

Feb. 17, 1931.

M. W. HAMBLETON ET AL

1,793,285

MACHINE FOR PLACING RINGS ON BOBBINS

Filed July 19, 1929

4 Sheets-Sheet 1

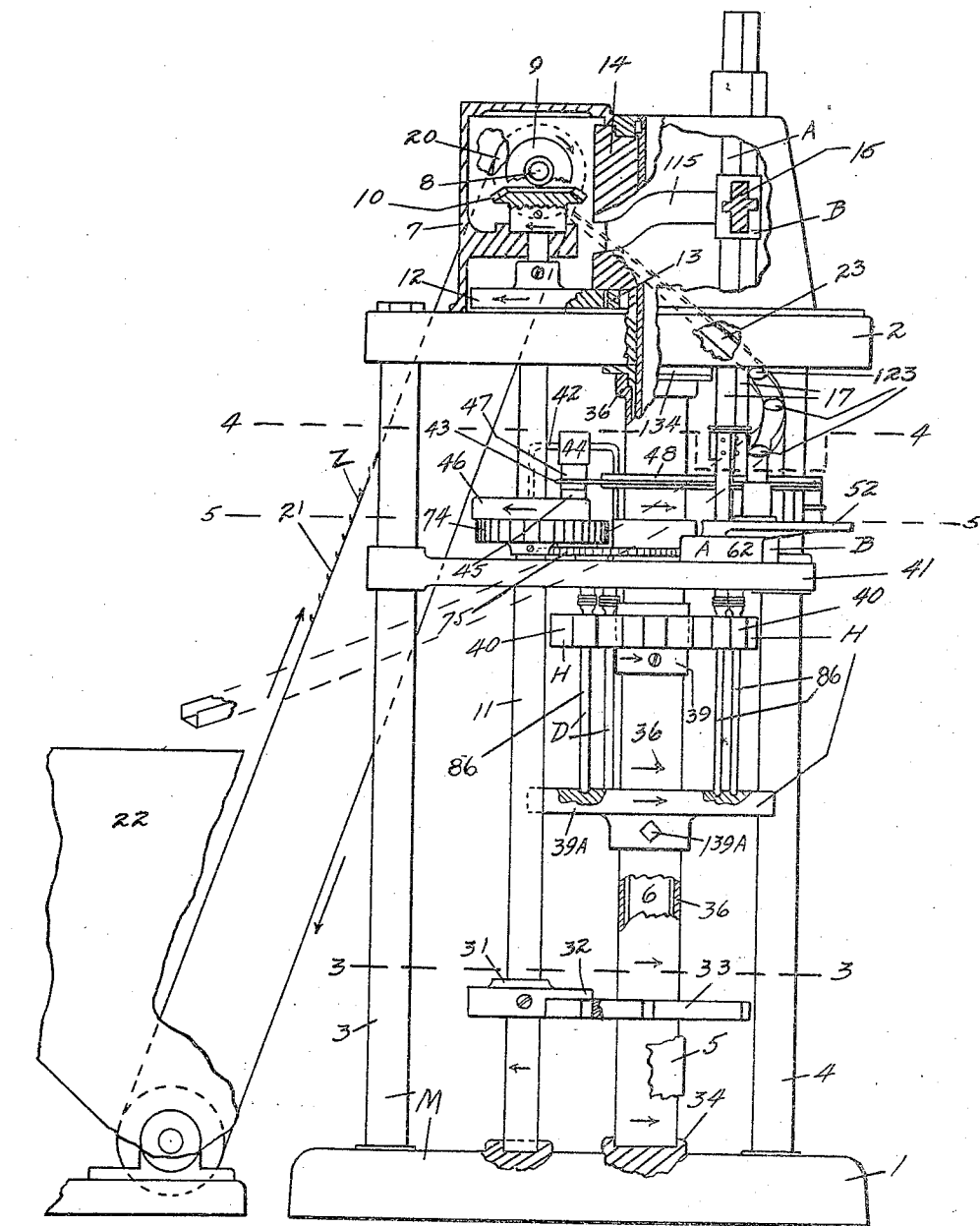


Fig. 1.

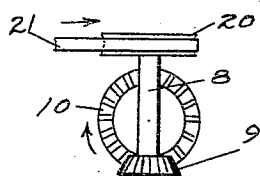


Fig. 1A

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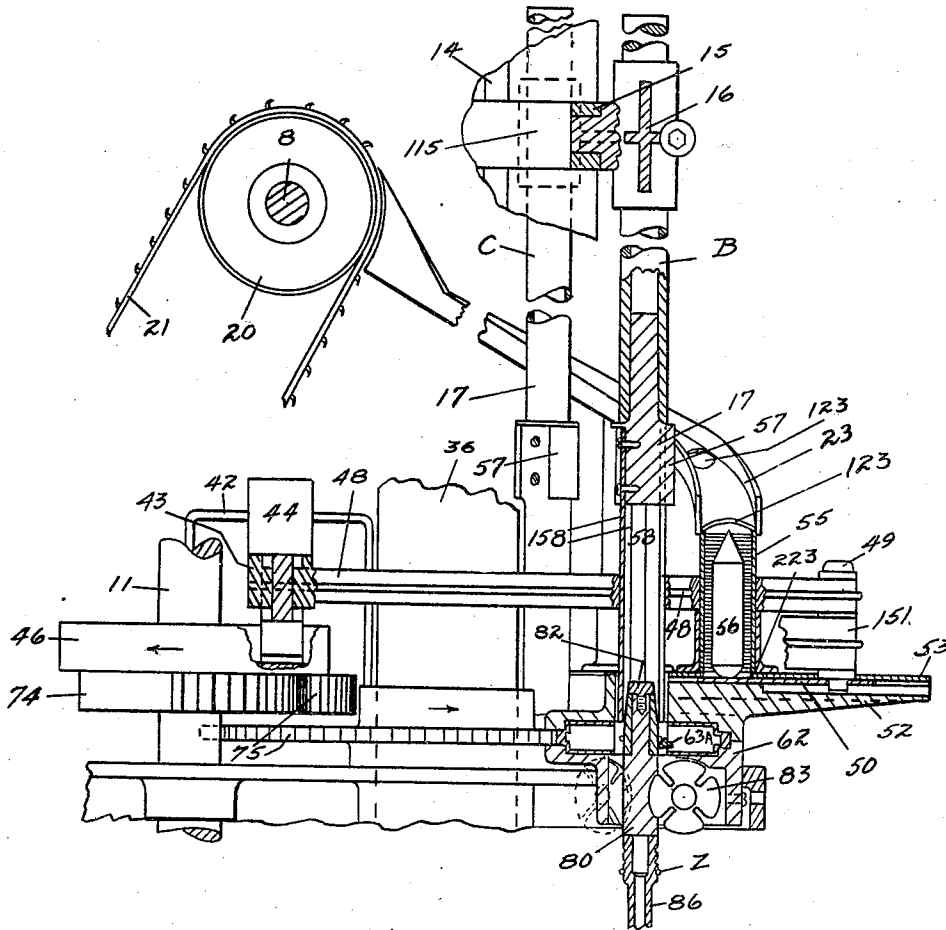


Fig. 2.

