No. 848,948. PATENTED APR. 2, 1907.

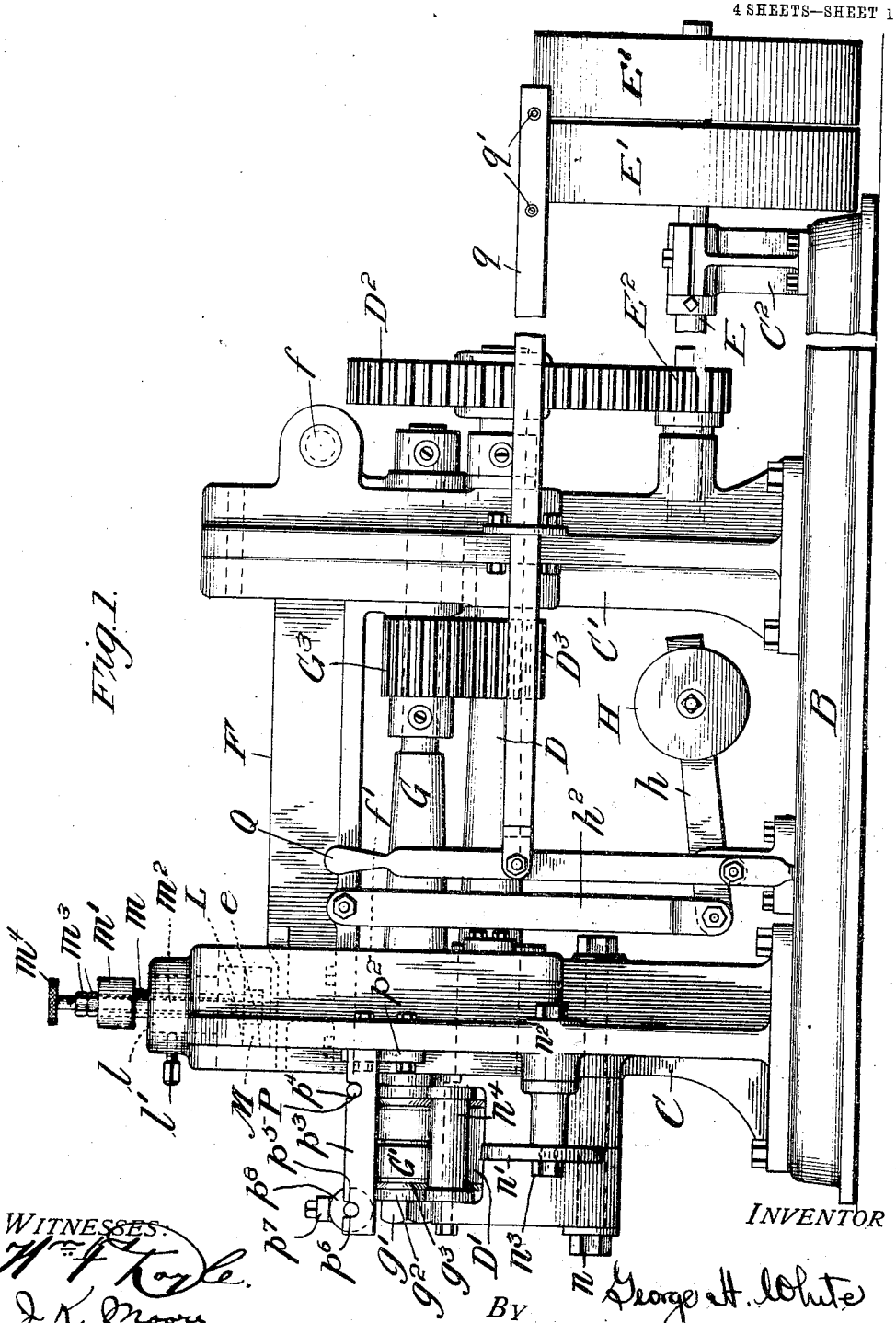
G. H. WHITE.

FLARING MACHINE FOR METAL RINGS, &c.

APPLICATION FILED FEB. 20, 1906.

4 SHEETS—SHEET 1.

Fig. 1.



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No. 848,948. PATENTED APR. 2, 1907.

