

March 20, 1956

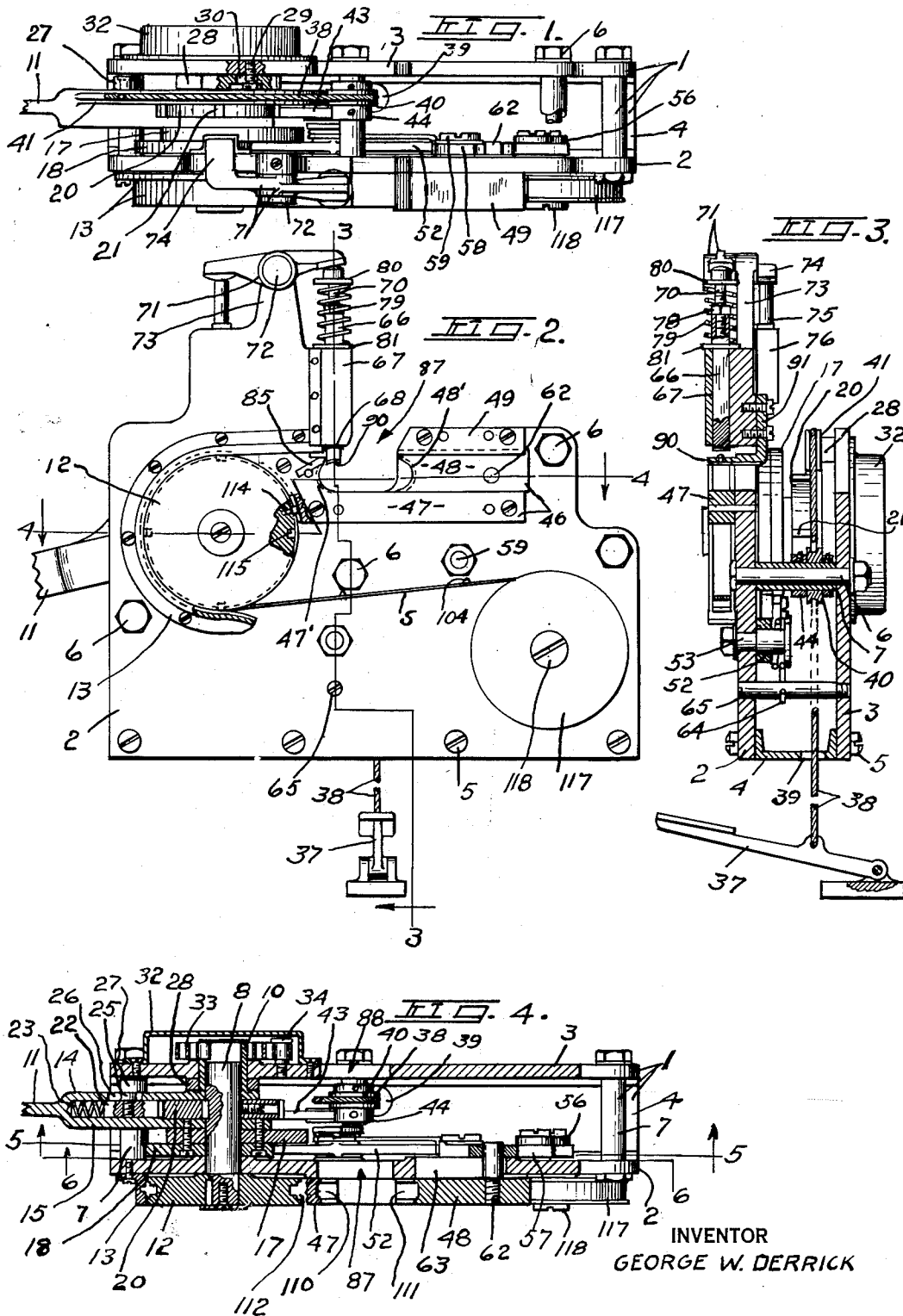
G. W. DERRICK

2,738,747

BAND FORMING AND APPLYING APPARATUS

Filed June 17, 1950

3 Sheets-Sheet 1