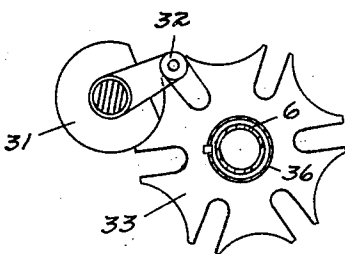


Fig. 3.

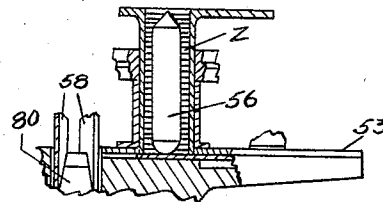


Fig. 3A.

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4 Sheets-Sheet 3

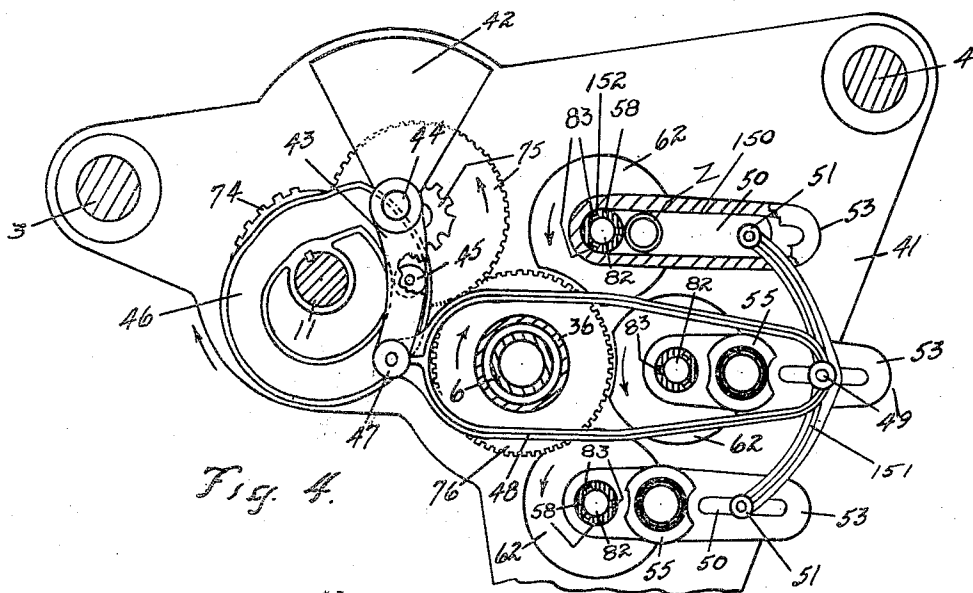


Fig. 4.

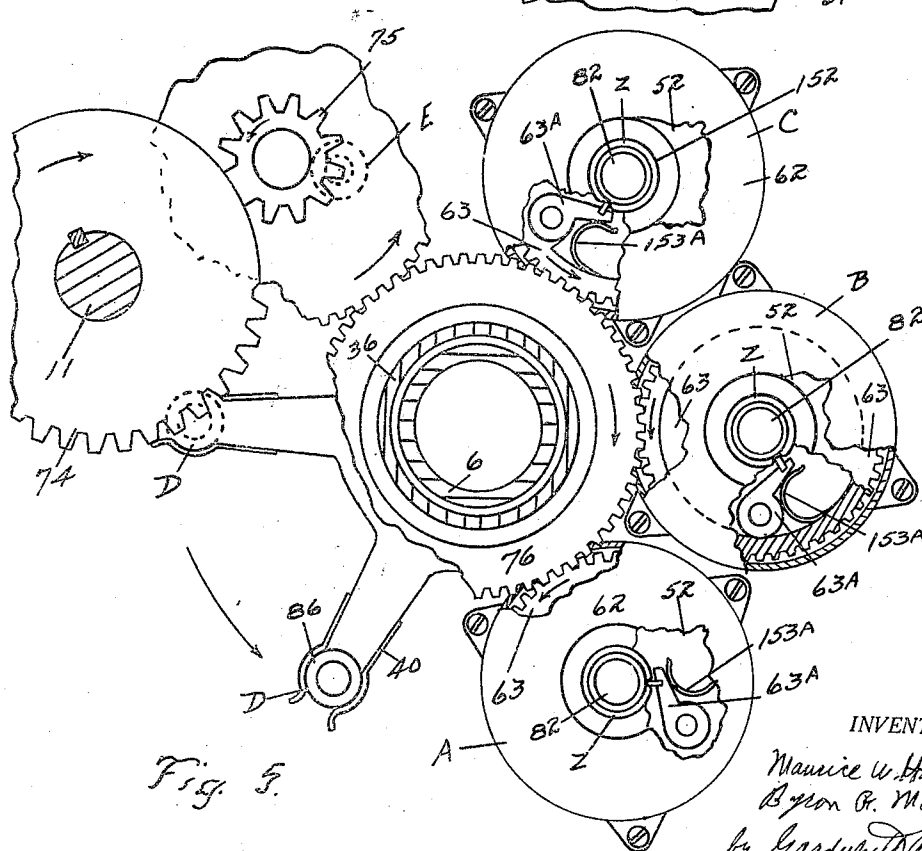


Fig. 5.

