No. 619,937. Patented Feb. 21, 1899.

A. CALLESON.

MACHINE FOR MAKING WIRE RINGS AND ATTACHING CLIPS THERETO.

(Application filed Apr. 8, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2.

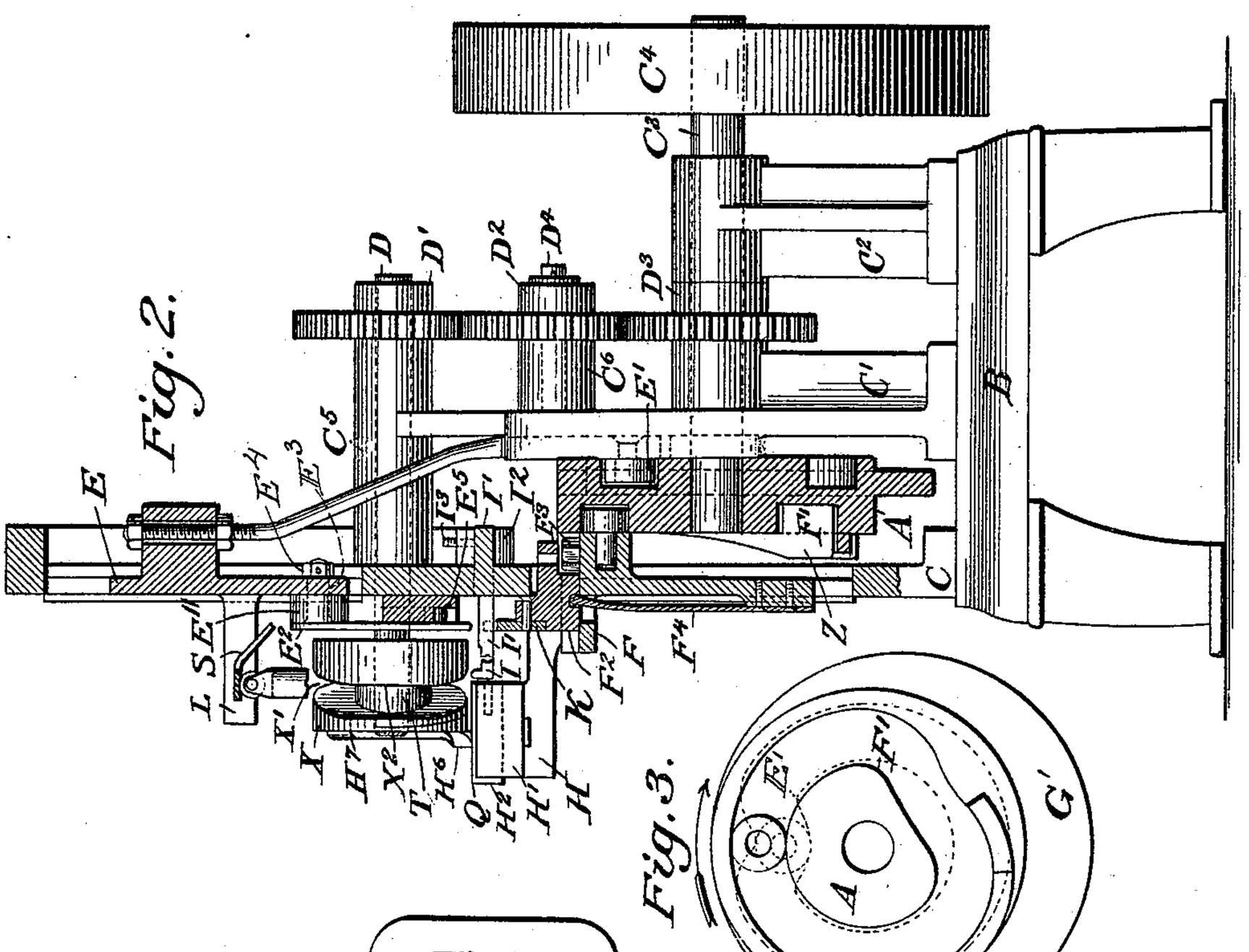
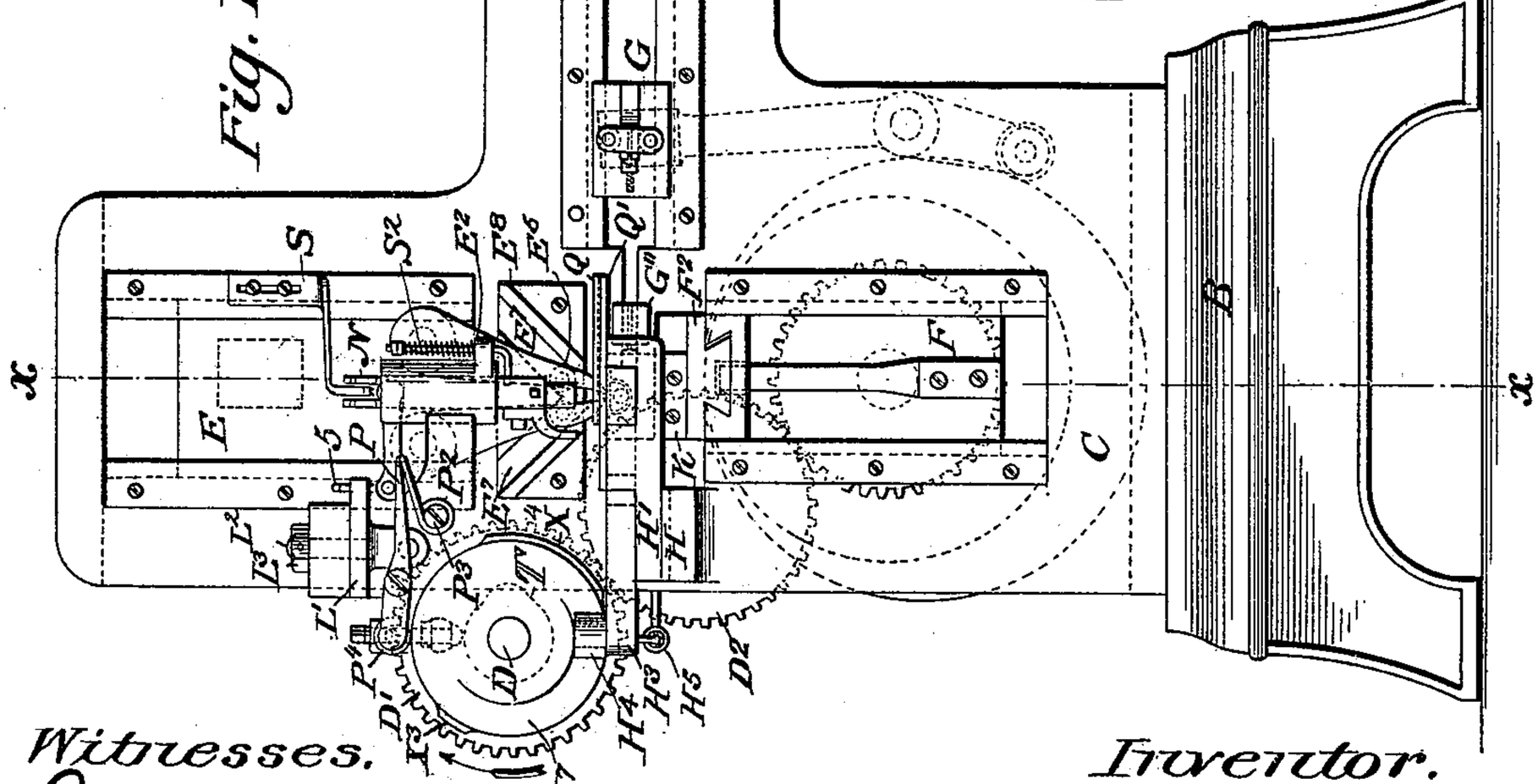