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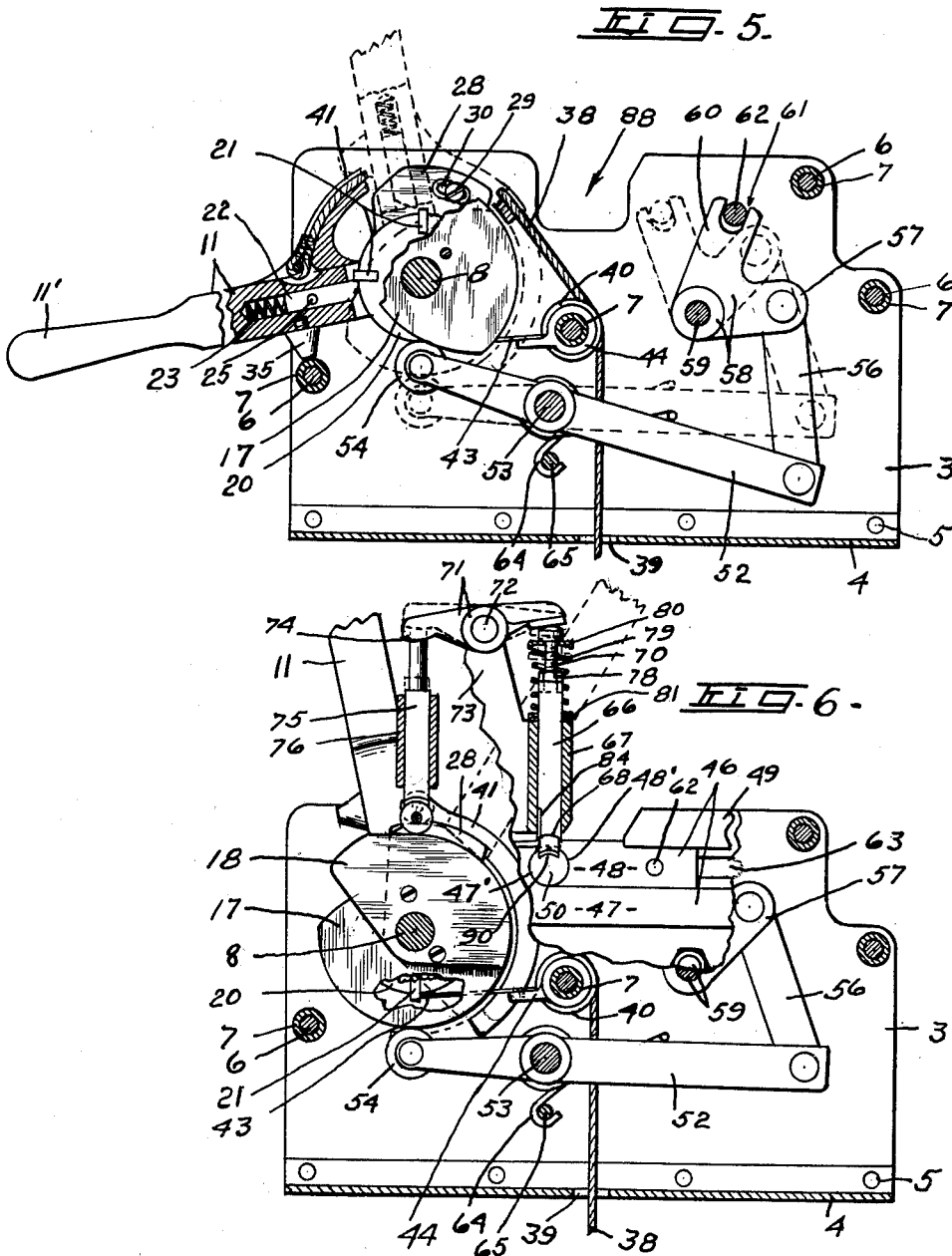
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3 Sheets-Sheet 2



