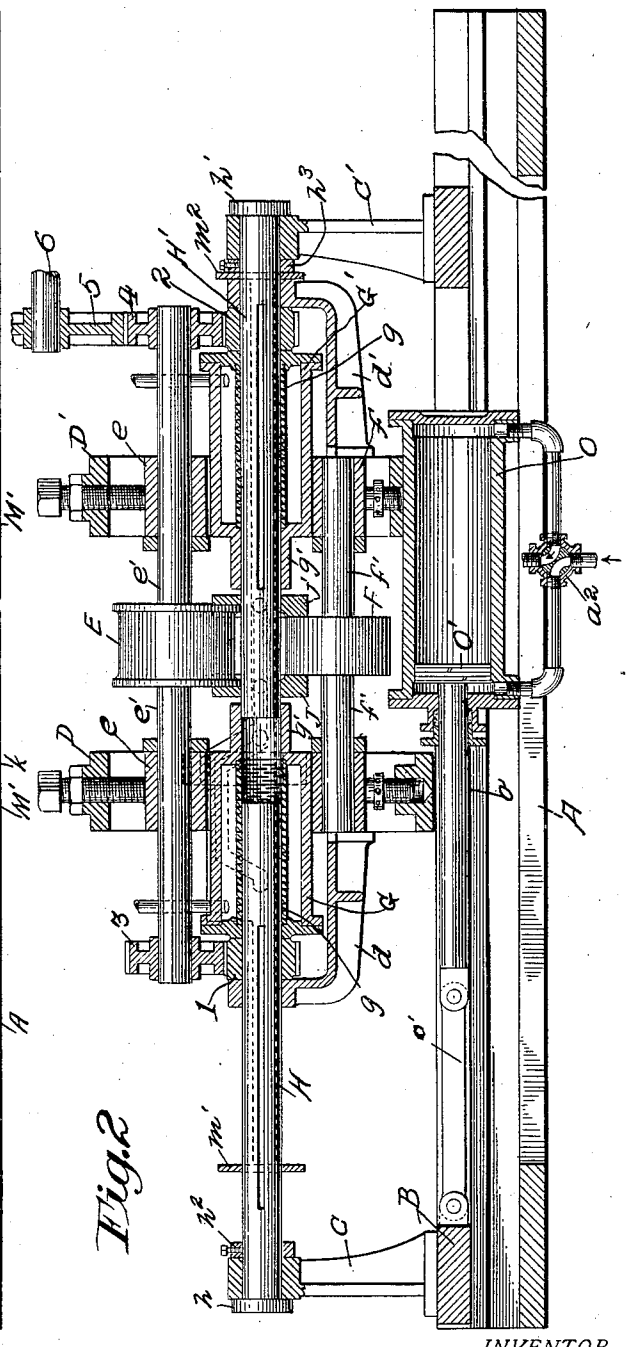

Fig. 2

WITNESSES:

