

C. L. BRÉHIER.
 APPARATUS FOR THE MANUFACTURE OF METALLIC HOOPS.
 APPLICATION FILED JUNE 13, 1911.

1,052,433.

Patented Feb. 4, 1913.

6 SHEETS—SHEET 1.

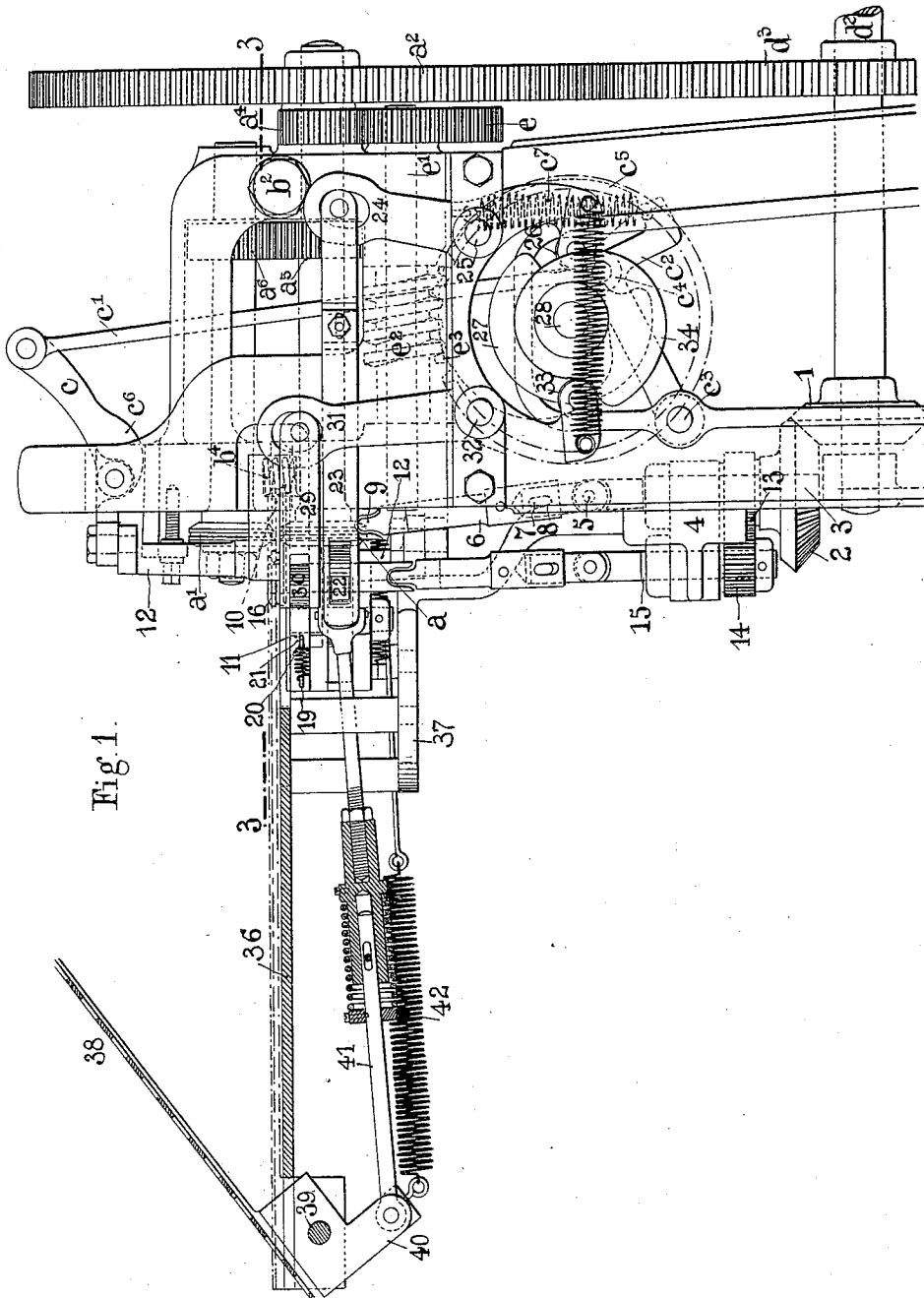


Fig. 1.