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4 Sheets-Sheet 4

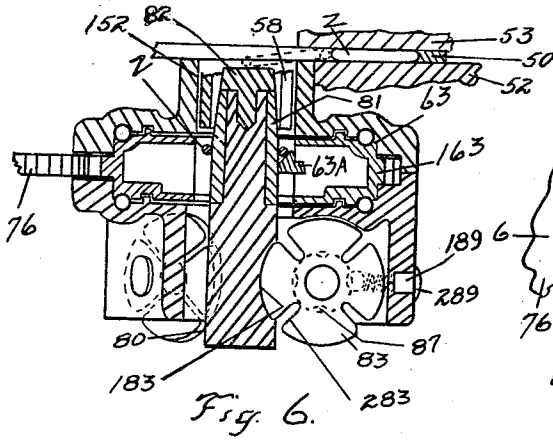


Fig. 6.

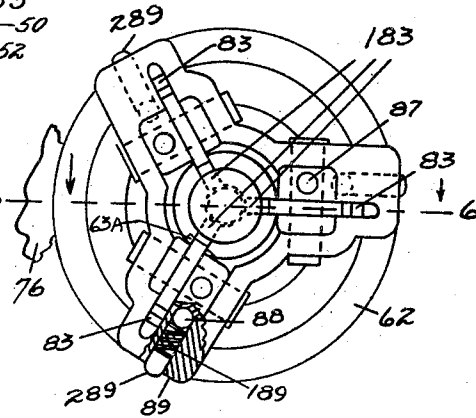


Fig. 7.

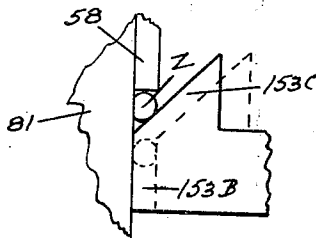


Fig. 8.

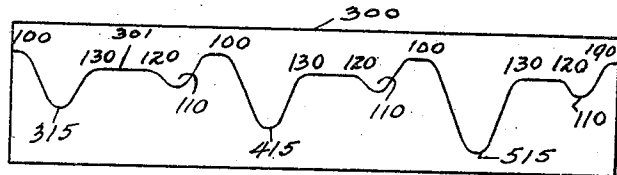


Fig. 9.

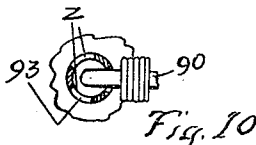


Fig. 10.

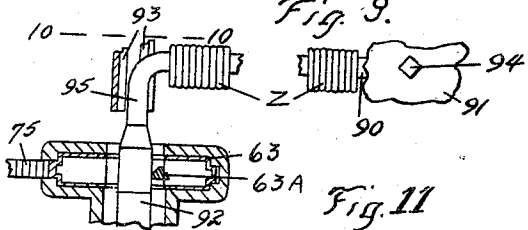


Fig. 11.

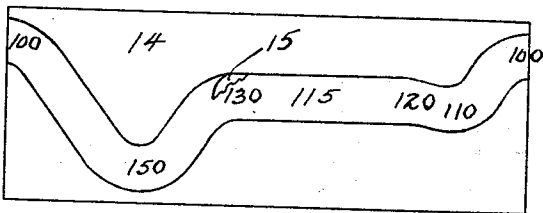


Fig. 12.

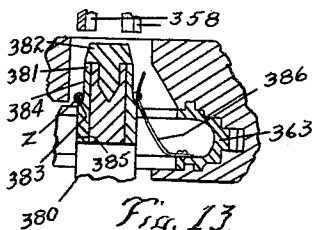
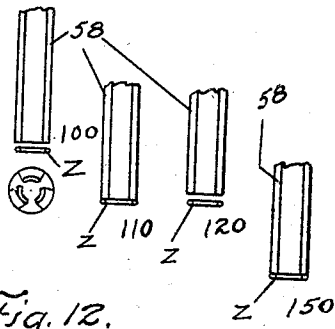


Fig. 13.

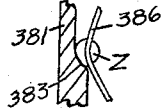


Fig. 13A.

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UNITED STATES PATENT OFFICE

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MACHINE FOR PLACING RINGS ON BOBBINS

Application filed July 19, 1929. Serial No. 379,559.

This invention relates to machines for placing expansible split rings on bobbins, particularly those of the type used in automatic looms.

5 Such bobbins are generally made with a head around which are two or more shallow grooves in each of which rests a split ring.

Such rings are ordinarily made of springy metal and are expanded so that they can be 10 forced over the large end or the head of the bobbin into one of the grooves. It is desirable that the splits in the rings should not be in the same line, and it is desirable that they should be evenly arranged around the 15 circumference of a bobbin head so that the jaws in the receiving shuttle can hold the bobbin in the correct position with its axis coinciding with the axis of the shuttle.

We are aware that there are machines for 20 placing these rings on the bobbin and that afterwards the rings are turned by hand into the correct position, and we are aware that there are machines for turning the rings by friction to a certain predetermined point and 25 then forcing one ring on the bobbin after which the bobbin with one ring is turned, then forcing another ring on the bobbin and again turning, and so on.

We are also aware that there are machines 30 wherein the rings are all turned so that the split of each ring will be in the same position, and that the ring is carried to a certain bobbin and forced thereon, after which the bobbin is automatically turned perhaps one- 35 third when another carrier with another ring having its split in the same position as the first is forced on to the bobbin, after which the bobbin is again turned and another carrier with another ring also with the split in the 40 same position is forced on the bobbin.

With this invention, we feed one ring at a time preferably by automatic machinery and drop a ring on to what we will call a floating 45 cone which is a cone so held that a ring can pass over the top and out at the bottom on to a bobbin which is held up underneath it.

On this cone is a revoluble sleeve of a size to catch and hold a ring dropped over the 50 top of the cone or forced down on it by an

expanding stroke of a plunger carrying suitable fingers or jaws.

Around this sleeve is a positively revoluble ring gear with a pawl on the inside adapted to catch the split in the ring, such gear preferably being operated to revolve one and one-third revolutions and to then positively stop, 55 always leaving the split of the ring on the collar at a point 120 degrees beyond its last stop.

The plunger with its jaws is so arranged 60 that it will retract and will then come down with a finishing or setting stroke, the jaws moving down to the location, for instance, of the ring and groove which in the machine is at the bottom, but which on the spinning 65 frame is at the top.

This particular bobbin with one ring placed is then carried to a next station where the same process is repeated for the next ring, the difference being that the pawl and the 70 split will stop at another position, preferably one-third of the circumference away from the first split.

The bobbin is then moved to a third station, if three rings are required, and the process is 75 repeated.