Fig. 3.

Fig. 1.



Witnesses.

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Fig. 4.

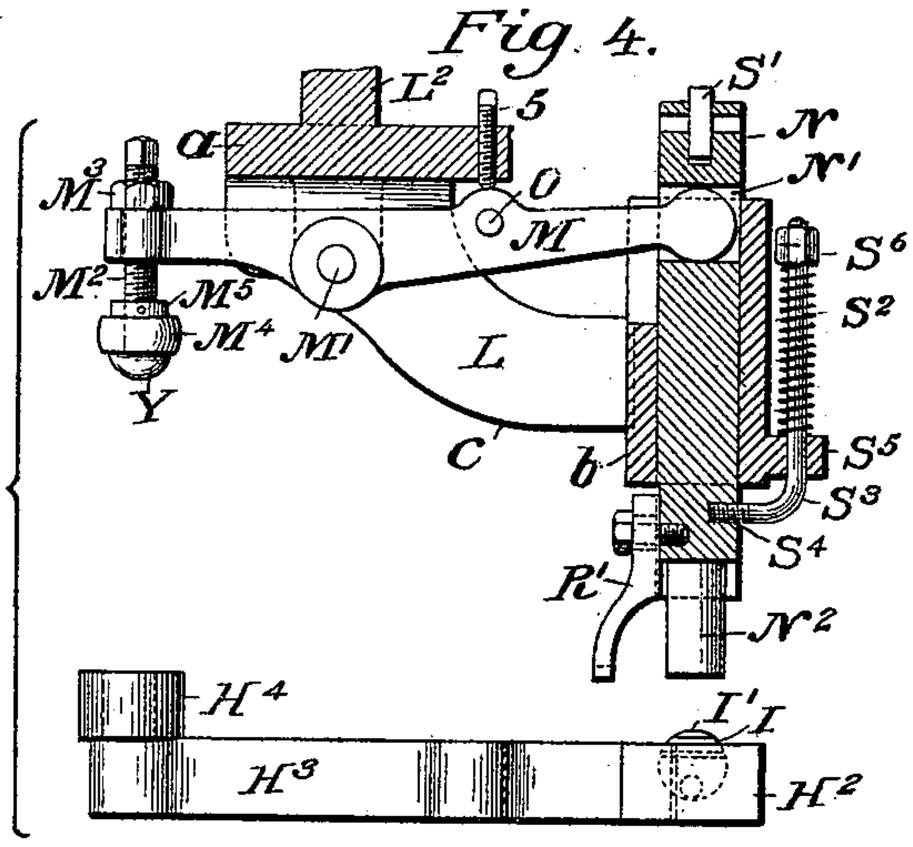


Fig. 8.

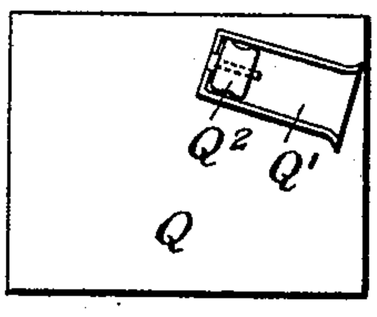


Fig. 9.

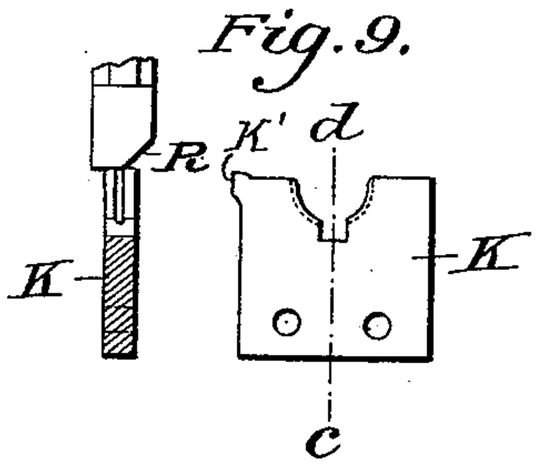


Fig. 10.

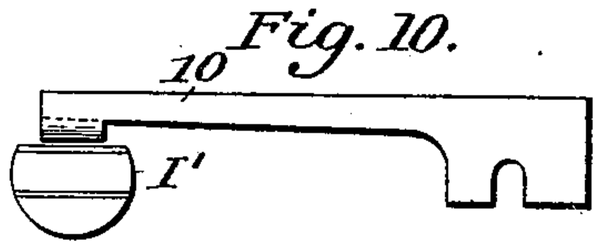


Fig. 5.

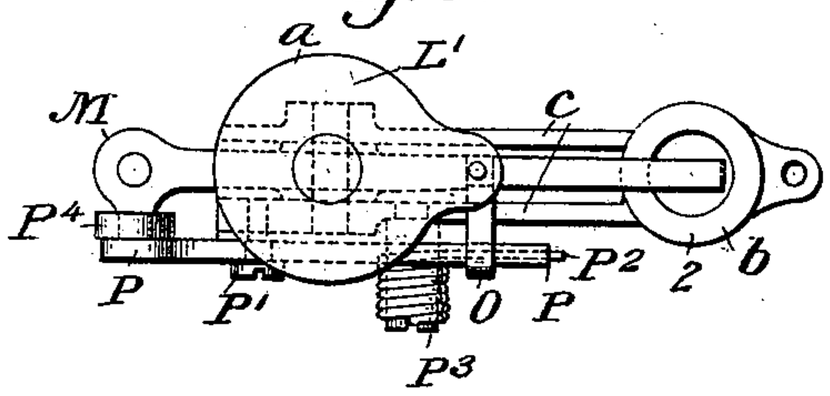


Fig. 6.

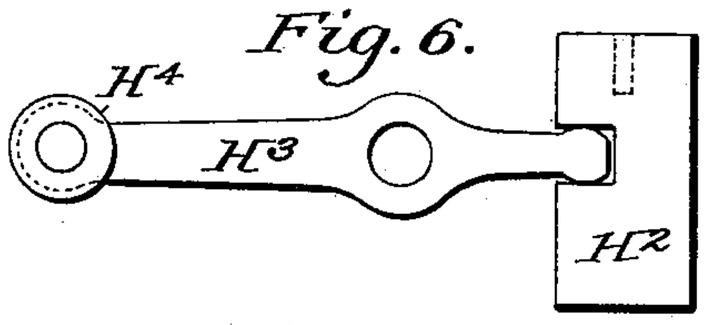


Fig. 11.