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Fig. 3

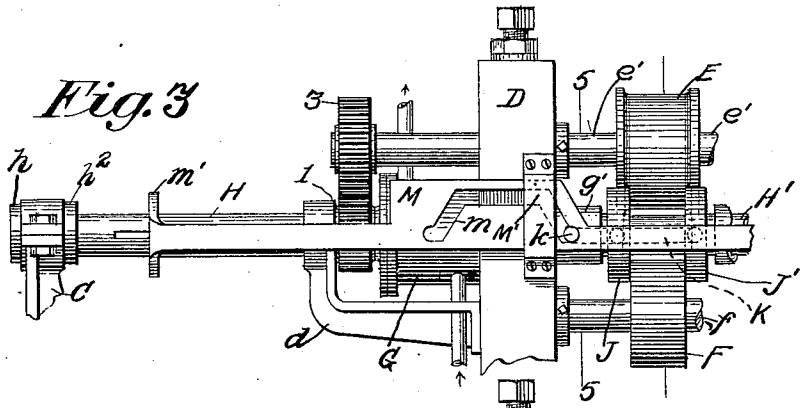


Fig. 4

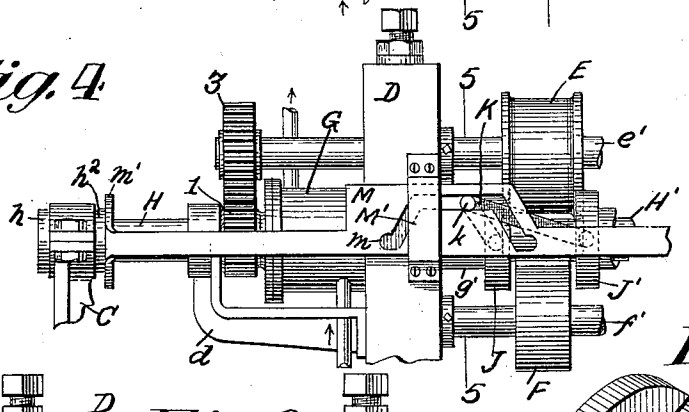


Fig. 5

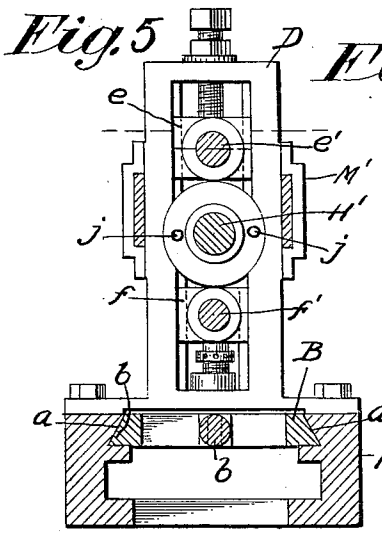


Fig. 6

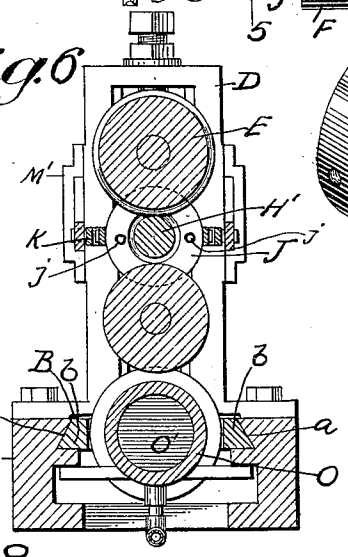


Fig. 7

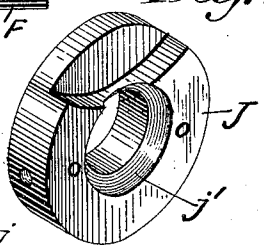


Fig. 9

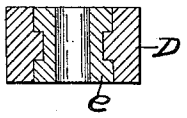
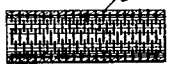


Fig. 8



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3 SHEETS—SHEET 3.