All of the actions being positive, there is no chance for any of the rings to get out of place, and with any suitable automatic feeding device to feed one ring at a time to each 80 suspended cone, all the operator needs to do is to place each bobbin in its carrier, after which it is carried along from one station to the next and finally discharged by any suitable automatic mechanism. As all three 85 stations are operating at the same time, it means that a finished bobbin with three rings is being discharged at every complete cycle and the machine is therefore very fast.

Besides this, if the operator fails to feed a 90 bobbin to a particular carrier, no harm is done except that three rings are dropped on the ground, but it is not necessary to wait or to start over again to get the correct sequence of operations in placing the different 95 rings.

While we prefer the suspended cone construction in which a cone is supported by three wheels each of which has radial slots and each of which revolves in a curved slot in 100

the cone, the principle of the machine can be used with what is known as a rod feed. In a rod feed, a large number of rings are loaded on a rod at the end of which a cone is carried, such feed being preferably provided with some automatic device which will feed one ring at a time to each cone.

We prefer to use three ring setting stations each having a positive ring turning device which will position the split in the ring at a point 120 degrees from each of the others, and also an automatic feed which will feed one ring at a time to each of the three stations, together with carrier mechanism to carry a bobbin from one station to the next as with this construction the operator has only to feed one bobbin at a time to one station.

The main idea is to position and turn the rings with their openings at predetermined co-relative angles, before they are applied on the bobbins and to prevent displacement of the ring openings between the time they are correctly positioned and set on the bobbins.

The second consideration is to do this work with expedition combined with accuracy.

Turning the rings to predetermined positions before they are placed on the bobbins and then dropping them on the ring guides for transfer to the bobbins results in a great deal of displacement of the openings as regards their co-relative positions.

Turning the ring openings to a fixed position and turning the bobbin by hand after each ring is applied is inaccurate, unsatisfactory and slow.

Turning the ring openings to proper position after they are placed on the bobbin, tears the grooves in the bobbins and causes much defective work.

The action of this machine turns each ring opening accurately to a predetermined position, stops the ring and locks it firmly until it is set on the bobbin.

To accomplish this result five different unit organisms are employed, either as units or in corresponding pluralities.

Since the apparatus herein described is designed to apply three rings to each bobbin, three similar organisms of each kind are used at each of three ring placing stations. These include:

Three ring feeds with positive let-off motion.

Three floating cone ring guides, each preferably supported by rigid sustaining wheels, each revoluble in a groove in the cone.

Three plungers, each with a driving head carrying three similar sets of ring setting jaws and each with synchronized intermittent reciprocating motion.

Three revoluble ring carrier sleeves, one revoluble on each cone.

Three pawl carrying gears, each carrying a pawl.

Three or more bobbin carriers so arranged as to permit placing a bobbin in a carrier, which is then intermittently moved from one ring placing station to the next, one ring being put in place at each station.

The number of ring feeds, floating ring guides, sustaining wheels per cone guide, plungers, driving heads, ring setting jaws per driving head, revoluble sleeves, and pawl carrying gears, are all co-related to the number of rings to be applied to each bobbin and to the degree of angle between each positioned ring opening. We mean by this that when three rings are to be applied, as in the present case, three corresponding ring feeding, ring turning and positioning organisms are employed and if two or four rings were to be applied, an organism of each kind would be omitted or added, as the case required and the degree of angle between ring openings changed by appropriate gearing arrangement.

In the drawings, Fig. 1 is an elevation of my preferred type of machine, some parts being broken away to show the construction.

Fig. 1A is a detail plan view showing part of the drive mechanism.

Fig. 2 is an elevation partly in section showing on an enlarged scale part of the feed and floating cone mechanism.

Fig. 3 is a section looking down on the line 3-3 of Fig. 1.

Fig. 3A is a sectional detail of a modified or reduced type of feed.

Fig. 4 is a section looking down on the line 4-4 of Fig. 1.

Fig. 5 is a section looking down on the line 5-5 of Fig. 1.

Fig. 6 is a vertical section of the floating cone and turning pawl gear looking in the direction of the arrows on the line 6-6 of Fig. 7.

Fig. 7 is a plan of the floating cone with its supporting wheel and casing looking upward from underneath.

Fig. 8 is a detail in elevation on an enlarged scale showing the construction of the pawl and sleeve.

Fig. 9 is a diagram showing a modification of the cutting of the driving cam.

Fig. 10 is a plan of a modified type of feed.

Fig. 11 is an elevation of the modified type of feed shown in Fig. 10.

Fig. 12 is a diagram showing the cutting of my preferred type of cam together with the respective positions of a plunger in operation.

Fig. 13 is a sectional view showing a modification of the ring turning means.

Fig. 13A is a detail of Fig. 13.

In the drawings are shown three ring turning and setting units each adapted to place one ring on a bobbin. These are substantially the same except that the plungers and plunger jaws are of different lengths.

We will designate broadly these units or stations from left to right as A, B, and C and will describe the various members shown in unit B, as the same description applies to A and C.

We will indicate by D, D what may be called the filling stations and by E the discharging station. As shown, there are six units, one having no function, where only three rings are to be put in position except that it may be used for filling.

The bobbin carriers indicated by H, H travel from left to right and carry a bobbin from station D to A then to B, then to C and along to E where it is discharged. Each bobbin stops at each station long enough to receive a ring. If more or less rings than three are to be set, more or less stations are used and there are certain other changes which are desirable and which can be made.

As shown in Fig. 1, the fixed frame of the machine indicated generally by M includes a base 1, a cap 2 supported by three columns 3, 4 and 5, a hollow central column 6 which serves as a pivot for a sleeve 36 and for other parts, and also a plate 41 which supports other parts of the mechanism.

Mounted on cap 2 is a circular housing 7, which carries the bearings for horizontal drive shaft 8, which through bevel gear 9 engages bevel gear 10, and imparts motion to vertical drive shaft 11. Gear 12 fast on shaft 11 engages gear 13 fast on cylindrical cam 14 and through roll 15 revolving on tie bracket 16 imparts vertical reciprocal motion to plungers 17, 17, 17 as it moves in cam groove 115.

Pulley 20 fast to shaft 8 drives a prong bearing belt 21 which follows through hopper 22 and delivers the bobbin rings Z to spiral chute 23 at its upper end.