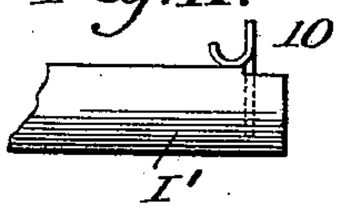


Fig. 7.

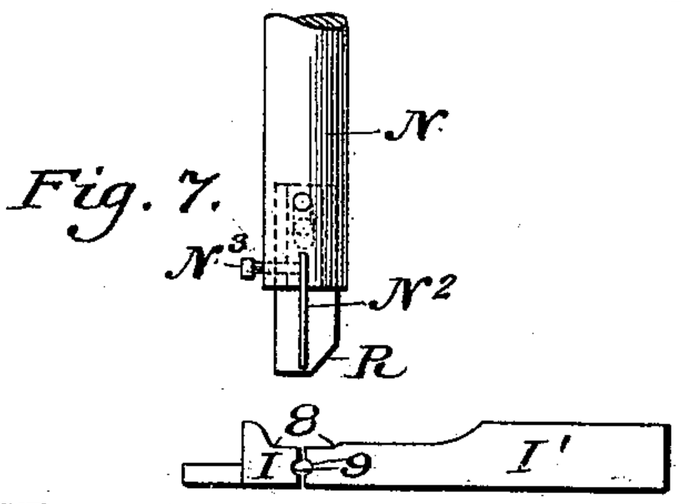
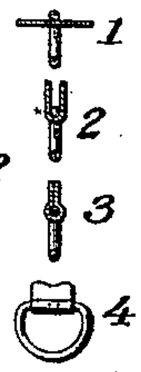


Fig. 12



Witnesses.

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UNITED STATES PATENT OFFICE.

AMOS CALLESON, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO WILLIAM H. HIBBARD, OF SAME PLACE.

MACHINE FOR MAKING WIRE RINGS AND ATTACHING CLIPS THERETO.

SPECIFICATION forming part of Letters Patent No. 619,937, dated February 21, 1899.

Application filed April 8, 1898. Serial No. 676,969. (No model.)

To all whom it may concern:

Be it known that I, AMOS CALLESON, a citizen of the United States, residing at New York, (Brooklyn,) county of Kings, State of New York, have invented certain new and useful Improvements in Machines for Making Wire Rings and Attaching Clips Thereto, of which the following is a specification.

This invention relates to improvements in machines for making wire rings such as are used as handles for tinware covers, pans, &c., being attached to same by means of a tin clip or blank bent around the ring and fastened to the articles aforesaid by means of rivets or solder, or both.

My invention consists in a machine comprising two mechanisms, one of which operates to form the rings into the required shape, while the other bends the clips or blank around the ring. Heretofore the latter operation has been done by hand in another machine, and the result of my improvement is to reduce the expense of manufacture of said article nearly one-half.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a front view of the machine. Fig. 2 is a side view thereof, showing the machine partly in section on the line *x x*, Fig. 1, certain of the parts being removed. Fig. 3 is an elevation of an actuating-cam. Fig. 4 is a side elevation, partly in section, and Fig. 5 a top view, of the mechanism for attaching the clip to the ring. Figs. 6, 7, 8, and 9 show details thereof. Figs. 10 and 11 are detail views of a guard for the clip. Fig. 12 shows the ring and clip in successive stages of formation.

On a suitable base B, Figs. 1 and 2, are mounted a frame C and brackets C′ and C², the latter containing suitable bearings for the shaft C³, which is the main driving-shaft of the machine and is driven by belt connection to pulley C⁴, secured to outer end of said shaft. The bracket C′ extends upward and terminates in head C⁵, in which freely revolves another shaft D, which is driven by shaft C³ through direct gearing D′, D², and D³, as shown in Figs. 1 and 2, the intermediate gear D² revolving freely on a stud D⁴, secured to a projection or stud C⁶ of bracket C′.

In frame C are mounted slides E, F, and G, adapted to reciprocate freely in suitable guideways formed in said frame and operated, respectively, by cams E′, F′, and G′, as shown in Figs. 2 and 3. Slides E and F have an up-and-down motion and form part of the ring-forming mechanism, and slide G has a horizontal motion and is used for feeding the wire for making the rings.

The machine as far as described does not constitute any part of my invention, all the parts and motions being practically the same as used in many other wire-forming machines, and therefore the said parts have only been described briefly in order that the following description of the invention proper may be clearly understood.

