

Sept. 27, 1949.

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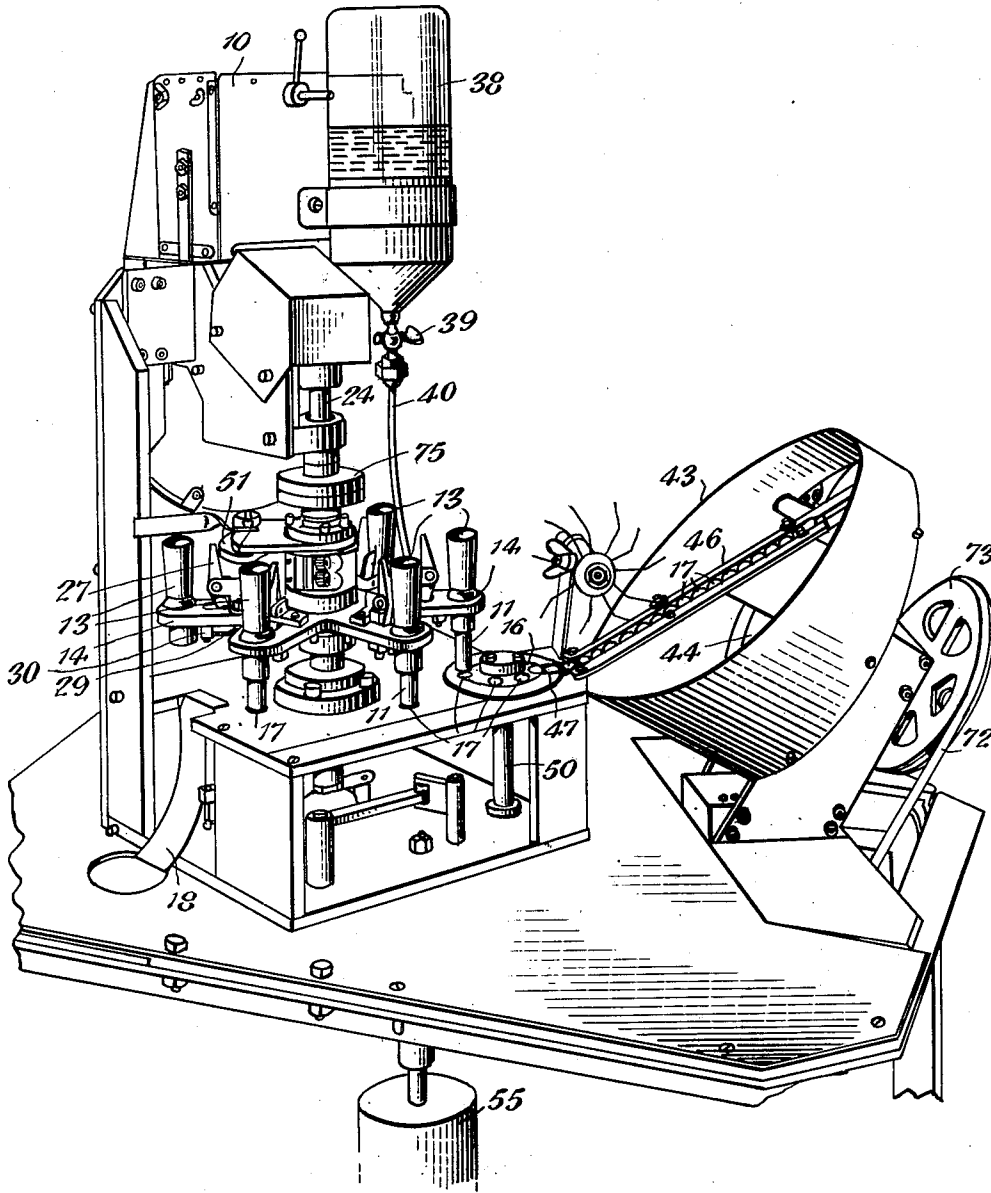
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MACHINE FOR CAPPING TUBES

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Fig. 1.