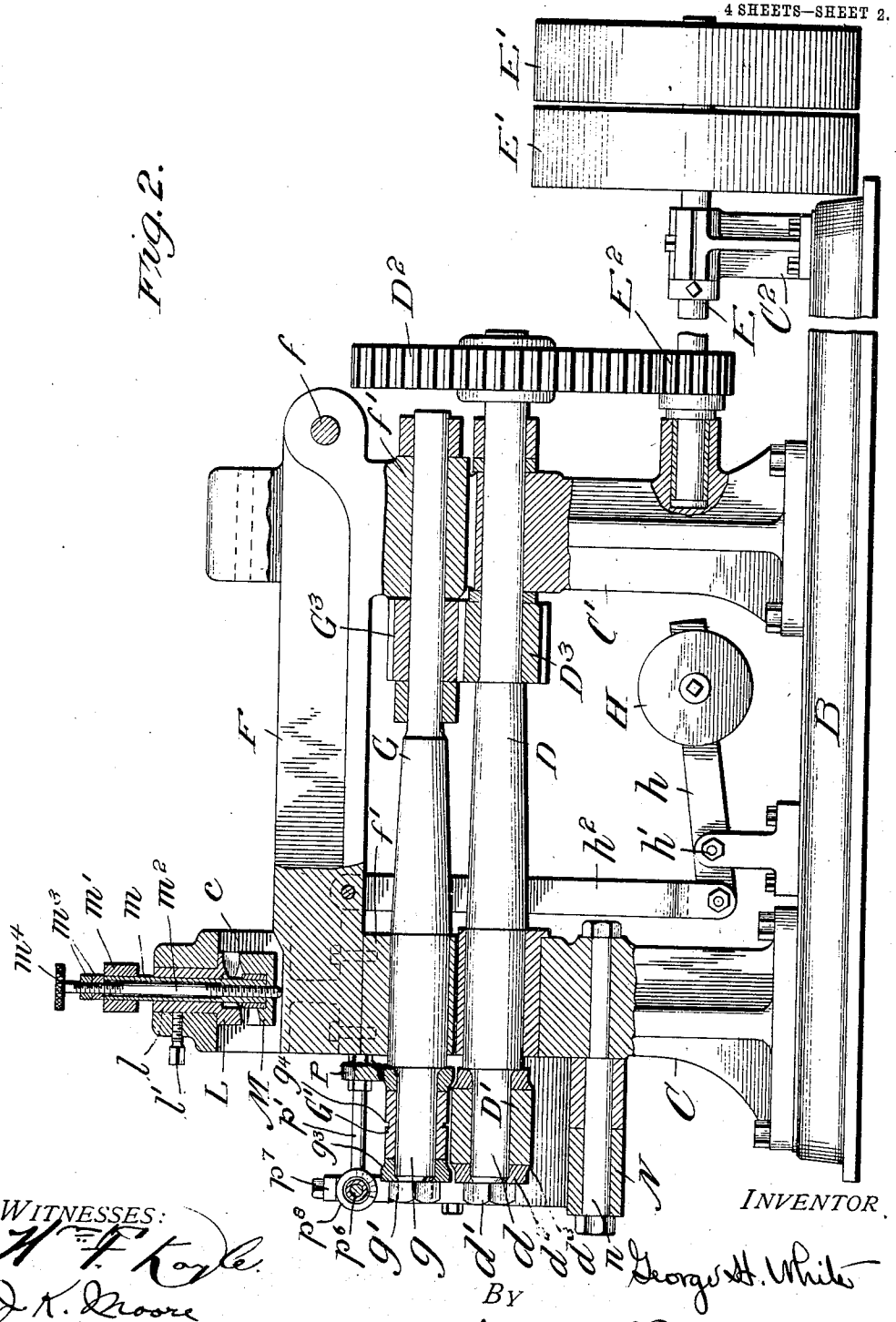
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