Fig. 10

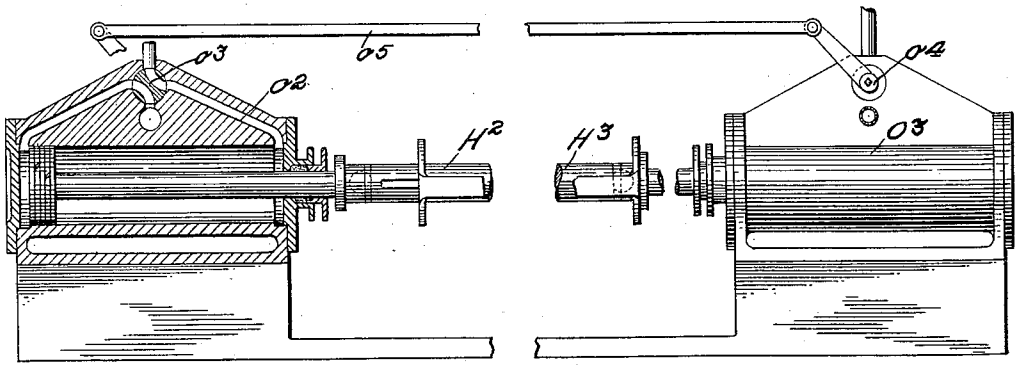


Fig. 11

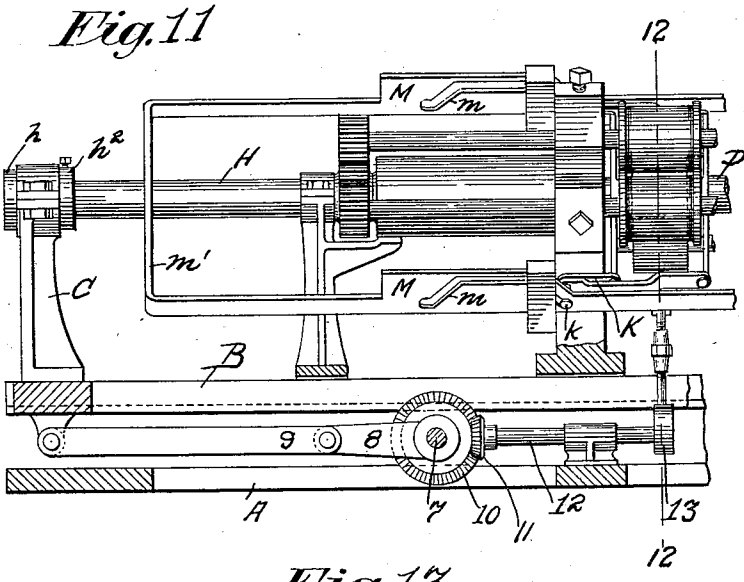


Fig. 12

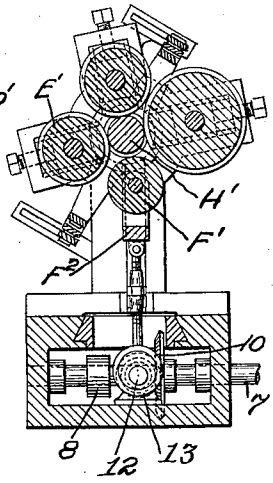
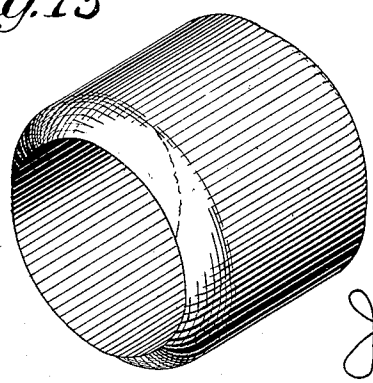


Fig. 13



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APPARATUS FOR MAKING PIPE-COUPLINGS.

1,017,322. Specification of Letters Patent. Patented Feb. 13, 1912.

Application filed October 21, 1903. Serial No. 177,876.

To all whom it may concern:

Be it known that I, JOHN H. RONEY, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Making Pipe-Couplings, of which improvement the following is a specification.

My invention relates to improvements in apparatus for making pipe couplings, and has for its object the provision of novel means whereby couplings may be continuously formed, without the interruption now made necessary by the changing and cooling of the mandrels on which the said couplings are formed.

A further object of my invention is to produce a machine in which oppositely disposed mandrels are alternately brought into operative position with relation to the forming rolls and in such a position that they may be suitably cooled by water or any other desirable agent after each operation, and to provide means whereby the coupling will be formed with a smooth and finished surface, especially at the ends.

To accomplish these objects, my invention consists in the novel construction and arrangement of parts hereinafter more specifically described, reference being had to the accompanying drawings, forming part hereof, in which—

Figure 1 is a plan view partly in section of my improved apparatus. Fig. 2 is a longitudinal sectional elevation of the apparatus. Fig. 3 is a side elevation of the upper end of the apparatus. Fig. 4 is a similar view showing the operation of the parts illustrated in Fig. 3. Fig. 5 is a transverse section on the line 5—5 of Figs. 3 and 4. Fig. 6 is a similar view on the lines 6—6 of Figs. 3 and 4. Fig. 7 is a detailed perspective view of one of the stripping and forming rings. Fig. 8 is a sectional detail view of the interior sleeve of the cooling device. Fig. 9 is a sectional plan of one of the journal boxes for the shafts of the forming rolls. Fig. 10 is a side elevation, partly in section, of a modified arrangement of operating cylinders. Fig. 11 is a side elevation, partly in section, of one end of a modified form of the apparatus. Fig. 12 is a transverse section on the line 12—12 of Fig. 11. Fig. 13 is a perspective view of one form of article which may be formed with my improved apparatus.