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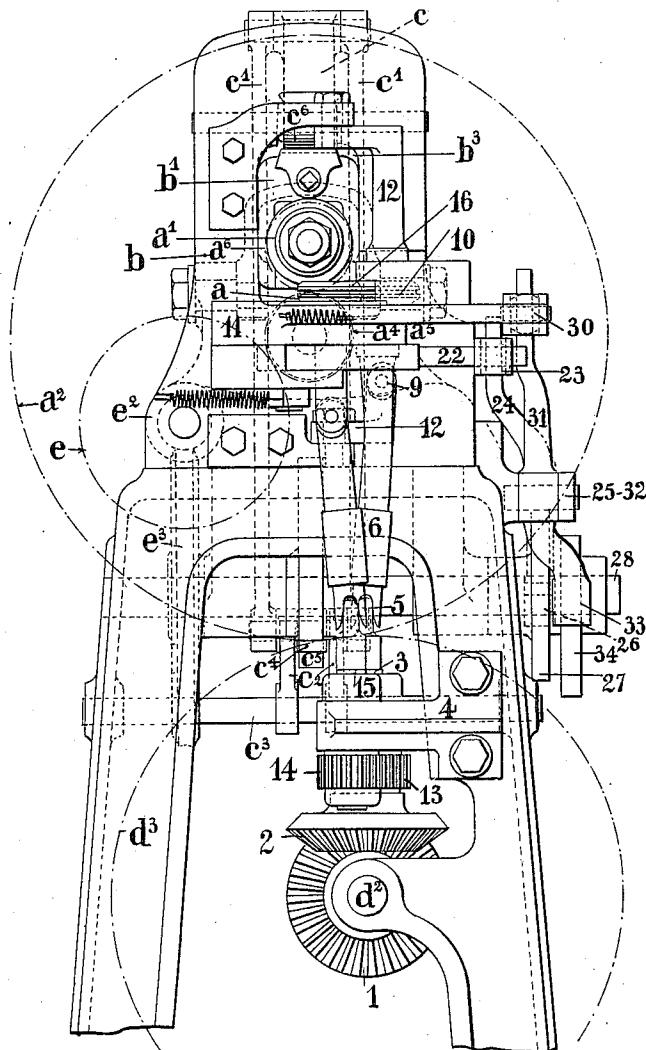
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Fig. 2.