Surrounding pivotal column 6, and arranged to rotate freely, is a hollow sleeve 36, supported by a bearing 34 in base 1 and a bearing 134 under cap 2.

Mounted fast on drive shaft 11 is the male Geneva member 31 of a six-station Geneva motion, which through roll 32 engages female Geneva member 33 fast to sleeve 36. See Fig. 3.

H represents a bobbin carrier which includes a hub 39 fast on sleeve 36 which carries the radial spring clips 40 equally spaced in numerical correspondence to the number of stations on the machine and in the female Geneva member, in this case six, and a table 39A.

Table 39A is mounted on sleeve 36 directly under hub 39 and rotates therewith. It is vertically adjustable by a set screw 139A for different lengths of bobbins. This table 39A has a series of depressions equally spaced on a circle equal to that of the bobbin clips 40 and disposed directly under the bobbin clips 40 to hold the bobbins in vertical alignment.

At the feeding station D, the lower end of each bobbin is placed in a depression in table 39A and pressed into a spring clip 40.

A plate 41 fastened to columns 3, 4, 5 but loose on sleeve 36, carries the ring feeding and turning mechanism.

The ring feeding mechanism consists of the following parts, as see Figs. 1, 2 and 4.

From bracket 42 superimposed on plate 41 hangs a lever 43 fulcrumed on stud 44; this lever is medially engaged through roll 45 with box cam 46 on shaft 11. The other end of lever 43 is connected by stud 47 with yoke 48; yoke 48 at the other end is connected by stud 49 with centre slide 50 and stud 49 is further connected with tie bracket 151 which through studs 51, 51 connect with feed slides 50, 50. Rotation of cam 46, oscillates lever 43 and causes yoke 48, tie bracket 151 and slides 50, 50 and 50 to reciprocate horizontally as a unit.

The ring feeding device consists of a hopper 22 into which the rings are placed in bulk, elevated by a prong bearing belt 21, driven by pulley 20 and discharged into a spiral chute 23, discharging from left to right, and having three orifices large enough for the size of ring used to drop through easily, and located directly over the intakes of the three feeding organisms in units "A", "B" and "C".

Housings 52 in units "A", "B" and "C" each have a radial groove 150 in which fits a flat slide 50 slightly thicker than a ring, located in each housing, and retained by slotted cover plates 53. These cover plates each have an opening 223 large enough for the size of ring used to enter freely; these openings 223 are directly under and connected by vertical feed tubes 55 of equal inside diameter, with the three orifices 123 in chute 23, so that the rings can drop through the chute orifices 123, to the top of each slide 50.

The size of orifice used in the chute 23 is such that a ring too large will not enter but will pass by the orifice and also if two or more rings become locked together as is often the case, they will not enter the orifice but will pass by.

Each tube 55 contains a free hollow light cylindrical floating post 56 resting loosely on slide 50 with its base rounded to a point slightly higher than the thickness of a ring. The tops of these posts are conical with their apices placed slightly below the bottom of chute 23.

The rings fill tube 55 in unit C, then fill tube 55 in unit B and then tube 55 in unit A. Thereafter all tubes are kept full and the surplus returns to hopper 22 along the chute shown in dotted lines in Fig. 1.

These posts 56 are of such diameter that the size of ring used will pass over same freely but a size smaller ring will not pass over

and the combination of the sized hole in chute 23 and the diameter of post 56 constitute an automatic check against clogging or jamming of the machine.

5 The main function of this floating post 56 is for its conical point to enter the ring as the ring drops through the orifice 123 in chute 23 and so that the rings will always lie in a horizontal position within the tube. This is very important, as if the ring entered the tube and remained in an inclined or vertical position, the feed would jam and something would break.

10 As the slide 50 recedes, the post 56 and tiers or rings rest on the slide, but when the slide 50 has fully receded, the post 56 and rings drop down, the lower ring coming in front of the face of the slide 50. The slide 50 then advances and comes in contact with the bottom ring and pushes it ahead. As the ring advances, it forces the rounded bottom of post 56 upward until the ring escapes from around the post and the slide passes under the post, the slide continues to advance until the ring drops through a cone hole 152 in groove 150 and is deposited on the sleeve 81 of floating cone 80 and then returns for another ring, the post 56 and bottom ring riding on the slide until the slide recedes to its full stroke then permitting the post and another ring to drop for a repetition of the process.

15 The motion of the post dropping and rising agitates the rings and keeps them settled close together horizontally.

20 The three slides 50, 50, 50 are reciprocated together by cam 46.

25 As shown in Fig. 3A, the belt 21, and chute 23 may be omitted and rings can be fed by hand on to one or more floating posts such as 56.

30 *The ring placing stations.*—At each station A, B and C is a floating cone ring guide which includes a vertical cylindrical post 80 having a truncated conical cap 82 the lower part of which is slightly larger in diameter than the base or butt of the bobbin 86 on which the rings are to be applied.

35 This post 80 is supported rigidly as a floating member by a series of three sustaining wheels 83, 83, 83, fitting freely in three vertical segmental grooves 183, 183, 183 in the post 80. See Figs. 6 and 7.

40 The three wheels 83, 83, 83 which sustain each post 80 are disposed radially at angles of 120 degrees with each other and revolve on studs supported in the lower half of each housing 62. Each wheel 83 has a plurality, preferably four, escapement slots 283, 283, 283 each to permit the downward passage of a ring Z over the cone ring guide post 80 on to a bobbin 86. Located on the hub of each wheel 83, is a corresponding number of curved depressions 87, 87, 87, 87.

45 In position to engage each depression as it

comes around is a brake formed by a checking ball 88 compressed by a spring 89. This spring fits freely in a hole 189 in the lower half of each housing 52, and is retained therein by a screw 289.

50 The slots 283, 283, 283 in the escapement wheels 83 are of such size and such number and so held in place by the action of the checking ball 88 on the hub that the top slots 283, 283, 283 of all three wheels 83, 83, 83 are always open for the downward ingress of a ring and are so disposed that upon egress of the ring, the next set of slots at top of all three wheels are in position for the ingress of the next ring.

55 A minimum of slots in each escapement wheel is preferable, so as to leave as much bearing surface as possible between the wheels and the curved grooves 183, 183, 183 in the posts 80, and also for strength in the wheels. These slots must be of sufficient radial depth to allow a ring to slip down along a post 80 without jamming.