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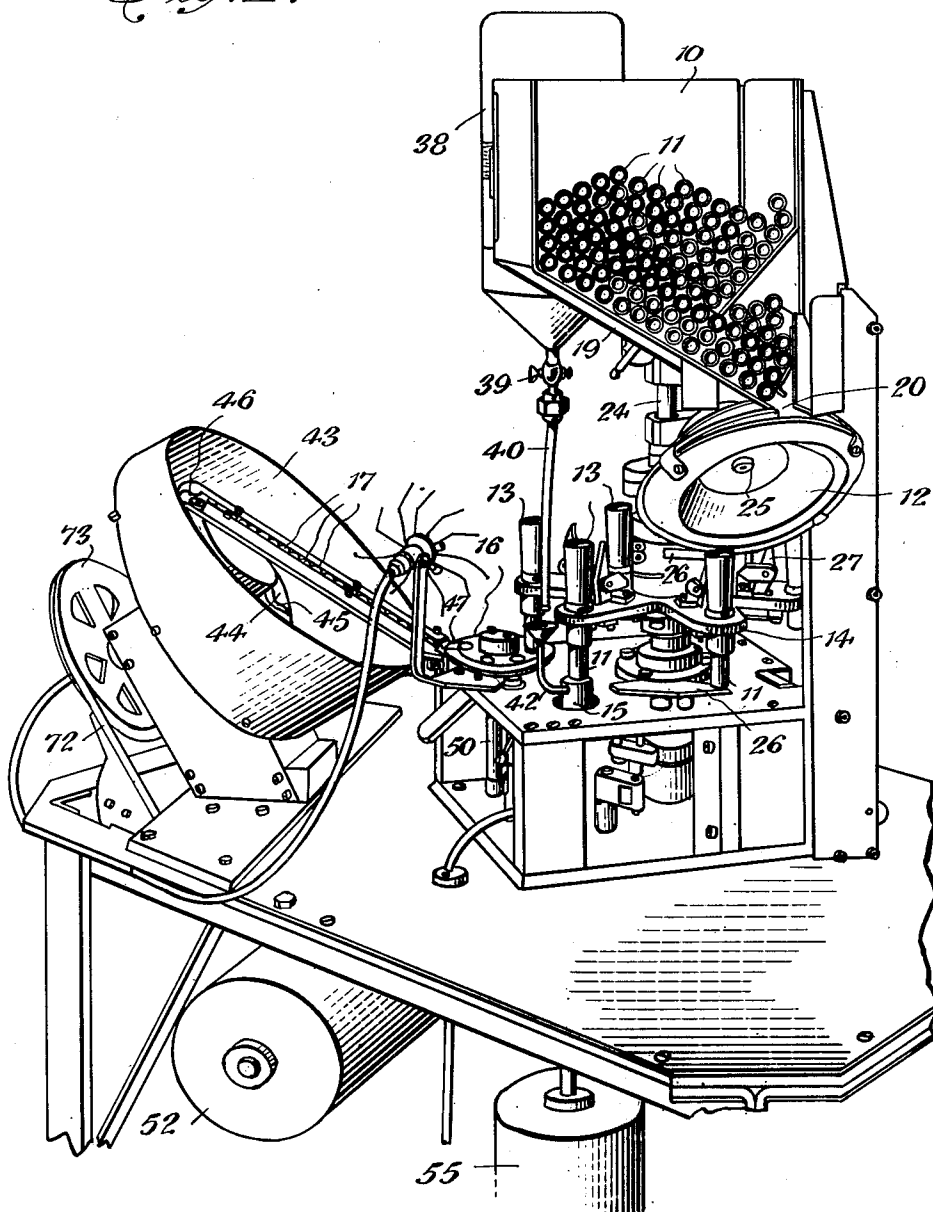
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Fig. 2.