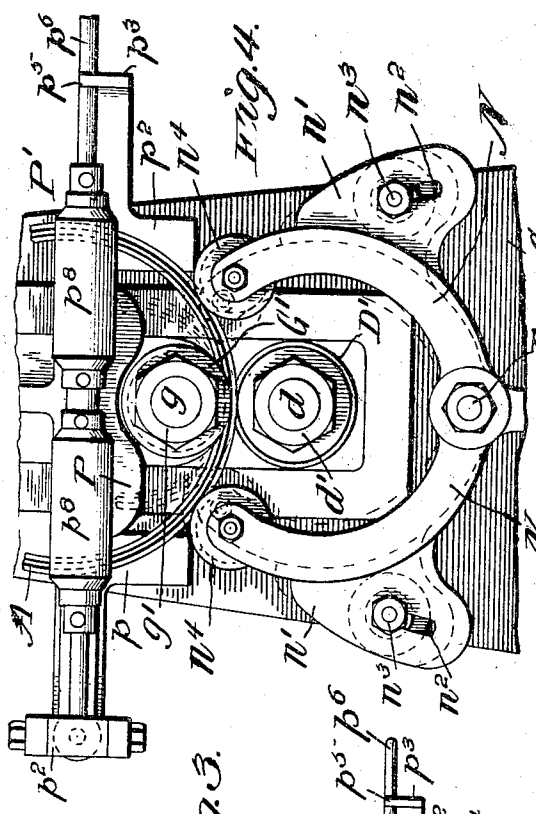


Fig. 4.

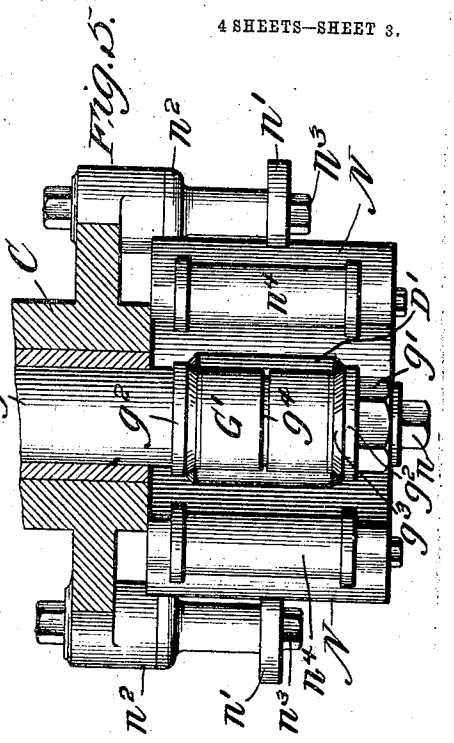


Fig. 5.

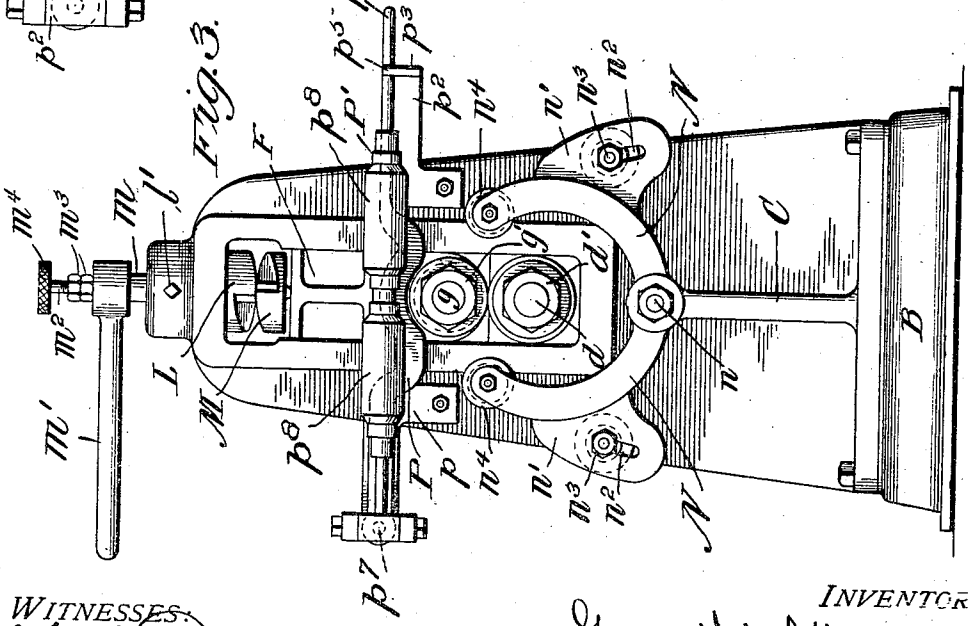


Fig. 3.