On a suitable projection H of frame C is mounted a box H′, containing a slide H², adapted to oscillate freely in a horizontal direction and being operated by a lever H³, pivoted to box H′, said lever having contact with the slide, as shown, Figs. 4 and 6, and having mounted on the end an antifriction-roll H⁴, which is held by spring H⁵ against the cam-surfaces H⁶ and H⁷ of casting X, the latter being secured to shaft D and revolved by same in the direction of the arrow, or, as will be seen by inspection of the drawings, it revolves in the same direction as the main shaft C³, and the gears D′, D², and D³ being all of the same size it follows that shafts D and C³ make always the same number of revolutions.

On the inner end of slide H² is mounted a horn I, and another horn I′ is mounted in the frame C, the shank or round end being held in lug I²·of said frame, where it is secured by a set-screw I³. The free ends of said horns are shaped from cylinders both of the same diameter and flattened on top, as shown in Figs. 4 and 7, and are placed so that the circumference of one coincides with that of the other, the middle of projecting portion of horns I I′ being of the same size and shape as the inside of the desired ring, but the ends being formed with a recess on top, (see Fig. 7,) made long enough to confine a clip or blank endwise when horns are in position shown in Fig. 7, leaving the opening between the horns midway between shoulders 8 of said recess.

Now returning to slide F, Figs. 1 and 2, it will be seen that the upper end of same carries another slide F^2, said slide having a roller-contact F^3 engaging with side of cam A and being held against same by a flat spring F^4, the lower end of which enters into and bears against the side of a cavity formed in slide F^2. On the outer end of slide F^2 is securely mounted a forming plate or die K, a rear and sectional view of which is shown in Fig. 9. The middle upper part of same is cut away, so that when the slide F is in its highest position the center of curvature of the horn I corresponds with that of the curved opening in the plate or die K; but the radius of the latter is longer, equal to about one-half the diameter of the wire from which the rings are formed, and a segmental groove of uniform depth is formed midway around the face of said curved opening. The radius of said segmental groove is equal to that of the wire before mentioned and the depth of same such that the distance of the bottom from the horn I is equal to the diameter of the wire. From above it follows that if a piece of straight wire of proper diameter be placed under and at right angles to the horn I and centrally over the forming plate or die K and the latter be moved upward to a vertical position the ends of the wire will be bent upward to a vertical position and the intermediate portion of same will be partly embedded in the segmental groove in forming plate or die K and will partly bear against the circumference of horn I.

The depth of the curved opening in die K is such that when in the above position the top of die K is on a level with the flat portion of horn I. As I have already stated, the automatic wire-feeding mechanism is no part of my invention, being old and well known in the art, and I will therefore simply state that of the various styles in use I have adopted the one in which a reciprocating slide G is employed, which through suitable gripping mechanism mounted on same feeds the wire from a coil in a straight line through a small hole formed in a fixed support, such as G″, said support being usually adjustable and the portion containing the opening for the wire hardened, so as to withstand the strain due to shearing off the wire by a cutting-tool, which bears against the inner side of said support G″ and is adapted to slide past the hole through which the wire is fed, thereby shearing it off into required lengths, and in this case I have formed said cutting-tool on the upper corner of the forming-plate K, as shown at K′ in the rear view, Fig. 9, the distance from K′ to center of forming plate or die K being equal to one-half of the required length of wire from which the ring is formed. In this case the wire is cut by the upward motion of tool K′ and die K immediately before the latter starts, forming the wire, as above described, and the length of the feed of wire is regulated so that the length of same is equal to twice the distance from center of K to K′, which is just sufficient to make a ring, or, in other words, if bent around the horn I the ends of same will just meet.

I will now describe my improved mechanism for finishing the forming operation of the rings or that of bending down the ends of the ring part formed so as to correspond with that part on top of horn I. On the front lower end of slide E are formed two suitable hubs E″, each carrying a forming-finger E^2, which swivels on a stud E^3, Fig. 2, formed on same and contained in hubs E″, a stop-collar E^4 keeping the finger up against hub E″, allowing lower ends of the finger to vibrate freely. On the inner face of fingers E^2 and near the lower ends of same are formed studs carrying antifriction-rolls E^5, which fit freely into oblique cam-grooves E^7, formed in a fixed support E^8, adjustably secured to frame C, and it is therefore obvious that an upward motion of slide E, carrying fingers E^2, will cause the lower end of same to move upward and sidewise at the same time, due to the roller-contact with cam-grooves E^7, as above explained.

The forming-fingers E^2 are of a uniform thickness throughout, equal to that of forming plate or die K, and the faces of all three parts are contained in the same plane. The faces of fingers E^2 taper toward their lower ends and terminate in almost a point at the extreme lower ends, the lengths of same being equal and adjusted, so that when the slide E, carrying same, is in its extreme lower position said ends almost meet centrally of the forming-horn I and are a sufficient distance away from the flat portion of the latter to allow one thickness of the wire to be formed to pass underneath. The upward motion of slide E is sufficient to carry the lower end of forming-fingers E^2 out of the path of the ends of the wire as it is being formed around the lower half of horn I; but as the forming-fingers are carried downward by slide E the points of same bend the wire around the upper portion of the horn, the points of the wire meeting midway between the forming-fingers on the flat portion of the horn I, and the forming of the ring is completed.