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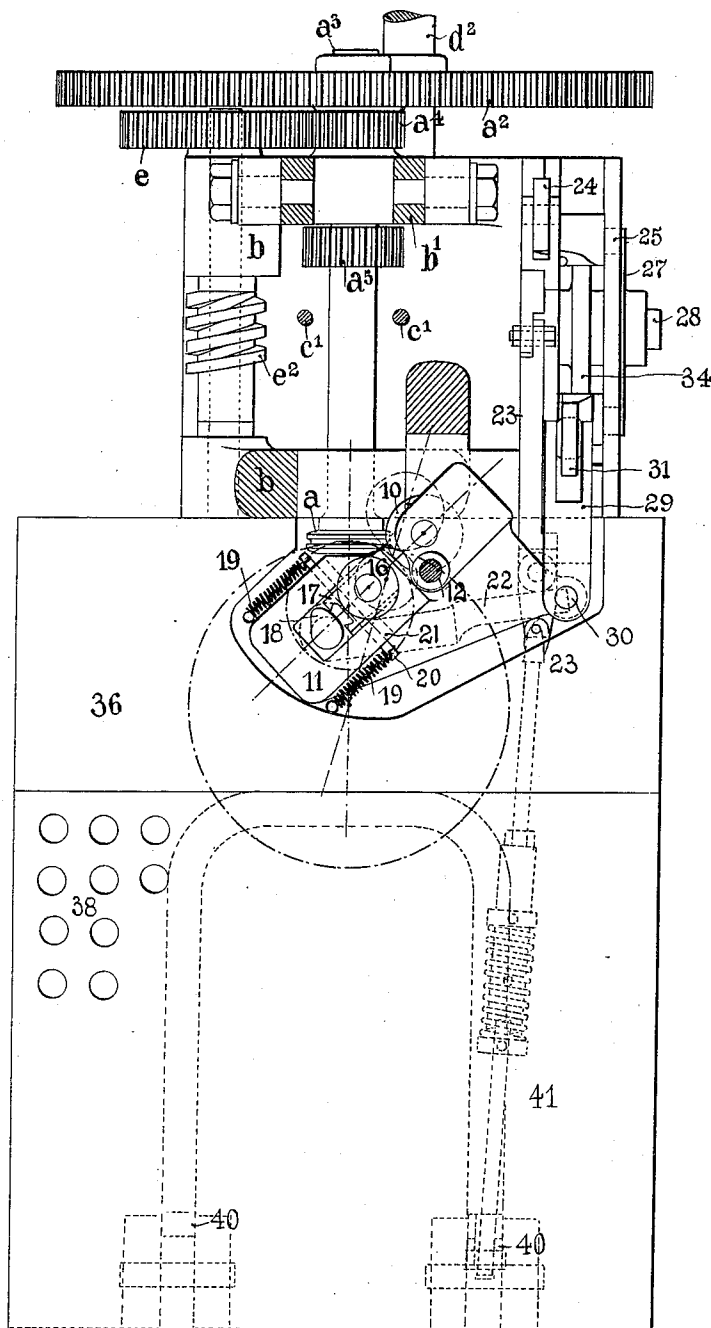
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Fig. 3