Referring to the drawings, A indicates the base of the apparatus and B the table on which at each end thereof the mandrel supports C—C′ are secured; the said table B being slidably mounted in the base A by means of the tongues *b* which are formed on the edges and on the lower side of said table and which are slidably seated in the ways *a* formed in the said base A. The said table may, however, be slidably mounted on said base in any suitable manner.

Mounted intermediate the length of the base A are uprights D—D′ in which the journal boxes *e e* and *f f* for the shafts *e′* and *f′* of the forming rolls E and F are adjustably mounted and also supported in these uprights are the mandrel cooling devices G and G′. Brackets *d* and *d′* secured to the uprights D and D′, respectively, form a support for the mandrels H and H′, the outer ends of which are journaled in the supports C and C′ and are prevented from having lateral movement in the said supports by the enlarged ends *h* and *h′* and the collars h^2 and h^3 secured on the said mandrels as clearly shown in Fig. 2.

Mounted on the mandrels H and H′, between the brackets *d* and *d′* and cooling devices G and G′, through which the said mandrels pass, are gears 1 and 2, the said gears being connected with the mandrels by a spline or feather connection, whereby the mandrels may be reciprocated through the gears but will be positively rotated by the said gears, with which mesh gears 3 and 4, mounted on the outer ends of the shaft *e′* on which the forming roll E is mounted. This shaft *e′* is positively driven by providing a gear 5 on a shaft 6 which is rotated from any suitable source of power, the said gear 5 meshing with one of the gears 3 or 4 and it will be seen that by this manner of rotating the mandrels H and H′ a predetermined relative speed of revolution will be maintained between the mandrels and forming rolls, whereby the best results will be obtained as will be hereinafter described. Many other methods of gearing may be used, such for instance as elongating the gears 3 and 4 to the length of the longitudinal travel of the mandrels and securing the gears 1 and 2 on said mandrels.

In order to cool the portions of the mandrels on which the couplings are formed, the cooling devices G and G′ before mentioned are provided, the same being in the form of cylinders or tubes suitably fed by water supply pipes and in which the perforated sleeves g are secured, through which the water has access to the mandrels. A contracted hollow extension g' is provided on the ends of the cylinders, adjacent to the forming rolls and the interior bore of said extension is such that the ends of the mandrels will have a bearing therein when a coupling is being formed on said mandrels.

Slidably supported on bearing pins j, secured to the extension of each cooling cylinder, are the stripping and end forming rings J and J′, (shown in Fig. 7) which have the concaved cut away portions j' on one side adjacent to the mandrel and the upper sides of these rings are cut away as at J^2 to permit the forming roll E to revolve therein. The pass in the said roll E conforms to the outer contour of the finished coupling and therefore must be of greater width than the roll F, the face of which is flat, as it only acts on the portion of the outside of the coupling which is flat. This roll F however, could be formed the same as roll E, in which case a cut away portion the same as J^2 would have to be cut in the lower as well as the upper side of the rings J and J′. It is obvious that these stripping and end forming rings must be securely held in position while the coupling is being formed and at the same time they must be relatively moved away from each other when it is desired to eject the coupling after the same has been stripped from the mandrel on which it has been formed and to this end I provide the toggle joints K the outer ends of the members of which are pivotally secured to the sides of the rings J and J′. The center joints of these toggles are provided with rollers k, the said rollers lying in cam slots m in the slidable plates M. It will thus be seen that the actuation of the said plates M will, through the medium of the cam slots m, rollers k and toggles K actuate the said rings, the operation of which will presently be described.