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APPLICATION FILED FEB. 20, 1906.

4 SHEETS—SHEET 4.

Fig. 6.

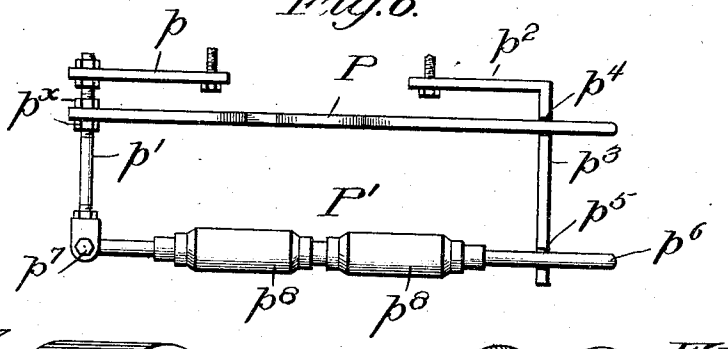


Fig. 7.

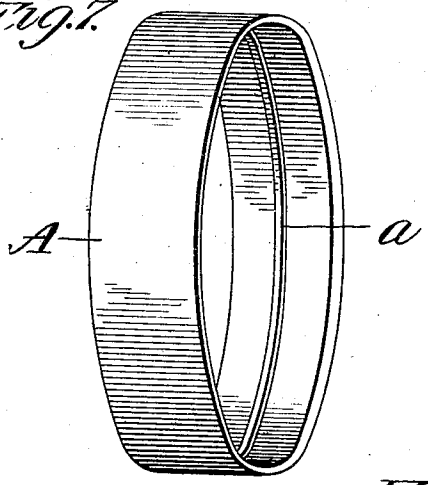


Fig. 8.

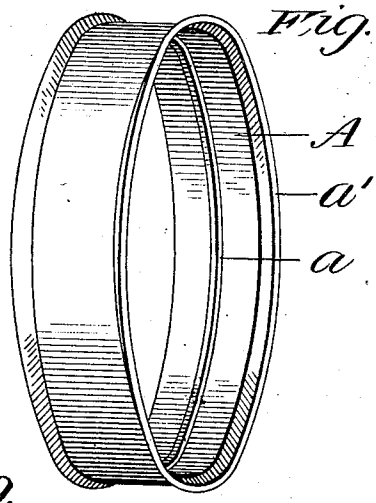


Fig. 9.

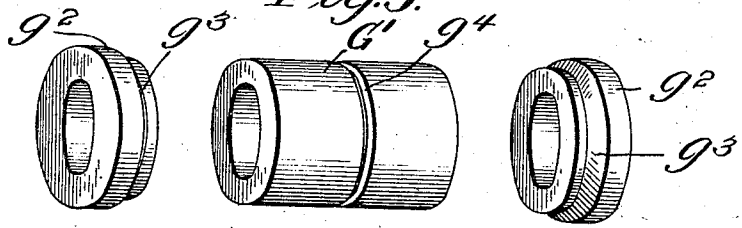
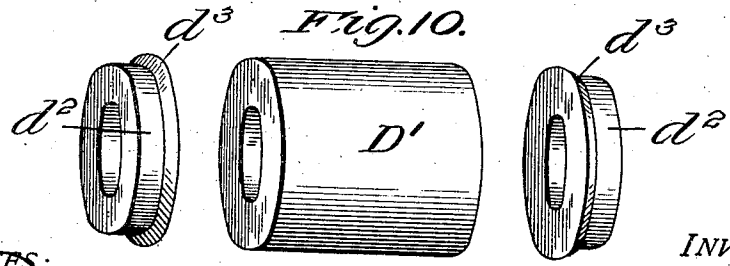


Fig. 10.



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UNITED STATES PATENT OFFICE.

GEORGE HENRY WHITE, OF OIL CITY, PENNSYLVANIA, ASSIGNOR TO S. R. DRESSER MANUFACTURING COMPANY, OF BRADFORD, PENNSYLVANIA.

FLARING-MACHINE FOR METAL RINGS, &c.

No. 848,948. Specification of Letters Patent. Patented April 2, 1907.

Application filed February 20, 1906. Serial No. 302,054.