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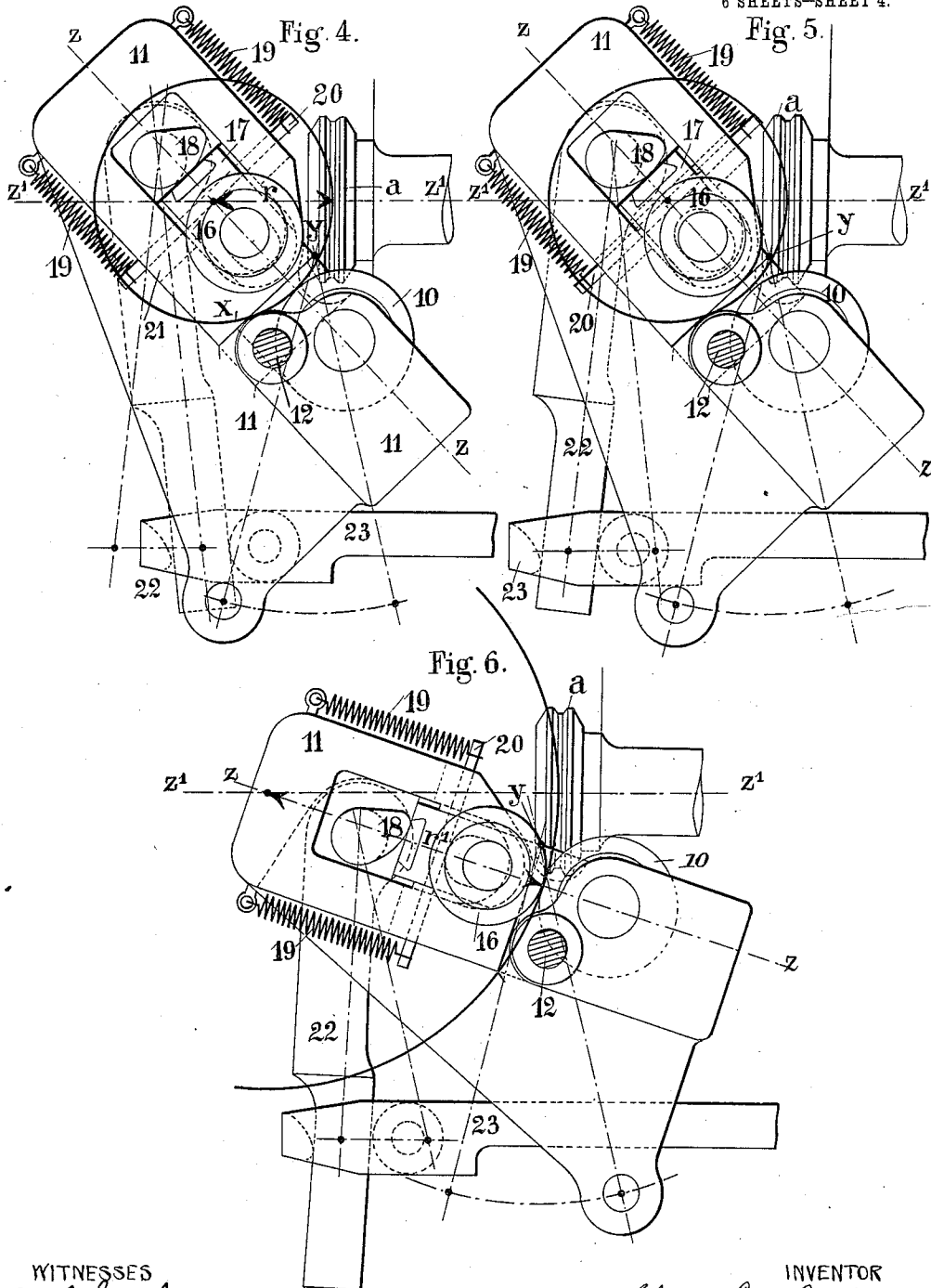
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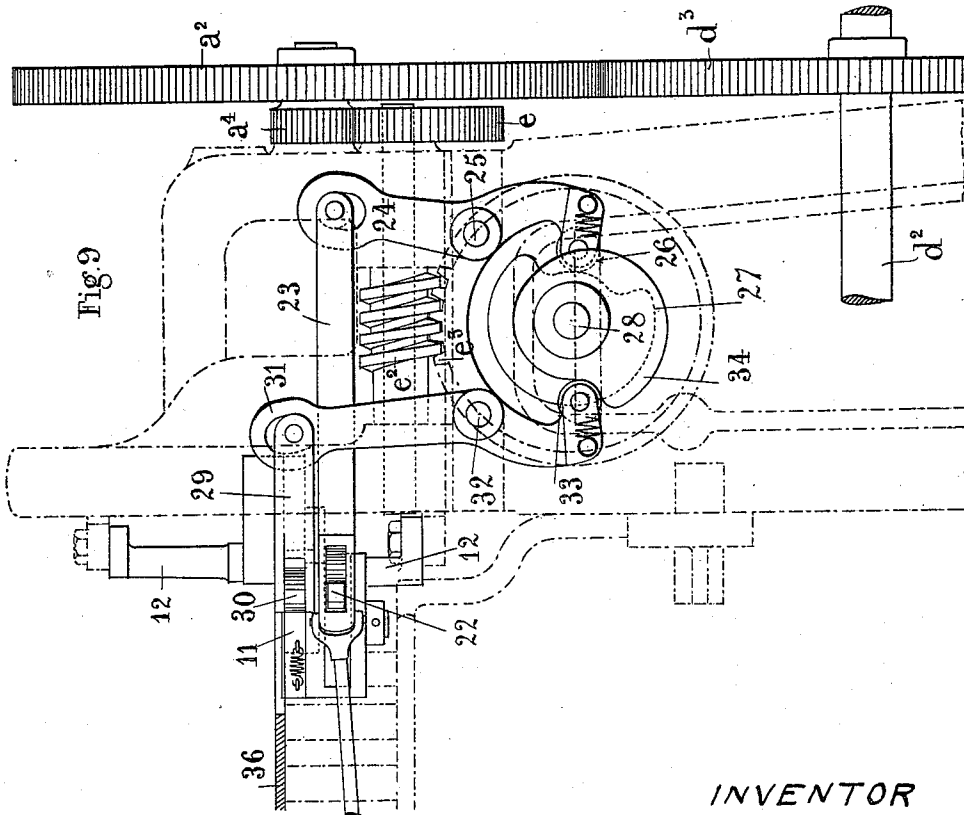
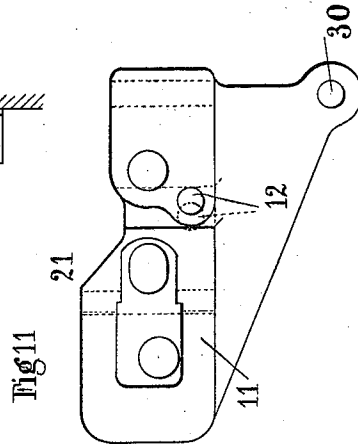
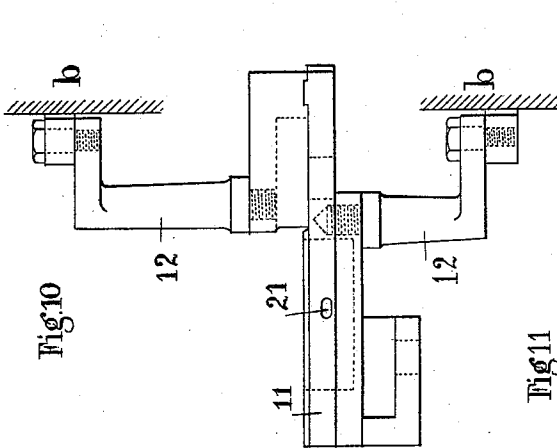
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6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR THE MANUFACTURE OF METALLIC HOOPS.