Suitably located adjacent to the base A of the apparatus, is a cylinder O, the piston O′ of which is suitably connected with the table B, by the piston rod o and the link o'. The piston O′ within the said cylinder may be actuated by steam, air, or any other suitable pressure, the ingress and egress of the same being controlled by the four way valve O^2 in the usual manner. The reciprocation of the said piston O′ will, through its connections with the table B, impart longitudinal movement to the same, whereby the mandrels H and H′ carried by the supports C and C′ will be correspondingly and alternately moved into operative position, and the length of this movement is such that the mandrel on which a coupling has just been formed, say for instance mandrel H′ will be withdrawn from the rings J and J′, the latter of which strips the coupling from said mandrel and the mandrel H will be correspondingly advanced, but there is sufficient space between the ends of the said mandrels, whereby, when the coupling has been stripped from the mandrel and the rings J and J′ are separated, the coupling may be ejected before the mandrel H passes through the ring J.

The actuation and position of the rings J and J′ are regulated by the cam slots m in the plates M as hereinbefore described and the construction and actuation of the said plates will now be described.

The plates M are located on each side of the machine, as clearly shown in Fig. 1, and the ends thereof are connected by the cross pieces m' and m^2 in the center of which, apertures are provided for the mandrels to pass through. The plates M are supported in bearings M′, secured to the uprights D and D′ and the said plates are of such length that the cross piece m^2 will, when in the position shown in Figs. 1 and 2, be firmly held between the collar h^3 on the mandrel H′ and the bracket d', whereby the plates are held against longitudinal movement and when the said plates are in this position, the portions of the cam slots formed therein, which are in engagement with the rollers k on the toggles K hold said toggles in such a position that the rings J and J′ are securely held against longitudinal movement. When the table is in the position shown in Figs. 1 and 2, cross-piece m' will be about the length of the coupling being formed, distant from the collar h^2 on the mandrel H, the mandrel will therefore traverse such distance before the said collar h^2 on said mandrel H will contact with the said cross-piece m' and by further movement force the said plates from left to right, whereby the roller k in the cam slot m will be raised by the said slot and thus separate the rings J and J′, thus permitting the coupling which has just been formed on and stripped from the mandrel H′ to fall by gravity from the machine and the said mandrel H′ is then cooled in the cylinder G′, while the mandrel H which has just been cooled in the cylinder G is advanced to such a position that a coupling may be formed thereon, and the cross piece m' will be locked between the collar h^2 on said mandrel and the bracket d, the cam slot having again been moved to such a position that the rings J—J′ are locked in their operative position. The heated metal, which is to be formed into a coupling is now fed into the machine between the mandrel and

the forming roll E, the said metal being of slightly greater thickness and less width than the thickness and length of the finished coupling. The peripheral speed of the roll E being considerably greater than the peripheral speed of the mandrel, due to the gearing hereinbefore mentioned, the tendency will be for the side of the metal in contact with the roll E to move faster than the other side, and this will naturally curve the metal which has passed the roll E onto or toward the mandrel, and by this arrangement, only the two forming rolls E and F are required, but if desired a plurality of forming rolls, such as the rolls E′ E′ E′ and F′ illustrated in Figs. 11 and 12 and in this case any of the rolls could positively be driven in conjunction with the mandrel and one or more of the rolls would have to be movable to permit the ejection of the finished coupling which as illustrated is the roll E′.

As illustrated in Figs. 11 and 12, the table B is moved through the power shaft 7 through the medium of the crank 8 and link 9, and a gear 10 on the said power shaft meshes with the gear 11 on the shaft 12, to the outer end of which an eccentric 13 is secured, the rod of the said eccentric connecting with a cross head F^2 of the roll F′, whereby when the table B is laterally moved the roll F′ is simultaneously withdrawn from the group of rolls to permit the exit of the coupling and is restored to said group when the table has reached its other operative position.

In Fig. 10 I have illustrated separate cylinders O^2 and O^3, for actuating the mandrels H^2 and H^3, the simultaneous movement of the mandrels being accomplished by actuating both valves O^3 and O^4 at the same time by the rod O^5, which is connected to the actuating handles of the said valves.

In Fig. 13 a finished pipe coupling is illustrated, the lap weld being indicated by a broken line, but in practice this line is practically invisible.