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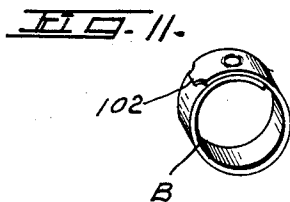
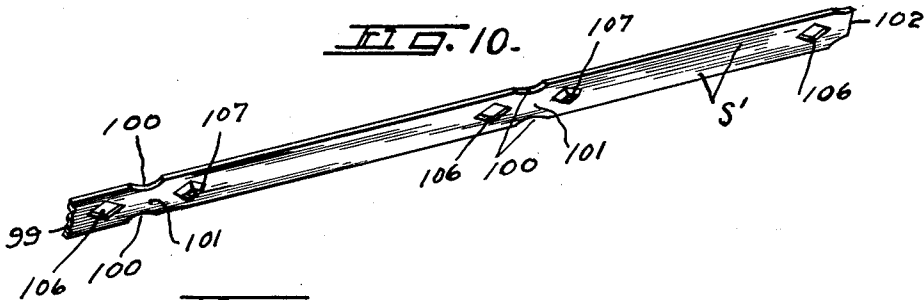
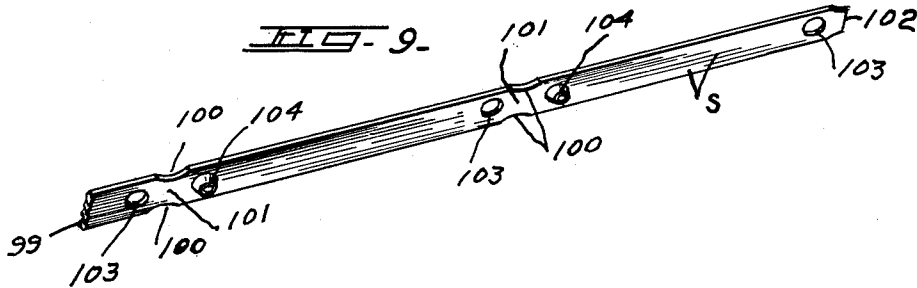
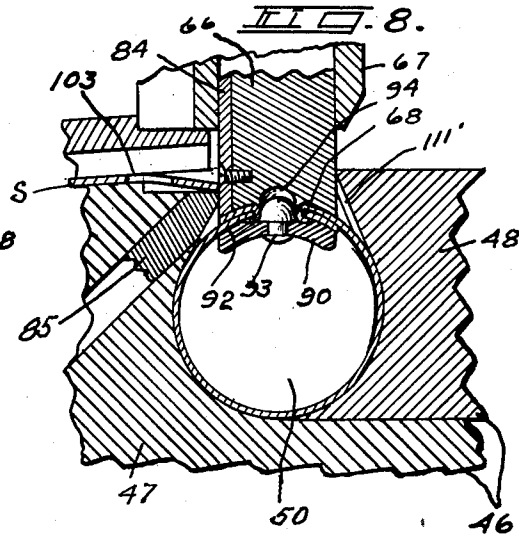
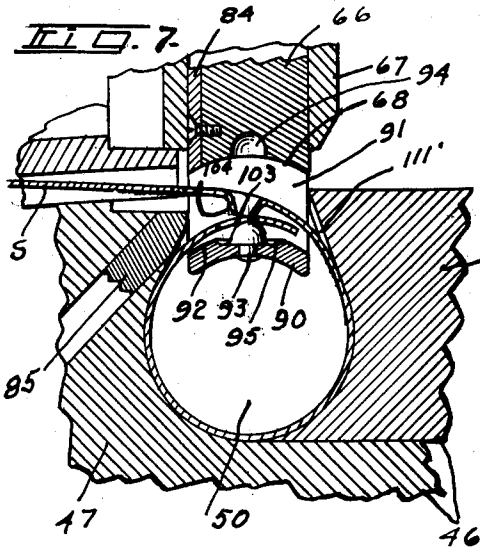
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3 Sheets-Sheet 3



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2,738,747

BAND FORMING AND APPLYING APPARATUS

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3 Claims. (Cl. 113—1)

This invention relates to identification bands or rings adapted to be applied to the legs of fowl, poultry, or the like, and to an apparatus for forming and applying such bands.

On poultry farms and other places it is often desirable and profitable that a simple and inexpensive identification means be employed to distinguish one fowl from another of the same breed. For instance, it is often desired to determine the laying quality of each individual fowl; often it is wished to determine certified fowl from those that are not certified; or it may be desired to keep record of fowl which have passed a blood test from those that have not passed the test. A convenient means employed to enable one fowl to be thus distinguished from another has been to attach bands having different numbers or other identification markings thereon to the legs of hens, turkeys, ducks, or other fowl. In so far as I am aware, these bands have been manually attached to the fowl with the aid of pliers, pincers, or other band-fastening instruments. This method has proven unsatisfactory due to the entering in of such human elements as fatigue, carelessness and inaccuracy with the result that many of the bands become unfastened and fall from the legs of the fowl with the consequent loss of identification. Further, it is difficult to apply the bands serially with the result that errors are made in identification and diseased fowl may be confused with healthy specimens.