1,052,433.

Specification of Letters Patent.

Patented Feb. 4, 1913.

Application filed June 13, 1911. Serial No. 632,863.

To all whom it may concern:

Be it known that I, CHARLES LÉON BRÉHIER, of 52 Rue de l'Oureq, in the city of Paris, France, manufacturer, have invented certain new and useful Improvements in Apparatus for the Manufacture of Metallic Hoops, of which the following is a full, clear, and exact description.

This invention relates to apparatus for the manufacture of metallic hoops or rings by the progressive elongation to a definite diameter of metallic rings obtained in any suitable manner.

The invention is characterized by the fact that the ring is drawn or rolled in two perpendicular planes simultaneously, and consists in the arrangement of a second pair of rollers placed at 90° to the first and in sequence thereto, but in such a way that the latter rollers remain always automatically tangential to the ring in spite of the increase in its diameter, these rollers being rotated in the same direction as the first and one of them being actuated so as to approach progressively toward the other for effecting the drawing of the metal. The ring is therefore rolled or drawn first by one of the two pairs of rollers in one direction and then upon leaving this pair it passes through the second pair of rollers which draw it in a plane perpendicular to the first. As a result of this simultaneous drawing in two perpendicular planes, there takes place a more rational working of the molecules of the metal, resulting in a much better quality than that obtained by the apparatus hitherto employed; moreover, since the drawing is effected simultaneously in the two planes without interruption the enlargement of the ring is quicker.

By way of example the annexed drawing represents a machine fitted with a pair of horizontal rollers as well as means for their rotation, their adjustment according to the progress of the drawing, and their automatic displacement whereby they remain always tangential to the ring of which they follow the increase of diameter.