To all whom it may concern:

Be it known that I, GEORGE HENRY WHITE, a citizen of the United States, residing at Oil City, in the County of Venango and State of Pennsylvania, have invented certain new and useful Improvements in Flaring-Machines for Metal Rings, &c.; and I 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 appertains to make and use the same.

My invention consists in the novel features hereinafter described, reference being had to the accompanying drawings, which illustrate one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 represents a side elevation of an apparatus embodying my present invention. Fig. 2 represents a vertical central longitudinal section of the same, certain portions being shown in elevation. Fig. 3 is a front view of the machine. Fig. 4 is an enlarged view of a portion of the front of the machine, showing the operation of the parts in flaring the ends of a metal ring or tube. Fig. 5 is a top plan view of the upper and lower flaring-rollers and the lateral guiding-rollers and adjacent portions of the machine. Fig. 6 is a top plan view of the front and rear guiding devices for steadying the upper portions of the rings while they are being operated upon. Fig. 7 is a perspective view of a metal ring designed to form the middle ring of a pipe-coupling as it appears before being subjected to the action of this machine. Fig. 8 is a similar view of the same ring after it has been subjected to the action of the herein-described flaring-machine. Figs. 9 and 10 are detail perspective views of the upper and lower flaring-rolls, respectively, showing the parts thereof separated.

The object of my invention is to provide a machine for flaring or bending outwardly the marginal or other portions of a metal ring or section of tubing, and the particular machine herein shown and described and which embodies my invention is particularly designed to flare or bend outwardly the edge or marginal portions of a metal ring which forms the middle ring of a pipe-coupling, known in the trade as the "Dresser" pipe-coupling. This ring is formed by cutting a skelp of iron or steel, preferably steel, having a central longitudinal rib or bead on one face, into sections or blanks of the required length to produce a ring of certain size, bending the blank into the form of a ring with the bead on the inner side and welding the two ends of the blank together, after which the ring is subjected to the action of the flaring-machine herein shown and described, in which the marginal portions adjacent to each end or edge of the ring are simultaneously flared outwardly for the purpose of forming a packing-recess to receive a suitable rubber or other elastic packing when the ring is used with the other parts forming a Dresser coupling.

In Fig. 7 I have shown one of the rings A as it appears after being welded and before being subjected to the action of the flaring-machine, the said ring being provided with a central internal web or rib *a*, as shown. It is to be understood, however, that my invention is applicable to machines for flaring the ends of rings or tube-sections which have no internal bead and that the form of the finished ring, as defined by the flared portions thereof, may be varied to a considerable extent to suit different requirements by varying the configuration of the flaring-rollers hereinafter described.

Referring now to the general construction of the machine, B represents the base-plate, upon which are secured the forward vertical standard C and the rearward vertical standard C′.

D represents the lower roll-shaft, which is horizontally disposed and is mounted in fixed bearings in the standards C C′. At the front end of the machine the shaft D is provided with a reduced portion *d*, which receives the lower or outer flaring-roller, which is secured on the shaft by a suitable nut *d*′, so that the said roller can be removed and replaced when desired. At its rear end the shaft D is provided with a driving-gear D^2, engaging a pinion E^2 on a driving-shaft E, mounted in bearings in the standard C′ and in a separate standard C^2 or bearing-support, and said shaft is provided with the usual fast and loose pulleys E′ E′, by means of which the machine is driven. The shaft D is also provided (preferably between the standards C and C′) with a pinion D^3, as shown.

F represents a vertically-movable swinging frame for carrying the upper flaring-roll shaft, said frame being pivoted at *f* in the

standard C' and having its forward end extending into a vertical slot *c* in the standard C. The frame F is provided on its lower side with bearings *f' f'*, in which is mounted the shaft G for the upper or inner flaring-roll. The forward end of the shaft G projects beyond the standard C, as does also the forward end of the shaft D, and is provided with a reduced portion *g* to receive the upper or inner flaring-roll, the latter being removably held in position by means of a nut *g'*. The shaft G is also provided with a pinion G^3, meshing with the pinion D^3 on the shaft D, so that the two flaring-rolls are driven in opposite directions by the driving-shaft G. Said pinions D^3 and G^3 are provided with teeth of such length that they will remain at all times in gear notwithstanding the vertical movement of the swinging frame F.