The operation of my device is as follows:—A blank of suitable size and width, dependent upon the size of the coupling to be made, when properly heated, and when the mechanism is in the position shown in Figs. 1 and 2 is inserted between the forming roll E and the mandrel H′ it being understood that both the forming roll E and the mandrel H′ are being operated as heretofore herein specified, the coupling is formed on said mandrel. Immediately after the welding operation has been completed the piston O′ in the cylinder O is reversed, causing the mandrel H′ to travel out of the pass of the forming roll and through the stripper, the members of stripper being separated as heretofore specified, permitting the formed coupling to drop. Mandrel H meanwhile has been moved into the pass of the forming roll E and the operation of forming a coupling is repeated.

As it is found desirable in machines of this character to have them capable of making more than one size coupling, I have made the different parts removable and the journal boxes for the roll shafts adjustable whereby by having different sizes of mandrels, cooling cylinders, forming rolls and gears, the general structure of the machine may be used for producing many different sized couplings.

I claim as my invention and desire to secure by Letters Patent:

1. In a machine for making pipe couplings, etc., the combination of a welding roll, oppositely disposed rotary mandrels, means to bring said mandrels successively into operative position with relation to said roll, means to hold either of said mandrels in operative position until the welding operation of the coupling thereon is complete, and means to move the mandrel out of operative position, simultaneously the other mandrel is moved into operative position with relation to said roll.

2. In a machine for making pipe couplings, etc., the combination of a welding roll, oppositely disposed rotary mandrels, means to bring said mandrels successively into operative position with relation to said roll, means to hold either of said mandrels in operative position until the welding operation of the coupling thereon is completed, means to move the mandrel out of operative position, simultaneously the other mandrel is moved into operative position with relation to said roll, and means disposed in the path of the mandrel for removing the coupling therefrom.

3. In a machine for making pipe couplings and other hollow cylindrical bodies, the combination of a welding roll, oppositely disposed mandrels, the axes of which are parallel with the axis of said roll, and means to successively operatively position said mandrels with relation to said rolls.

4. In an apparatus for making pipe couplings, etc., the combination of a welding roll, oppositely disposed mandrels, the axes of which are parallel with the axis of said roll, and means to simultaneously move one of said mandrels into operative position, and the other of said mandrels out of operative position.

5. In an apparatus for making pipe couplings, etc., the combination of a rotatable former, oppositely disposed rotatable mandrels, the axes of which are parallel with the axis of said former, and means to successively operatively position said mandrels with relation to said former.

6. In a machine of the character described the combination of forming rolls, of a water

cylinder, a mandrel playing through said water cylinder, and adapted to be positioned in the pass of the rolls, and means for advancing said mandrel into the said pass, and for withdrawing it into the cooling chamber.

7. In a machine of the character described, the combination with forming rolls, of alined mandrels adapted to be alternately positioned in the pass of the forming rolls, means for advancing and retreating said mandrels, as desired, and independent water cylinders through which the respective mandrels play.

8. In a machine of the character described, the combination of forming rolls, oppositely disposed mandrels, the axes of which are parallel to the axes of said rolls, means for simultaneously moving one of said mandrels in one direction, and the other mandrel in an opposite direction, a stripper slidable relative to the mandrels, and through which the mandrels work, and means for holding the inner face of said stripper close to the edges of the pass between the rolls and mandrel while the piece is being formed, and for moving the stripper away from said rolls upon the completion of the piece.

9. In a machine of the character described, the combination with forming rolls, of a mandrel, the axis of which is parallel with the axis of said rolls, means for advancing and returning said mandrel, a stripper, the sides of which adjacent to the forming rolls are provided with recesses which constitute formers for the ends of the piece, the said stripper being slidable relatively to the mandrel and through which the mandrel operates, a toggle joint for operating said stripper and a movable member co-acting with the toggle joint to operate the said stripper, and itself operated by the movement of the mandrel.

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

JOHN H. RONEY.

In the presence of—
CLARENCE A. WILLIAMS,
GEO. B. ROWLEY.