In this drawing: Figure 1 shows the machine in end elevation. Fig. 2 is a front view, with the work-table removed. Fig. 3 is a sectional plan upon line 3—3 of Fig. 1. Figs. 4, 5 and 6 are diagrams showing in plan the displacements and relative adjustments of the horizontal rollers in the three positions corresponding to the intro-

duction of the ring into the machine, to the tightening of the two rollers to begin the action, and to the moment when the drawing attains its maximum. Fig. 7 is a side elevation showing only the vertical drawing rolls and their operating connections; Fig. 8 is a similar view showing only the horizontal drawing rolls and their operating connections; Fig. 9 is a similar view showing only the movable support 11 and its operating connections; Fig. 10 is a similar view drawn to a large scale showing the movable support 11 and the arms 12 to which it is jointed; and Fig. 11 is a plan view of the parts shown in Fig. 10, the arms 12 being raised.

a is a drawing roller journaled upon the main frame b , a' is a drawing roller journaled above the first in a support b' pivoted at b^2 upon the frame b (see particularly Fig. 7).

At the top of the frame b is pivoted a lever c attached to two rods c' connected at their other ends to two levers c^2 pivoted at c^3 upon the base of the frame. Between the two levers c^2 is journaled upon the axis of the connecting rods c' a roller c^4 maintained in contact with a cam c^5 journaled upon the frame b by coiled spring means c^7 attached at one end to the lever c^2 and at the other to the frame b . The lever c carries near its pivot an eccentric portion forming a cam c^6 resting operatively upon the top of the support b' . The latter is guided in an opening b^3 upon the frame b during its angular movement to bring the roller a' toward or away from the roller a .

A coiled spring b^4 raises the support b' to separate the rollers a a' for the insertion and subsequent removal of the ring to be extended.

The apparatus is driven from a shaft d^2 journaled upon the frame b and carrying a toothed wheel d^3 gearing with a pinion a^2 , keyed upon the shaft a^3 upon which is likewise fixed a toothed wheel a^4 ; the latter meshes with a pinion e keyed upon the spindle e' of a worm e^2 engaging a worm wheel e^3 keyed upon the shaft of the cam c^5 .

The rollers a a' are geared together by toothed wheels a^5 , a^6 mounted upon their shafts.

A bevel wheel 1 (see particularly Fig. 8) secured upon the shaft d^2 meshes with a second bevel wheel 2 keyed at the bottom of a vertical shaft 3 journaled in a support 4 and connected by a flexible joint 5 to a

rod 6 secured by a cotter 7 engaged in a slot 8 in a socket upon the said rod, the latter being connected by a second flexible joint 9 to the bottom of the shaft of a drawing roller 10 journaled in a movable support 11 in which are pivoted, eccentrically to each other, the ends of the two arms 12, one extending above and the other extending below the support 11 and being pivoted at their other ends to the frame 6. At the foot of the shaft 3 is mounted a pinion 13 meshing with a pinion 14 mounted at the base of a second doubly-jointed shaft 15 actuating a second drawing roller 16 journaled upon a part 17 slidably mounted in the movable support 11 and maintained in contact with a cam 18 (Fig. 3) by two springs 19 attached to the support 11 and to a gudgeon 20 fixed to the part 17 and projecting on either side of the support, through which it passes by way of a slotted hole 21 (Figs. 3, 9 and 10).

The cam 18 journaled in the movable support 11 is controlled by a lever 22 (Figs. 3 and 9) the arm of which is engaged in the extremity of a rod 23 carrying at its other end a roller engaging an eye-ended lever 24 pivoted at 25 and having a roller 26 maintained in contact with a cam 27 keyed upon the shaft 28 (see Figs. 3, 4, 5, 6 and 9). The movable support 11 is actuated by a rod 29 pivoted thereto at 30 and having a roller engaging an eye-ended lever 31 pivoted at 32; this lever carries a roller 33 maintained in contact with a cam 34 likewise keyed upon the shaft 28 (see Figs. 3 and 9).

The work-table 36 is fixed to a support 37; it carries a protecting cover consisting of a perforated metal plate 38 hinged at 39 and intended to hold the ring during drawing and in case of breakage of the ring to oppose the projection of the fragments (Fig. 1). This protecting cover is controlled automatically so as to be lowered as soon as a ring is engaged between the drawing rollers, and to be lifted as soon as the drawing is finished. For this purpose it is connected by an arm 40 to an extensible rod 41 operated by the rod 23; it is also subject to the action of a coiled spring 42 attached to the arm 40 as well as to a fixed point on the frame.