The main objects of my invention, therefore, are to provide a machine for attaching identification bands or rings to the legs of poultry or the like, which is rapid, dependable, and easy in operation, and that is economical, durable and simple in construction.

A further object of the invention is to provide an improved identification band means in that it is peculiarly adapted to be used in conjunction with the machine of my invention.

In carrying out the above mentioned objects, I preferably use a metal tape or a long continuous strip of light, thin material having a multiplicity of suitable identification markings spaced longitudinally of the tape or strip which is preferably formed in a roll or wound on a spool or reel for convenience of handling. I have also provided a band-forming means which includes a die adapted to receive the leg of a hen, turkey, or the like therein; a means for intermittently feeding the tape or strip to the die to form a band about the leg; a fastening means for securing the band in the formed position, and a cut off means for severing the formed band from the remainder of the tape or strip. In order to permit the leg of a fowl to be quickly and easily placed into and removed from the die, I have provided a sectional die member having at least one of the sections movable for opening and closing the die. Furthermore, the tape or strip from which the bands are formed is preferably composed of thin, flexible material which is easily bent.

A still further object of the invention is to effect a

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closing of the die as the strip or tape is moved into engagement with the movable die section to prevent excessive bending or buckling of the strip or tape, and to facilitate the initial forming operation.

These and other objects and advantages pertaining to the detail construction of the machine and operation of the parts thereof will be more clearly understood from the following description taken in conjunction with the accompanying drawings in which:

Figure 1 is a top plan of a machine embodying the various features of my invention.

Figure 2 is a side elevation of the device shown in Figure 1.

Figure 3 is a vertical section view taken substantially on line 3—3 of Figure 2.

Figure 4 is a horizontal sectional view taken substantially in the plane of line 4—4 of Figure 2.

Figure 5 is a vertical section taken substantially in the plane of line 5—5 of Figure 4, illustrating the co-action of the tape feeding and die closing mechanism.

Figure 6 is a vertical section taken substantially in the plane of line 6—6, Figure 4, illustrating the mechanism for fastening the formed band, a portion of the machine being shown in side elevation.

Figure 7 is an enlarged vertical sectional view through the closed die, illustrating the manner of forming the band.

Figure 8 is a view similar to Figure 7, illustrating the manner of cutting the band from the band tape and manner of locking or fastening the formed band.

Figure 9 is a perspective view of a detail section of a band forming strip.

Figure 10 is a perspective view similar to Figure 9 showing a modification of band forming strip.

Figure 11 is a perspective view of the formed band.

The structure disclosed in the drawings comprises a supporting frame 1 having a front plate 2, a back plate 3, a channel bar base, 4, to which the plates 2 and 3 are secured by screws 5 and a plurality of tie bolts 6 and spacing bolts 7. A drive shaft 8 extends transversely of frame 1 with its forward portion joined in front plate 2 and the rear end thereof rotatably supported in a sleeve or hub 10 provided on an operating lever 11 as shown in Figure 4. The forward end of shaft 8 extends outwardly beyond front plate 2 and has secured thereto a feed drum 12 for the band strip as S in Figure 9 or S', Figure 10.

A suitable guard 13 is secured to plate 2 for maintaining the band strip in cooperative relation with the feed drum 12. The above mentioned lever 11 has the inner end thereof bifurcated as shown in Figure 4. The sleeve or hub 10 is connected with the rearwardly disposed arm 14 of lever 11, while the other arm 15 has secured thereto a die operating cam 17 and a cut off and dividing punch operating cam 18, said cams being loosely mounted on shaft 8 to permit free independent rotation of said cams and shaft with respect to each other.