The lower or outer flaring-roll has its exterior shaped to conform to the exterior of the finished ring desired, and in the present instance it is provided with a central cylindrical portion D' and end portions d^2 of reduced diameter with intermediate beveled shoulder portions d^3, extending from the reduced portions d^2 outwardly to the central cylindrical portion. This flaring-roll may be made in one piece, but I prefer to form it in a number of sections, and in Fig. 10 I have shown the roll formed in three sections—to wit, the central portion D' and two end portions, each of which comprises one of the reduced portions d^2 and one of the adjacent beveled portions or shoulders d^3. The object in making the roll of several parts is that in the operation of the machine the greatest wear will naturally come upon the inclined shoulders d^3, and by this means I can renew the roll by simply replacing the end sections without remaking the entire roll. The parts of the roll, as shown in Fig. 10, are provided with central apertures which fit upon the reduced portion *d* of the shaft D, and they may be keyed or otherwise rigidly secured thereto, in addition to the nut *d'*, if desired.

The inner or upper flaring-roll is constructed to conform with the shape of the inner face of the desired ring and is also preferably made in three parts, as shown in Fig. 9. This roll comprises a central section G', which is substantially cylindrical and of slightly smaller diameter than the central portion of the lower roll, and is provided with a central annular groove g^4 to accommodate the central bead or rib *a* of the ring A. Each of the end portions of the inner or upper roll is provided with an end portion g^5 of larger diameter than the central portion and with an inclined shoulder g^6, which opposes the shoulder d^3 of the lower or outer roll. The three parts of the upper roll are provided with central apertures, as shown, to fit over the reduced end *g* of the shaft G and may be keyed or otherwise secured to said shaft.

The swinging frame F and upper roll and shaft are normally held in such a position that the flaring-rolls are separated, and this is accomplished by means of counterbalancing devices. In the present instance I provide at each side of the machine a counterbalance-lever *h*, pivoted at *h'* to a bracket secured to the base-plate B and provided at one end with an adjustable weight H, the other end of the lever *h* being connected by a link h^2 to the swinging frame F. The counterbalance-weights H H thus maintain the said swinging frame and upper roll normally in raised position.

I prefer to provide the following mechanism for depressing the upper roll and its swinging frame, which is so constructed that the roll can be depressed or released by a quarter turn or swing of an operating-arm, thus greatly expediting the work on the machine. This mechanism is best shown in Fig. 2. L represents a stationary cam located at the upper end of the recess *c* in standard C and provided with a hollow attaching sleeve or bushing *l*, which extends vertically through an aperture in the upper part of said standard and is secured therein by a set-screw *l'*. The sleeve or bushing is of less diameter than the cam, forming a shoulder at the upper end of the cam, which directly engages the top face of the recess *c* and relieves the bushing *l* and set-screw *l'* of strain. M is a rotatable cam located below the stationary cam and rigidly secured to a hollow shaft *m*, the upper end of which is squared and receives an operating-lever *m'*. (See Fig. 3.) The interior of the shaft *m* is counterbored and the lower portion is threaded internally to receive an adjusting-screw shaft m^2, which may be projected below the cam M to directly engage the swinging frame F. The upper end of the screw-shaft m^2 is threaded and is provided above the upper end of the hollow shaft *m* with a jam nut or nuts m^3 (two being shown) and a hand-wheel or other operating device m^4. The opposing faces of the cams M and L are so constructed that a quarter-turn of the shaft *m* will bring the high parts of the cams together and depress the swinging frame F to bring the upper flaring-roll into operative relation with the lower roll, and a quarter-turn of shaft *m* in the opposite direction will allow the counterbalance-weights to lift the said frame and upper roll sufficiently to allow of the insertion and removal of the ring. The parts can be accurately adjusted by means of the screw-shaft m^2, which can also be adjusted from time to time to compensate for any wear of the parts. The particular mechanism for depressing the swinging frame and upper roll herein shown and described forms no part of my present invention, as the same is illustrated, described, and claimed in my application for Letters

Patent of the United States for improvements in metal-bending machines, filed February 20, 1906, and given Serial No. 302,055.