60 Each ring guide post 80 has a cylindrical stem surmounted by a conical cap 82 which so holds a revoluble sleeve 81 that it can turn freely on a vertical axis.

65 This sleeve may be tapered at the top, as shown in Fig. 6, or the cap alone may be tapered and the sleeve may be cylindrical from top to bottom on the outside without a shoulder or with a shoulder as shown in Fig. 13.

70 The ring setting mechanism includes at each station a plunger 17 with driving head 57 carrying a series of yielding spring jaws 58 corresponding in number to the number of sustaining wheels 83 for each ring guide post 80 which is disposed axially above each ring guide post 80. The jaws are concaved on their inside to fit the outside of a ring guide post 80, but they are separated sufficiently to permit them to pass down the ring guide 80 between the retaining wheels 83 without coming in contact with the latter.

75 The plunger travels from its extreme upward position where the bottom ends of jaws 58, 58, 58 are at a point high enough to permit a ring to be fed by the slide 50 over the cap 82 then down so that the jaws force a ring over the conical cap 82 on to the revoluble sleeve 81. The jaws then move up to a point which clears the top of gear 63 and the path of the pawl 63A, at which point it dwells during that part of the cycle required for the pawl 63A in each gear 63 to rotate and turn the ring opening to its predetermined position. The plunger and its jaws then descend the remainder of their traverse and force the ring along and off the ring guide on to the base of bobbin 86. Each plunger and its jaws then ascend to top position to permit another ring to be deposited on a cap 82 and the process is repeated.

80 The revoluble expander sleeve 81 has the

top portion so tapered that when a ring which is larger than the base of cap 82 is dropped on, it will settle evenly on the conical part in a horizontal position and not hang at an angle. This is necessary to allow simultaneous contact of the ring "Z" with all three jaws 58, 58, 58.

The lower portion of the sleeve is straight and of a diameter sufficiently in excess of the inside diameter of the ring Z, to partially expand the ring when the ring is forced down onto and along this straight section by setting jaws 58.

If this sleeve 81 was stationary instead of revoluble, or if it were omitted and the rings turned around the solid cone, the friction between the ring and the stationary sleeve or solid cone, as the case might be would be so great that the pawl 63A would slip out of the opening in the ring due to the tapered ends of the ring and fail to move the ring opening to the desired position, and the machine would not be positive.

Preferably each ring should be expanded by being forced over a conical cap like 82 or 382, or else over the conical portion of a conical sleeve, or over both, so that the ring will hug the sleeve and turn it when acted on by a turning pawl.

Moreover, as the pawls 63A revolve at very high speed to attain a production basis they would slip if any great resistance was encountered.

Even though a pawl could be made to hold against the tapered end of the ring, the friction between the ring and stationary sleeve or cone, as the case might be and the power required would be so great that the burred ends of the rings would quickly wear away the hardest steel cone and also the pawls. Moreover, the spring tension required to make a pawl resist slipping from the tapered end of the ring would be so great as to cause the pawl to turn the ring by friction alone, before the pawl engaged the opening in the ring and again for this reason the action would not be positive.

It is therefore imperative that the sleeve 81 revolve freely.

The ring turning pawl and gears consist of three equal hollow gears 63, 63, 63, each with an opening through its centre large enough for the jaws 58 to pass through. These three gears engage with a common gear 76, which is one-third larger in diameter so that at every turn of the gear 76 the three pawl bearing gears 63 revolve one and one-third turns. Each of these gears is supported by the exterior of its hub 163 in bearings in housings 62. Each gear has a pawl 63A disposed at an angle of 120 degrees with the pawl on each other gear, as the rings are turned; in other words, if the three gears were placed one above another in coincidence

each pawl would be 120 degrees from each other.

See Figs. 6, 7 and 8.

The pawls are so arranged that each stops directly over the top of an escapement wheel 83 in each unit "A," "B," and "C," and remains locked in that position while the plunger forces the ring from sleeve 81 downward onto the bobbin 86. In other words, since the pawls stop over the escapement wheels and the plunger jaws 58 span the escapement wheels, the jaws 58 never touch the pawls. This feature eliminates wear of the pawls as the plunger jaws with their sharp edges would quickly wear out the pawls.

Three pals 63A, 63A, 63A, one in each gear 63 are arranged to swing on a stud at such an angle as to tend to cause their free ends to dig into the revoluble sleeve 81; in other words, they tend to push rather than drag. Each pawl is held in light compression against the sleeves 81 by a spring 153A. That portion of the pawl which comes in contact with the sleeve 81 is straight at the contact surface. Above the straight contact surface 153B, the pawl is inclined at 153C, to permit a ring to easily force the pawl away from the sleeve while the ring is being pushed down by the plunger jaws 58 during their initial downward stroke. The round ring is the only surface which ever comes in contact with the pawl and as the ring operates on the inclined top of the pawl, the strain and wear on the pawl is therefore reduced to a minimum.

It is found convenient to make all three plungers so that they will be operated by a single cam 14, the only difference in the plungers being the length of their jaws 58. This length corresponds with the distance between the rings on the bobbin. It is therefore convenient to make the straight contact surface 153B of the pawl of a height slightly greater than the extreme distance between the rings so that the shortest jaws and the longest jaws will on the preliminary stroke locate their respective rings in engagement with the pawl.

In Fig. 13, I show a cone 380 on which is revoluble a sleeve 381. The nose 382 is preferably tapered and holds sleeve 381 in place. The sleeve 381 instead of being tapered is at the bottom 385 cylindrical and of the same size as the rest of 380 but at 383 is formed with an annular depression and from there up to the nose 382 is cylindrical 384.

The plunger jaws 358 like jaws 158 yield radially but normally on their inside fit over the small part 384 of sleeve 381 so as to engage a ring Z which fits loosely over 384 when dropped over nose 382.

Jaws 358 and the plunger to which they are attached make only one stroke. They go down the entire length of the cone, sleeve

and nose forcing each ring Z over the swell at 383 and down onto the bobbin.

The pawl shown is a piece of spring wire 386 fastened at one end inside ring gear 363, and thence extends over so that it normally enters the recess 383 and thence extends up and out. This wire can be made so light that a ring dropped over the nose 382 will force the wire 386 out and rest on the swell 383, but when gear 363 revolves with wire 386, the latter acts like the pawl and when it strikes the split in a ring Z, it enters just enough to carry the ring and sleeve, or the ring alone, along with it until it stops. It should stop at a place between the jaws 358 so that they will not strike it as they descend.