Secured to shaft 8 and positioned between the lever arms 14 and 15 is an indexing wheel 20 having a plurality of, in this instance, four lugs or teeth 21 projecting from the periphery thereof in uniform circumferential spaced rotation. As best seen in Figures 4 and 5, the lever 11 has a pawl 22 mounted for longitudinal sliding movement into and out of engagement with teeth 21. A spring 23 yieldingly urges pawl 22 toward wheel 20. A shouldered stud 25 screw threaded in pawl 22 extends rearwardly therefrom through an elongated slot 26 provided in arm 14 and has a roller 27 rotatably mounted on the outer end thereof. Roller 27 is adapted to engage a pawl release cam 28, as lever 11 is swung forwardly, for moving pawl 22 out of con-

tact with an indexing tooth 21. Cam 28 is loosely mounted on the lever sleeve or hub 10 to permit free rotation of said sleeve and is fixedly secured to the back plate 3 by one or more screws 29. It is sometimes necessary to produce a slight radial adjustment of cam 28 to compensate for wear and produce proper synchronization of the parts affected by the operation thereof. I have, therefore, shown screw 29 as passing through an elongated slot 30 provided in cam 28 and screw threaded in the back plate 3 (see Figures 1 and 5).

The lever sleeve or hub 10 is journaled to the frame back plate 3 and extends rearwardly beyond said plate into a housing 32 secured to plate 3. Also mounted in housing 32 is a coil spring 33 which has one end connected with the sleeve or hub 10 and its other end connected by a stud 34 to the plate 3 adapted to urge the lever 11 counterclockwise to its initial or starting position (see Figures 4 and 5). The rotation of lever 11 produced by spring 33 is limited by the engagement of a bumper 35 connected to said lever with an adjacent spacing sleeve 7. The forward movement of lever 11 may be produced manually through the lever treadle 37 positioned below frame 1 and operatively connected by a cable 38 to lever 11. Cable 38 may, as shown in Figures 3 and 5, pass upwardly from treadle 37 through an opening 39 in base 4 over a sleeve 40 rotatably mounted on a spacing sleeve 7 provided in the frame 1 intermediate the ends thereof. Cable 39 then passes over an arcuate guide arm 41 connected to lever 11 to extend over the indexing wheel 20, in spaced relation thereto. This machine is adapted to be mounted on any suitable support such as a bench, table, or tripod (not shown), and the treadle 37 may be supportably mounted on the support for the machine, to the floor of the room in which the machine is positioned or in any other suitable manner whereby the same is maintained in cooperative relation with the machine. A flat spring stop 43 has one end connected to a bracket 44 mounted on a spacing sleeve 7 adjacent the sleeve 40. The other end of stop 43 contacts the periphery of indexing wheel 20 at the rear of the lower most tooth 21 for holding the wheel, and therefore prevents shaft 8 and feed drum 12 from moving backward when lever 11 is returning from its forward to its initial position.

Located adjacent the feed drum 12 in position to receive the band strip therefrom, is a band forming die assembly 46. This die is composed of two sections, a substantially L-shaped fixed section 47 secured to the exterior of front plate 2, and a rectangular shaped section 48 which is slidably mounted on the fixed section 47 and is maintained in cooperative relation therewith by a guide rail 49, also secured to the frame front plate 2, as shown in Figure 2. Die sections 47 and 48 are provided with opposed substantially semicircular recesses 47' and 48' respectively, which, when the section 48 is moved to the closed position, form the die cavity 50 adapted to receive a sufficient amount of the band tape or strip therein to form a band of the desired size. As shown more clearly in Figures 3, 4, and 5, the means for closing and opening the die comprises a rock lever 52 rotatably mounted intermediate its ends on a shouldered stud 53 secured to the front plate 2. One end of rock lever 52 has a cam follower, which, in this instance, is a roller 54, connected therewith to engage the hereinbefore mentioned cam 17. The opposite end of rock lever 52 is connected by a link 56 to one arm 57 of a bell crank lever 58 rotatably mounted on a shouldered stud 59 secured to the frame front plate 2. The other arm 60 is slotted as at 61 in which extends a pin 62 connected to the movable die section 48 and which projects inwardly from said die section through an elongated slot 63 provided in front plate 2. A spring 64 coiled about stud 53, with one end connected to an anchor pin 65 and the other end engaging lever 52, maintains roller 54 in contact with cam 17 and

also yieldingly urges the die section 48 to the open position, as will be readily understood.