It will be understood that in the position shown in Figs. 1, 2, 3 and 4 a ring may be laid upon the table 36 and simultaneously between the drawing rollers a , a' and 10, 16.

When the machine is started, the cams c^5 and 27 begin to act upon the rollers c^4 , 26 so as to oscillate the levers c , 22 and to advance the drawing roller a' toward a and the roller 16 toward 10 (Fig. 5); from this time the rotation of the drawing rollers re-

or rolls it simultaneously in the planes of both pairs of rollers, the rollers a' and 16 being advanced progressively toward their opposite rollers in the former case by the cam c^5 and in the latter case after the two rollers are once brought together (as shown in Fig. 4) by the effect of the displacement of the movable support 11. This support carries the drawing rollers 10 and 16 progressively along so as to keep them tangential to the ring, the diameter of which increases under the action of rolling. When the said movable support 11 reaches the end of its path (Fig. 6), that is, when the rollers c^4 and 33 of the rod c' and of the lever 31 are at the greatest radii of the cams respectively, the ring is drawn to the required diameter; the said rollers then escape from the large radii of the cams, the drawing rollers separate, and the protecting cover 38 rises so as to allow the removal therefrom of the finished ring and the insertion therein of another ring to be rolled (Figs. 1 and 4).

The rod 41 is extensible so that when the rod 23 brings the movable drawing roller 16 toward the fixed drawing roller 10 under the action of the oscillating cam 18 and lever 22, lever 24, roller 26 and rotary cam 27, the protecting cover 38 is placed over the circle before the displacement of the movable support 11; but since the lever 23 can still be operated by the cam 27 during the displacement of the said movable support 11, the rod 41 is allowed to shorten by the action of its spring device. Moreover, if the workman should be taken unawares by the fall of the cover there could be no damage therefrom because the rod can yield and the workman would easily free his arms. It will be noted that the said movable support 11 (Figs. 4, 5 and 6) travels around an imaginary axis y such that the line z passing through the centers of the drawing rollers extends constantly to the center of the hoop, which moves in accordance with the progress of the operation along the axial line z' of the rollers a , a' the radius of the hoop varying during this time from r (Fig. 4) to r' (Fig. 6).

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

1. Apparatus for rolling hoops, comprising a pair of drawing rollers, a second pair arranged in sequence and at right angles thereto, a movable support for the latter, means for approaching and separating the rolls of each pair, and means for moving said movable support during the rolling operation to maintain at the center of the hoop the point of intersection of lines passing through the axis of both rollers of each pair of drawing rollers.

2. Apparatus for rolling hoops, compris-

ing a pair of drawing rollers, a second pair arranged in sequence and at right angles thereto, a movable support for the latter, means for approaching and separating the rolls of each pair, eccentric arms pivotally engaging said movable support, and means turning said support thereon during the rolling operation to maintain at the center of the hoop the point of intersection of lines passing through the axes of both rollers of each pair of drawing rollers.

3. In apparatus for rolling hoops, a movable support, a slide carried thereby, a drawing roller journaled in said support, and a cooperating drawing roller journaled in said slide, in combination with cam means for operating said support and slide during rolling, for the purpose described.

4. Apparatus for rolling hoops, comprising a pair of drawing rollers, a second pair

arranged in sequence and at right angles thereto, a movable support for the latter, means for approaching and separating the rolls of each pair, and means for moving said movable support during the rolling operation to maintain at the center of the hoop the point of intersection of lines passing through the axes of both rollers of each pair of drawing rollers, together with a protective cover and means for automatically lowering the same at the start and raising the same at the close of the rolling operation, substantially as described.

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

CHARLES LÉON BRÉHIER.

Witnesses:

H. C. COXE,

LÉON PEILLET.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."