At the front side of standard C are a pair of hinged brackets N, pivoted on a supporting-stud n and provided with outwardly-projecting flanges n', having curved slots n^2 therein concentric with the axis of stud n. These brackets are held in adjusted position by means of bolts n^3 extending through the slots n^2 and provided with nuts, or cap-screws may be employed, if desired. In the upper end of each of said brackets N is mounted an idle roller n^4, provided with an annular flange at each end for guiding and supporting the rings during the operation of the flaring-rolls.

In order to steady the upper parts of the rings, especially when rings of large diameter are being operated upon, I prefer to provide suitable guiding devices for engaging the peripheral edges of the rings as they are rotated by the flaring-rolls. For this purpose I have shown two different forms of guiding devices, and I prefer to employ both forms in the manner shown; but it is to be understood that I may use two guides constructed alike or vary the relative arrangement of the guides, if desired. In the present instance I have shown at the left of the machine viewed from the front a bracket-arm p, secured to the standard C and carrying at its end a forwardly-extending stud p'. (See Figs. 2, 3, 4, and 6.) An angular bracket p^2 is secured to the right-hand side of the standard C and has a forwardly-extending arm p^3, in which are provided two guiding-recesses p^4 and p^5.

P represents the rear guide, which is pivotally mounted on the stud p' between nuts p^6 on a threaded portion of the shaft, thus providing for slight lateral adjustment of the guide, and said guide has vertically-disposed faces for engaging the edges of the rings and is curved or arched centrally to engage the rearward portion of the upper flaring-roll, with which it rises and descends. The free end of guide P is arranged to drop into the recess p^4 in the arm p^3 when the rolls are in operative relation, so that both ends of the guide are held firmly and the guide will steady the ring on its rear edge as it is rotated. The front guide may be similarly formed; but I prefer to employ the guide P', which consists of a shaft p^6, connected to the stud p' by an universal joint p^7, so that it can be swung out of the way to facilitate the introduction and removal of the rings. The shaft p^6 is provided with two long rollers p^8 p^8, which engage the edges of rings of different diameters, and the free end of shaft p^6 is adapted to engage the notch or recess p^5 when in operative position. I have found that with these guiding devices are desirable to steady the upper portions of the larger sizes of rings; but for the smaller sizes they are not necessary and may be dispensed with.

Q represents a belt-shifter pivoted upon the base of the machine and connected to a sliding shifter-bar q, guided in a bracket secured to standard C' and provided with belt-engaging arms q' q' for shifting the driving-belt from the fast to the loose pulley.

In using the apparatus herein shown and described the rings to be flared are raised to red heat, and the roll G' being in raised position one of the rings is placed upon the roller D' and lateral guide-rollers. The machine may be driven continuously, or the belt-shipper lever may be operated at intervals to start and stop the machine. I prefer, however, to having the flaring-rolls operate continuously. The flaring-rolls being in continuous rotation the lever m' is given a quarter-turn to force the inner or upper roll down upon the inner face of the ring. As soon as the ring is gripped between the two flaring-rolls it will begin to rotate about its axis, and as the pressure upon the lever m' continues to bear down upon the upper roll the inclined shoulders g^3 thereof will flare outwardly the edge or marginal portions of the ring until they are forced into contact with the inclined shoulders d^3 of the lower roll. One or two revolutions of the ring between the upper and lower flaring-rolls will flare both ends of the ring simultaneously and accurately. The lever m' is then reversed, the upper roll allowed to rise under the influence of its counterbalance, and the ring may be removed and another substituted, when the operation will be repeated. In Fig. 8 I have shown the ring A is it appears after being operated upon by this machine, and it will be seen that it is provided at each end with a flange or flared portion a'.

It is to be understood that when the front guide P' is employed it is necessary to lift its free end out of the notch p^5 and swing it out of the way to remove the rings from the machine and to replace it after each ring is inserted.

The shape of the flared portions a' a' of the ring A will depend upon the form of the beveled portions or shoulders g^3 and d^3 of the flaring-rolls, and these shoulders may be varied in shape to produce flanges of various cross-sections, as may be desired. It is also obvious that in handling rings which do not have a central bead the groove in one of the flaring-rollers which accommodate said bead (in this instance the upper or inner roll) may be dispensed with.