Referring now more particularly to Figures 2, 3, and 6, it will be observed that I have provided a mechanism for securing or locking the band in the formed position and for severing the band from the remainder of the band strip or tape. This mechanism includes a vertically disposed driver 66 mounted over the die 46 in alignment with the die cavity 50. The driver is supported for vertical reciprocative movement by the front plate 2 and a housing member 67 secured to said plate. The lower end of driver 66 is normally positioned a short distance above the die 46 and is provided with a curved recess 68 extending from front to the rear sides thereof and which conforms in contour substantially to that of the periphery of the identification band. Driver 66 extends above the housing 67 and has a tappet screw 70 screw threaded therein adapted to be engaged by one end of rocker arm 71 mounted on a stud 72 secured to an upwardly extending arm 73 of front plate 2. The other end of rocker arm 71 has an offset 74 which projects inwardly into contact with a plunger 75 mounted on the rear face of front plate 2 in a housing 76 secured to said plate. Plunger 75 is mounted over cam 18 to be reciprocated vertically, whereby motion is transmitted from the cam to rocker arm 71 and driver 66. The proper position of driver 66 with respect to die 46 may be obtained by adjustment of screw 70 which may be secured in the adjusted position by a lock nut 78. A spring 79 positioned between washers 80 and 81 on screw 70 and housing 67 respectively, maintains the screw in contact with rocker arm 71 and thereby prevents lost motion between said arm and plunger 75, and also between said plunger and the cam 18. Secured to the driver 66 is a shear blade 84 which cooperates with a shear bar 85 secured to section 47 as the driver moves downwardly to sever the band strip. In order that the leg of a fowl may be readily placed into and removed from die 46 when said die is in the open position, I have provided front plate 2 with a recess 87 which extends downwardly from the upper edge of the plate into transverse alignment with the cavity formed between the adjacent spaced ends of the die sections. Also the rear plate 3 is provided with similar recess 88 (see Figure 5) which aligns with recess 87. An anvil 90 is positioned in the die cavity 50 beneath the driver 66 to cooperate with said driver to lock the ends of the formed band together. Anvil 90 is maintained in position in the die 46 by an L-shaped arm 91 which extends rearwardly from the anvil through recess 87 and then upwardly adjacent the inner side of plate 2 to which it is secured (see Figure 3), as illustrated more particularly in Figures 7 and 8. The anvil has the upper face 92 curved transversely thereof to conform substantially to the interior surface of the band B, Figure 11. A clincher stud 93 is secured to the anvil to extend upwardly therefrom and a clearance hole 94 is provided in driver 66 for receiving the stud therein. The clincher stud 93, in this instance, is of conoidal formation and has the base thereof blending with an annular recess 95 provided in the anvil co-axially with said stud.

The band strip S may be of any suitable construction and, as shown in Figure 9, includes a flexible metal tape 99 composed of copper, brass, aluminum or the like, and has a multiplicity of arcuate recesses 100 in the opposite side edges thereof. The recesses 100 are arranged in pairs with the recesses of each pair spaced transversely of the tape to form a restricted portion or neck 101 between them. Adjacent pairs of recesses are spaced from each other, longitudinally of the strip, a distance substantially equal to the length of the strip required to form an identification band B. The intermittent feeding of the band strip into the die cavity 50 is such that upon the completion of each intermittent movement of the strip, a neck 101 aligns with the shear blade 84 so that the strip is severed intermediate the ends of said narrow neck portion. This is not only provides for an easier cutting

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of the strip, but also provides the ends of the band with retracted corners positioned within the boundary of the edges of the band, as indicated at 102, Figure 11. The strip is also provided with apertures 103 and fastening lugs or projections 104 which protrude from a side face of the strip in alignment with said apertures. The apertures 103 are arranged at one end of the necks 101 in close, spaced relation thereto, while projections 104 are similarly positioned at the opposite ends of said necks. Apertures 103 are, as shown in Figure 9, circular holes, while the projections 104 are of frustoconical formation and of such diameter as to readily enter said apertures. The modified band strip S', illustrated in Figure 10, is constructed like the band strip S of Figure 9, except that the apertures as 106 and projections 107 are of diamond shape to possibly render the entrance of the projections into the apertures to be more readily accomplished.