Next I will describe that part of my invention which provides the novel mechanism for automatically fastening the tin clip or blank to the finished ring. A suitable projection L of frame C is provided, which carries a bracket L′, (shown in mid-section, Fig. 4, and plan of same, Fig. 5,) said bracket L′ being secured to projection L by having a stud L^2 formed, which passes through the latter and is secured in place by a stop-collar L^3, allowing bracket L′ to vibrate freely in a horizontal plane. The bracket L′, Figs. 4 and 5, consists, essentially, of a flange *a*, carrying a vertical hollow cylinder *b*, both being connected by two ribs *c*, all being cast in one piece, and the distance between the ribs is made large enough to receive a suitable lever M,

pivoted to same at M′ and adapted to vibrate in a vertical plane independent of the motion imparted by vibration of the bracket L′. One end of said lever is rounded and enters into cylinder *b*, Figs. 4 and 5, the wall of latter being cut away sufficiently to clear its path and allow it to vibrate vertically. The rounded end fits loosely in a rectangular opening formed in a slide N at N′, said slide having a free-working fit in said cylinder, and it will be seen that if the lever M is vibrated on its pivot M′ it imparts a similar motion to slide N. Into the other end of lever M is screwed a stud M^2, adjustable vertically and secured in position by a jamb-nut M^3. The lower end of said stud carries an antifriction-roller M^4, confined between the head Y of said stud and a stop-collar M^5. A stud O projects from lever M nearly midway between pivot M and slide N, and against it bears another lever P, said lever being pivoted to the outer rib *c* of bracket L′ at P′ and being held up against stud O by a torsional spring P^2, mounted on a stud P^3, secured to outer rib *c*, Figs. 1 and 5, said spring being strong enough to normally force lever M, carrying slide N, against stop-screw 5, the the latter thereby limiting the upward motion of slide N. On the free end of lever P is formed a stud carrying an antifriction-roll P^4, confined between the sides of the levers M and P, as shown in Fig. 5. The roll M^4 engages in cam-groove X′, formed in cam X, which when rotated gives a horizontal vibrating motion to lever M, which gives a horizontal corresponding motion to bracket L′ and slide N. The cam-groove is shaped with a "dwell" or an idle portion of each extreme position, one being shown at X^2, Fig. 2, which causes the slide N to pause at each extreme position before returning to the other extreme. While thus pausing, the antifriction-roll P^4, which controls lever P and is normally well clear from contact with cam X, is forced upward by cam-surfaces X^3 and X^4, which lie in its path and are formed on cam X. While thus forced upward at P^4 the other end of P is moved downward, compressing spring P^2, thereby removing the upward pressure, and pin O and the corresponding end of lever M and the slide N are carried downward by gravity, the pin O following lever P as it goes down, and the moment the said cam-surfaces revolve out of the way of roll P^4 the spring P^2 forces slide N and corresponding end of lever M upward till the latter strikes stop-screw 5. The lower end of slide N is slotted to receive a punch N^2, which is held in position by set-screw N^3, said punch being magnetized in the ordinary manner, the strength of same being amply sufficient to carry one clip or blank at a time, but not sufficient to carry two blanks.

On the top of box H′, already described, is mounted a plate Q, which keeps slide H^2 in position and also carries a box Q′, made, preferably, of sheet metal, with projecting walls on the sides and one end, the other end being left open with the side wall diverging to form a flaring opening. The distance between the walls of box Q′ is a trifle more than the length of a clip or blank Q^2, Fig. 8, and the height is sufficient to properly guide a number of blanks at a time when placed in position, as shown at Q^2, Fig. 8, resting against the end wall of box Q′. The said position of clip Q^2 is such that when the slide N descends while in its extreme outer position the punch N^2 strikes centrally on blank Q^2, as shown by dotted lines, Fig. 8, and in going upward again it carries a blank along with it. The other extreme position of slide N, Fig. 7, is such that when the latter descends the inner side of punch N^2 passes outer end of horn I, leaving a space between same of fully one thickness of a clip or blank, and with horn I in position shown in Fig. 7 the other side of punch clears the end of horn I by the same amount. If now punch N^2 carries a blank, as before stated, and descends while in the position of Fig. 7 the blank will be deposited in the recess already described, and thereby limit the downward motion of punch N, which rests on top of blank Q^2 over the opening between horns I and I′. The recess containing the blank Q^2 is deep enough to leave said blank entirely below the flat middle portion of horn I, over which the ring is formed.