What I claim, and desire to secure by Letters Patent, is—

1. In a flaring-machine for metal rings, &c., the combination with the main frame provided with a stationary roller, of a vertically-movable roller and a guide extending transversely of the said rollers, and on opposite

sides of the same, for engaging the lateral edges of the ring under treatment, said guide being pivotally supported at one end, and a supporting device for the free end of said guide, for holding it firmly when in operative position, substantially as described.

2. In a flaring-machine for metal rings, &c., the combination with the main frame provided with a stationary roller, of a vertically-movable roller and a guide, extending transversely of the said rollers, and on opposite sides of the same, for engaging the lateral edges of the ring under treatment, said guide being pivotally connected at one end to the main frame and having a central portion in engagement with the movable flaring-roller, with which it moves vertically, and a support connected with the main frame, and provided with a recess to receive the free end of said guide when in operative position, substantially as described.

3. In a flaring-machine for metal rings, &c., the combination with the main frame provided with a stationary roller, of a vertically-movable roller, a guide extending transversely of said rollers, and on opposite sides of the same, and rollers having their axes perpendicular to the axes of said rollers carried by said guide, for engaging the lateral edges of the ring under treatment, substantially as described.

4. In a flaring-machine for metal rings, &c., the combination with the main frame provided with a stationary roller, of a vertically-movable roller, a guide extending transversely of said rollers, and on opposite sides of the same, and rollers having their axes perpendicular to the axes of said rollers, carried by said guide, for engaging the lateral edges of the ring under treatment, said guide being pivotally supported at one end, and a rigid support having a recess for receiving the free end of said guide, when in operative position, substantially as described.

5. In a flaring-machine for metal rings, &c., the combination with the main frame provided with a stationary roller, and a vertically-movable roller, of a pair of guides disposed transversely to the axes of said rollers, and above the stationary roller, for engaging the opposite lateral edges of the ring under treatment, said guides being each pivotally supported at one end and supporting devices for holding the free ends of said guide firmly when in operative position, substantially as described.

6. In a flaring-machine for metal rings, &c., the combination with the main frame provided with a stationary roller, and a vertically-movable roller, of a pair of guides disposed transversely to the axes of said rollers, and above the stationary roller, for engaging the opposite lateral edges of the ring under treatment, said guides being each pivotally supported at one end, means for adjusting said guides toward and from each other, and supporting devices for holding the free ends of said guides firmly, when in operative position, substantially as described.

7. In a flaring-machine for metal rings, &c., the combination with a stationary roll and a vertically-movable roll, one of said rolls having annular enlarged portions and the other being provided with annular reduced portions, means for forcing the movable roll toward the stationary roll to clamp a portion of a ring between them, a pair of hinged brackets having guiding-rollers on opposite sides of the stationary roll, a supporting-pivot for said brackets, each of said brackets being provided with a curved slot concentric with the axis of said pivot, and adjusting devices engaging said slots, substantially as described.

8. In a flaring-machine for metal rings, &c., the combination with a stationary roll, and a vertically-movable roll, means for forcing said movable roll toward the stationary roll, said rolls being provided, the one with annular enlarged portions and the other with corresponding annular reduced portions, a pair of adjustable supporting and guiding rollers, arranged on opposite sides of said stationary and movable roll, and guiding devices disposed transversely to and above said rolls for engaging the ends or edge portions of the ring, one of said guiding devices being provided with separate idle rollers having their axes disposed transversely to the axes of the flaring-rollers for engaging the edge portions of the ring on opposite sides of its center, substantially as described.

9. In a flaring-machine for metal rings, &c., the combination with the main frame, of a stationary shaft mounted therein and provided with a flaring-roll, of a vertically-swinging frame pivotally mounted in the main frame, a roll-shaft carried in said swinging frame and provided with a flaring-roll, devices engaging said swinging frame for forcing the roll carried thereby toward the stationary roll, a counterbalance for said swinging frame for separating said rolls to permit the insertion and removal of the rings, means for rotating said roll-shafts, said rolls being provided the one with annular enlarged portions and the other with annular reduced portions, a pivot-pin arranged below said stationary roll, adjustable brackets pivotally mounted on said pivot-pin, guiding-rollers carried by said brackets, and pivotally-mounted guiding devices, extending transversely of and above said rolls, and provided with means for engaging the edges of a ring to steady the same, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

GEORGE HENRY WHITE.

Witnesses:
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ELIZABETH MULLIGAN.