At least one full turn of the gear 63 and pawl 63A is required to positively engage the opening of the ring, and more than one turn is desirable to positively assure engagement. Moreover the pawl must stop over an escapement wheel 83 to escape contact with the jaws as they come down; therefore, one and one-third revolutions of the pawl gear is the minimum of rotation which will positively effect pawl engagement and still stop a pawl over an escapement wheel 83, if they are disposed 120 degrees apart. This is a co-relative feature above referred to and is the arrangement for application of three rings. If four rings were used for instance, the revolutions would be changed to one and one-quarter revolutions and all other units changed to four.

The drive as shown in Fig. 5 is as follows: Gear 74 on vertical drive shaft 11 is cut intermittent with a 240 degree dwell. This gear engages compound gear 75 which is one-third as large and is intermittently matched with gear 74 so that at each revolution of the drive shaft 11 and gear 74, gear 75 makes one revolution in one-third of the drive shaft cycle and remains at rest the other two-thirds. The lower member of compound gear 75 is equal with and engages gear 76, which in turn engages ring turning gears 63, 63, 63.

Now, male intermittent drive gear 74 is three times as large as its female engaging member of compound gear 75; the other member of compound gear 75 is equal in diameter to gear 76, and gear 76 is one and one-third times as large as gears 63, 63, 63. The result is that at each turn of drive shaft 11, gear 76 makes one turn and remains locked stationary the equal of two turns.

One revolution of drive shaft 11 constitutes a complete cycle of the machine.

It follows that at each turn of vertical drive shaft 11, the ring turning gears 63, 63, 63 revolve one and one-third turns in one-third of the cycle and remain locked at rest the other two-thirds of the cycle.

This arrangement permits the ring turning function to take place in one-third of the cycle and the feeding and setting of rings to

occur during the other two thirds of the cycle.

In Fig. 12 is shown diagrammatically the cutting of the follower groove in cam 14. The views at the right of the jaws 58 and of a ring Z are numbered to correspond with the cam cutting as follows.

100 is the high point of the plunger or plungers and when it moves down to 110, it forces the ring Z down on to the desired position on sleeve 81. There is then a slight retraction to 120 so that the jaws will not interfere with the turning pawl in turning the ring Z. This turning is accomplished at the dwell between 120 and 130 and when accomplished, the jaws 58 move down as to 150, forcing the ring over the floating cone on to the bobbin.

Where a set of three plungers is used and a bobbin moves from one to the next, the various positions 100, 110, 120 and 150 will be correspondingly higher or lower, according as the top or bottom ring is being positioned.

It may be desirable in some cases to omit the ring turning device which can readily be done by removing the pawls or wedging them out of action and our machine with the automatic feed, floating cone and bobbin carrier is very effective and very fast, although it may be necessary after the rings are placed to turn them by hand or in some other machine.

It is obvious that we can use other automatic ring feeding devices such as the dropping device shown in patent to Hodgman, and other, 870,960, November 12, 1907.

It is also obvious that instead of a chute having three openings we could as readily use three chutes each with one opening or other device for landing the rings on a post such as 56.

It is also obvious that a post 56 could be filled up with rings by hand, and it is obvious that we might feed one ring at a time by hand to each of the three floating cones one at each station.

We may also either with or without any automatic feed device use only one station with a ring turning device as for instance one which moves one and one-third turns, thereby making the opening in each succeeding ring 120 degrees beyond that in its predecessor.

With such a device a cam such as shown at 300 in Fig. 9 can be used. In this case the cam 300 is cut with three sections and the groove 301 is the same in each section at the points 100, 110 120 and 130, but at the points 315, 415 and 515 the grooves respectively extend down different distances, each corresponding with the different distances of the three rings.

With such a device the operator can feed a bobbin and then feed three rings, one at a time, between the strokes of the single plunger with its jaws.

In fact by enlarging the cam such as 14

and using the identical construction otherwise shown in the first eight views, three operators can work each at a separate station which has a turning device. In both the last described cases the bobbin carrier can be entirely omitted.

A ring turning gear 63 and pawl 63A can be used with a well known type of feed and cone such as shown in Figs. 10 and 11. The feed rod 90 is removably attached at one end to frame 91 as by a set screw 94. It is filled with rings Z and put in place so that the goose neck 95 formed as a cone with a revoluble sleeve 92 is in operative position with plungers 93, 93 for forcing the rings on the sleeve and on the bobbin.

The ring gear 63 and pawl 63A surround sleeve 92 as in the other constructions.

One station of this type with a cam such as shown in Fig. 9 can be used or three stations as in Fig. 12, the rings being fed by hand.

This type of feed is not nearly as fast as either the automatic type shown in Fig. 1 or the type shown in Fig. 3A.

We claim:

1. In a machine for placing split rings on bobbins, the combination with a plurality of ring placing stations each station having a cone so supported that a ring can pass entirely over it and automatic feeding mechanisms adapted to feed one split ring at a time to said cone, a sleeve revoluble on the cone and adapted to receive and hold a split ring, an intermittently revoluble ring gear having on the inside a pawl adapted to engage the split in a ring on the sleeve said pawl having an outwardly and upwardly slanting top edge, a bobbin carrier adapted to hold a bobbin with its end against the bottom of the cone, a plunger having jaws adapted to force a ring over the cone on to the bobbin; of mechanism to cause each plunger to make a short expanding stroke, to retract and then to make a longer setting stroke; and means to move each bobbin carrier and its bobbin from the cone at one station to another cone at another station without turning the bobbin.

2. In a machine for placing split rings on bobbins, the combination with a plurality of ring placing stations each station having a cone and automatic feeding mechanism adapted to feed one split ring at a time to said cone, a sleeve revoluble on the cone and adapted to receive and hold a split ring, an intermittently revoluble ring gear having on the inside a pawl adapted to engage the split in a ring on the sleeve, a bobbin carrier adapted to hold a bobbin with its end against the bobbin of the cone, a plunger having jaws adapted to force a ring over the cone on to the bobbin; of mechanism to cause each plunger to make a short expanding stroke, to retract and then to make a longer setting

stroke; and means to move each bobbin carrier and its bobbin from the cone at one station to another cone at another station without turning the bobbin.