I will now describe the process of uniting the ring and clip. After the forming-fingers E^2 have completed forming the ring, as already described, the slide F^2 is forced outward against spring F^4 by cam-surface Z, formed on the side of cam A and bearing against roll F^3 of slide F^2. It moves sidewise sufficient to bring the finished ring carried by the segmental groove formed in die K central under punch N^2 and over middle of blank between end of horns I and I′, the punch being raised sufficiently to allow the top of ring to pass under same by the upper left-hand corner of forming-plate K, which strikes a cam-surface R, Fig. 9, formed on arm R′, adjustably mounted on lower side of slide N. As soon as the ring is in position under punch N^2, slide F, carrying slide F^2, with plate K^2, moves downward, leaving the ring on the blank, as shown at 1, Fig. 12. Cam Z is shaped so that the slide F^2 remains in its outer position while being carried down until forming-die K is well clear of the ring, when it moves inward and reaches its normal position before slide F starts on its upward stroke. As soon as die K is clear of the ring a cam-surface T, Fig. 1, formed on cam X, Fig. 2, strikes head Y of screw M^2 and carries same upward, thereby depressing the other end of lever M, which controls slide N and punch N^2. The latter forces the ring downward, and thereby bends the blank, as shown in Fig. 12 at 2. As soon as punch N^2 is in the extreme lower position, adjusted to suit the requirements, cam-surface T leaves head Y of screw M^2, and at the same time cam-surface X^2 leaves roll P^4, allowing spring

P^2 to act, and thereby carry punch N^2 upward, leaving the ring and blank suspended between horns I and I′, the friction of the blank against the horns being sufficient to hold both in position. Said position is such that the flat part of the ring is on a level with half-round grooves formed horizontally in each horn at 9, the radius of each groove being equal to that of the wire from which the ring is made plus one thickness of a blank. Now the cam-surface H^6 strikes roll H^4, carried by lever H^3, pushing same outward and the other end of H^3 inward sufficient to force the grooves 9 around blank containing flat of ring, thereby forming it, as shown in Fig. 12 at 3 and 4, which makes the operation complete. As soon as the clip or blank is formed horn I withdraws and the clip and ring drop by gravity. Normally the extreme outward position of horn I is farther away from horn I′ than shown in Fig. 7, to an extent sufficient to give the clip or blank considerable clearance between shoulders 8 of recess when deposited as already described; but as soon as the blank is deposited horn I moves forward to position shown in Fig. 7, being actuated through the intermediate mechanism by cam-surface H^7 striking roll H^4, moving same outward, thereby confining the blank snugly between shoulders 8 of the recesses, Fig. 8, the object being to provide ample clearance for the clip or blank while being deposited and to avoid any possibility of the ends of same catching on the top of shoulders 8.

I will now go through the operation in its regular order of making a ring and attaching a clip to same, so that the detailed description of each step of said operation may be more clearly understood. I will start at a point where with the machine properly adjusted the wire is being fed forward through the cut-off support G″ by slide G, with slides E and F in their extreme position away from horn I and slide F^2 in its inner extreme position. When the feed is completed, slide G returns and forming-die K, carried by slide F^2, mounted on slide F, starts upward, cutting the required length of wire off and bending same around lower half of horn, leaving the ends of same in a vertical position. Die K rests in that position while fingers E^2 finish the ring by bending the ends of same around the remaining upper part of horn I and again withdraw. Then while slide F still remains at rest die K, mounted on slide F^2, is pushed outward, carrying the finished ring under punch N^2 and over a clip or blank previously picked up by the magnetic punch N^2 from box Q′, carried over and deposited in recess on end of horns I and I′. Then die K moves down out of the way and punch N^2 pushes ring and clip down between horns I and I′ and returns. Next, horn I is forced toward horn I′, forming the clip around ring, as shown in Fig. 12 at 3 and 4, which completes the operation.

I will now describe an auxiliary attachment to the blank-carrying mechanism. It will be understood from Fig. 7 that if punch N^2, with carrying parts holding a blank, were to drop freely until limited by the blank striking the recess on horns I and I′ the momentum of the falling parts would exert more or less pressure on said blank, and not being supported under the point of pressure it would have a tendency to bend the ends of same upward, which would allow the ring to pass under the clip instead of over same, as required. Different means may be adopted to overcome said difficulty. The means shown in this case consist of a bar-spring S, Fig. 1, made of some elastic material, such as spring-steel, one end being bolted to frame C and the other end bent down, as shown in Fig. 2, in such a manner as to be in the path of friction-roll S′, mounted on upper end of slide N. (See Fig. 4.) Before reaching the inner extreme position the slide N is deflected downward and compresses spring S^2, Figs. 1 and 4, which is supported on rod S^3, secured to slide N at S^4 and passing through opening in lug S^5, said spring being confined between said lug and jam-nuts S^6 on upper end of said rod. The strength of spring S^2 is sufficient to carry the weight of slide N and attached parts, but not as strong as spring S, and therefore it will be understood that the clip is carried diagonally downward and the position of spring S is adjusted so that when slide N has reached its extreme position over the horns the blank has just been lodged in the recess, leaving the punch N^2 resting lightly on the top of same and spring S bearing against roll S′. Another way would be to discard all the above and provide an adjustable stop for bracket R′ when slide N drops, allowing the punch N^2 to deposit the blank properly in recess of horn without exerting any pressure on same stop, being removed by suitable mechanism before punch N^2 starts forming the blank.