It will now be observed by referring to Figures 2 and 4 that the die sections 47 and 48 have a shallow chamber or groove 110 and 111 respectively, in their opposed concave surfaces, adapted to receive and guide the band strip S or S' therein. I have found it advantageous to form the grove 11 with an upwardly extending tangential portion 111' for contacting and guiding the band strip during its initial entrance into the die cavity 50. Likewise, the feed drum 12 has an annular peripheral groove 112 for receiving and guiding the band strip. The drum 12 is also provided with a plurality of, in this instance 4, drive pins 114 adapted to enter the apertures 103 and a like number of recesses 115 for receiving the projection 104. The band strip may be carried in any suitable means as on a reel or spool 117 rotatably mounted on a shoulder stud 118 carried by frame 12.

Operation

When forming and applying identification bands to poultry, the leg of a fowl is first passed downwardly through the openings 86 and 88 into the die cavity and into a position beneath the anvil 90. The handle 11 is then manually moved in a clockwise direction either by use of handle 11 or treadle 37, or by both of these instruments. As the handle 11 swings from the starting position shown by full lines in Figure 5 to the position indicated by broken lines, the indexing wheel 20 will be rotated in unison with the lever 11 due to engagement of pawl 22 with tooth 21. Cams 17 and 18 will also be rotated by lever 11. Rotation of cam 17 actuates rock lever 52, bell crank lever 58, and cam section 48 to close the die 46, while rotation of the feed drum 12 will draw the band strip from the reel 117 and feed said strip into the die. As die section 48 approaches the end of its inner movement, the groove portion 111' will be engaged by the forward end of the band strip and will guide it downwardly. Continued movement of feed drum 12 causes the band strip to pass around the die cavity and up over the anvil 90 and beneath the incoming portion of the strip until an aperture 103 is positioned over stud 93. A projection 104 will now be in substantial alignment with the aperture 103 as indicated in Figure 7, while the adjacent neck 101 of the strip will be beneath the shear blade 84. As lever 11 approaches the position shown by broken lines in Figure 5 and by full lines in Figure 6 the latch 22 will be lifted from contact with the ratchet wheel tooth 21 by engagement of roller 27 and cam 28. As lever 11 moves forward from the position indicated by full lines in Figure 6 to that indicated by broken lines, cam 18 actuates plunger 75 and rocker arm 71 to move drives 66 downwardly against the action of spring 79

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until surface 68 engages and forces the adjacent underlying portions of the band downwardly onto anvil 90. During this downward movement of drives 66, the band strip is severed by coaction of shear blade 84 and the shear block 85, and the ends of the identification band are locked by clinching the lower end of the projection 104 at the inside of the band. As handle 11 is now released, it will be returned to its initial or starting position by spring 33 or until pawl 22 again passes below the horizontally disposed tooth 21 as shown in Figure 5. The die 46 will now be returned to its normal open position, driver 66 is returned to its normal uppermost position, and the banded leg of the fowl may now be quickly and easily removed from the die and out through openings 87 and 88.

Although I have shown and particularly described one embodiment of my invention, I do not wish to be restricted to the specific construction and relation of the parts thereof, as various changes may be made therein without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. A band forming machine for banding the leg of a fowl comprising a sectional die having a die cavity extending therethrough with substantially semicircular recesses, means for opening and closing the die including a cam actuated rock lever which actuates a bell crank lever by which a movable section of said sectional die is brought into closed position, while said rock lever simultaneously turns a feed drum and feeds a banding strip into said die cavity to form a band around the leg of a fowl and means for securing said band around leg.
2. A band forming machine for banding the leg of a fowl comprising a sectional die having a die cavity extending therethrough with substantially semicircular recesses, means for opening and closing the die including a cam actuated rock lever for operating a bell crank lever by which a movable section of said sectional die is brought into closed position, while said rock lever simultaneously turns a feed drum, and feeds said banding strip into said die cavity to form a band around the leg of a fowl, and means for securing said band around said leg including an anvil, and a driver.
3. A band forming machine for banding the leg of a fowl comprising a sectional die adapted to receive the leg of a fowl, means for intermittently feeding a flexible banding strip into said die, means for closing said sectional die whereby a band is formed about said leg, fastening means for securing said band including an anvil and a driver, and strip-cutting means including a shear blade and a shear block for severing the formed band from the remainder of the strip.

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