3. In a machine for placing split rings on bobbins, the combination with a plurality of ring placing stations each station having a cone and automatic feeding mechanism adapted to feed one split ring at a time to said cone, a bobbin carrier adapted to hold a bobbin with its end against the bottom of the cone, a plunger having jaws adapted to force a ring over the cone on to the bobbin; mechanism to cause each plunger to make a setting stroke; and means to move each bobbin carrier and its bobbin from the cone at one station to another cone at another station without turning the bobbin.

4. In a machine for placing split rings on bobbins, the combination with a hopper and a spiked apron which extends upwards from inside said hopper into a position to deliver rings to the top of a chute; of said chute which slopes from the top down and over a plurality of feed tubes in each of which is a floating post and thence extends back over the hopper; said feed tubes; a housing having a ring groove which extends under each feed tube; a movable slide therein; and a floating post free in said feed tube, said post having a rounded bottom and a substantially pointed top which extends up proximate and below the upper end of the feed tube.

5. In a machine for placing split rings on bobbins, the combination with a plurality of ring placing stations, each station having a floating cone supported by a plurality of sustaining wheels each fitting a segmental groove in the cone; each wheel having a plurality of radial escapement slots whereby a ring can pass over the top and along each cone while in radial slots; of a housing having a plurality of ring grooves one for each cone, each having a hole axially positioned above its cone and each provided with a movable slide together with a vertical open ended feed tube extending upward from the slot and a floating post free in said feed tube, said post having a rounded bottom and a substantially pointed top; together with means to lift a plurality of split rings and to deliver them into a chute which slopes down and over and above the tops of said floating posts and the top ends of the feed tubes; and means associated with each floating cone to force a ring along such cone and to set it on to the head of a bobbin held underneath it.

6. In a machine for placing split rings on bobbins, the combination with a floating cone supported by a plurality of sustaining wheels each fitting a segmental groove in the cone; and said sustaining wheels, each wheel having a plurality of radial escapement slots whereby a ring can pass over the top and along the cone while in radial slots; of a hous-

- ing having a plurality of ring grooves one for each cone, each having a hole axially positioned above its cone and each provided with a movable slide together with a vertical open ended feed tube extending upward from the slot and a floating post free in said feed tube, said post having a rounded bottom and a substantially pointed top; and means associated with each floating cone to force a ring along such cone and to set it on to the head of a bobbin held underneath it.
7. In a machine for placing split rings on bobbins, the combination with a cone adapted to receive a ring; of a sleeve revoluble on the cone and adapted to receive and hold a split ring; an intermittently revoluble ring gear having on the inside a pawl adapted to engage the split in a ring on the sleeve, said pawl having an outwardly and upwardly slanting top edge; a plunger having jaws adapted to force a ring along the cone onto a bobbin; mechanism to cause such plunger to make a short expanding stroke, to retract and then to make a longer setting stroke; and means to cause the ring gear and pawl to revolve one and one-third times while the plunger is out of contact with the split ring.
8. In a machine for placing split rings on bobbins, the combination with a cone adapted to receive a ring; of a sleeve revoluble on the cone and adapted to receive and hold a split ring; an intermittently revoluble ring gear having on the inside a pawl adapted to engage the split in a ring on the sleeve; a plunger having jaws adapted to force a ring along the cone onto a bobbin; mechanism to cause such plunger to make a short expanding stroke, to retract and then to make a longer setting stroke; and means to cause the ring gear and pawl to revolve while the plunger is out of contact with the split ring.
9. In a machine for placing split rings on bobbins, the combination with a floating cone supported by a plurality of sustaining wheels; and said sustaining wheels, each fitting a segmental groove in the cone, each wheel having brake mechanism and a plurality of radial escapement slots whereby a ring can pass over the top and along the cone while in radial slots; of a sleeve revoluble on the cone and adapted to receive and hold a split ring; an intermittently revoluble ring gear having on the inside a pawl adapted to engage the split in a ring on the sleeve, said pawl having an outwardly and upwardly slanting top edge; a plunger having jaws positioned between the cone supporting wheels, said jaws being adapted to force a ring along a cone onto a bobbin; mechanism to cause such plunger to make a short expanding stroke, to retract and then to make a longer setting stroke; and means to cause the ring gear and pawl to revolve more than one complete turn and to leave the pawl over one of the cone supporting wheels while the plunger is out of contact with the split ring.
10. In a machine for placing split rings on bobbins, the combination with a floating cone supported by a plurality of sustaining wheels; of said sustaining wheels, each fitting a segmental groove in the cone, each wheel having brake mechanism and a plurality of radial escapement slots whereby a ring can pass over the top and along the cone while in radial slots; a plunger having jaws positioned between the cone supporting wheels, said jaws being adapted to force a ring along a cone onto a bobbin; and mechanism to cause such plunger to make a setting stroke.
11. In a machine for placing split rings on bobbins, the combination with a floating cone supported by a plurality of sustaining wheels; of said wheels each fitting a segmental groove in the cone, each wheel having brake mechanism and a plurality of radial escapement slots whereby a ring can pass over the top and along the cone while in radial slots; of a sleeve revoluble on the cone and adapted to receive and hold a split ring; an intermittently revoluble ring gear having on the inside a pawl adapted to engage the split in a ring on the sleeve; and means to cause the ring gear and pawl to revolve more than one complete turn and to leave the pawl over one of the cone supporting wheels.
12. In a machine for placing split rings on bobbins, the combination with a cone adapted to receive a ring; of a sleeve revoluble on the cone and adapted to receive and hold a split ring; means adapted to engage the split in the ring from the outside and adapted to revolve the ring a predetermined distance; and a plunger having jaws adapted to force a ring along the sleeve and cone onto a bobbin while the ring turning mechanism is stationary.
13. In a machine for placing split rings on bobbins, the combination with a revoluble conical member adapted to receive and hold a split ring; of means adapted to engage the split in the ring from the outside and adapted to revolve the ring a predetermined distance; and a plunger having jaws adapted to force a ring along the conical member and onto a bobbin while the ring turning mechanism is stationary.
14. In a machine for placing split rings on bobbins, the combination with a ring guide post having a conical cap and a sleeve adapted to receive and hold a split ring, said sleeve being revoluble on said post under the cap; of means adapted to engage the split in the ring from the outside and adapted to revolve the ring a predetermined distance; and means adapted to force a ring along the guide post and sleeve and onto a bobbin while the ring turning mechanism is stationary.

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