Figs. 10 and 11 show an attachment to guard against any possibility of the ring passing under instead of over the clip deposited in the recess on ends of horns I and I′ when same is carried to its outer position, as before explained, the attachment consisting of a steel spring 10 or its equivalent cut and bent into the shape shown, one end being fast to some stationary part of the machine, the other end resting with its lower side on top of horn I just back of shoulder of recess 9. Now when the ring is carried outward to its position on the clips its upper portion strikes the spring 10, which thereby is carried outward at the point of contact until it meets the punch, when it is forced upward sufficiently to let the ring pass underneath same and allow it to snap back to its normal position. It will be understood from the above that should the clip happen to be bent upward on the inner end the end of spring 10, passing over said clip ahead of the ring, will force it down, and thereby avoid any danger of the ring passing underneath.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a machine for forming wire rings and attaching clips thereto, the combination with a horn around which the ring is formed, and a die coöperating with said horn to form the ring and having a groove in which the ring is formed and held, of mechanism for attaching a clip to the ring, and means for moving the die and thereby carrying the formed ring into position for the action of said mechanism.

2. In a machine for forming wire rings and attaching clips thereto, the combination of a ring-forming mechanism, a clip-attaching mechanism, and a die coöperating with the ring-forming mechanism to form the ring and carrying said ring into position for the action of the clip-attaching mechanism.

3. In a machine for forming wire rings and attaching clips thereto, the combination of a horn, a die movable transversely and longitudinally of said horn, and having a groove to form and hold the wire ring and to move it along the horn, a second horn and a punch coöperating with both said horns and forcing the ring and clip between the said horns.

4. In a machine for forming wire rings and attaching clips thereto, the combination of ring-forming mechanism, clip-carrying mechanism, means for carrying the formed ring over the clip after the latter is carried into position, and a punch and means coöperating therewith to bend the clip around the ring.

5. In a machine for forming wire rings and attaching clips thereto, the combination with a fixed horn I′ of a forming-die K, oscillating in a plane at right angles to said horn and adapted to form a suitable length of wire around one portion of said horn and having a rounded groove around the line of contact with the wire whereby said wire is partly embedded in said groove thereby adapting the die K to securely carry said wire while thus held to some other fixed position, substantially as shown and described.

6. In a machine for forming wire rings and attaching clips thereto, the combination with a fixed horn I′, of a forming-die K, and two slides F and F^2, one slide moving in a fixed plane and the other carrying die K being suitably mounted on said first slide and having an independent side motion, substantially as shown and described.

7. In a machine for forming wire rings and attaching clips thereto, the combination with a slide E of one or more forming-fingers, one end of each being hinged to said slide and oblique cam-surfaces E^7 fixed in position and engaging said fingers at some point between the ends of same thereby imparting to same a side motion independent of that due to the motion of slide E, substantially as shown and described.

8. In a machine for forming wire rings and attaching clips thereto, the combination of a fixed horn I′, and a movable horn I properly guided in position by suitable mechanism and made with guiding-shoulders 8 and forming grooves 9 on the ends, substantially as shown and for the purpose described.

9. In a machine for forming wire rings and attaching clips thereto, the combination of a slide N having a vertical movement and an independent side movement and a punch and magnet N^2 attached and adapted to pick up a "tin" clip or blank in one position and deposit it in another and there partly form same, substantially as shown and described.

10. In a machine for forming wire rings and attaching clips thereto, the combination of a slide N, a magnet N^2 and means of lifting same automatically after depositing a blank and resting on same, sufficiently to allow the flat portion of a ring to pass between it and the blank, substantially as shown and described.

11. In a machine for forming wire rings and attaching clips thereto, the combination of a slide N, a magnet N^2 and means to arrest the down motion of same when depositing the clip or blank on horns I and I′, thereby avoiding any undue pressure on same, substantially as shown and described.

12. In a machine for forming wire rings and attaching clips thereto, the combination with the ring-forming and clip-attaching mechanisms and means for supplying clips to the clip-attaching mechanism and for carrying the ring from the ring-forming mechanism to the clip-attaching mechanism, of a spring-guard engaging with said ring and clip to prevent passage of the ring under the clip.

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Witnesses:
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