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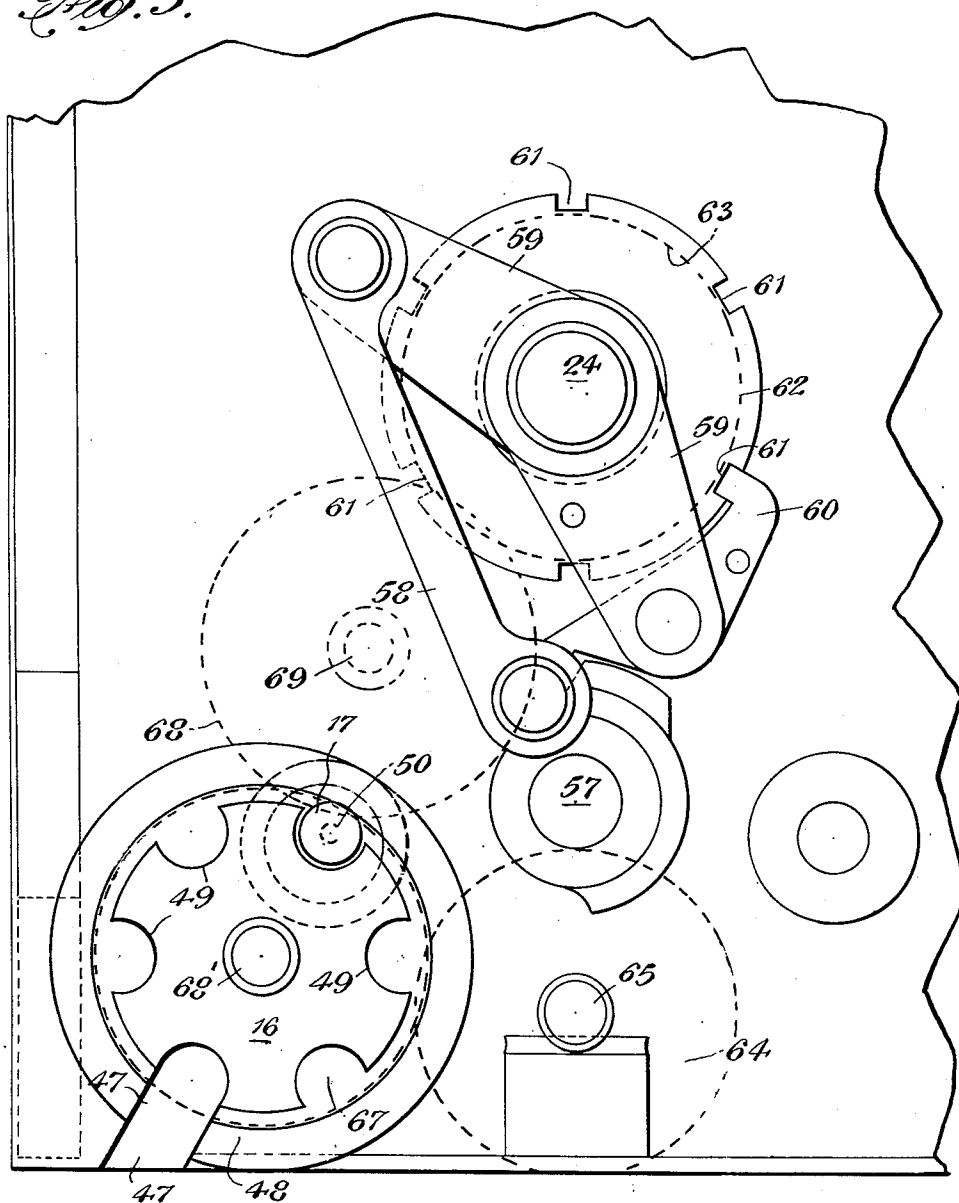
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Fig. 3.



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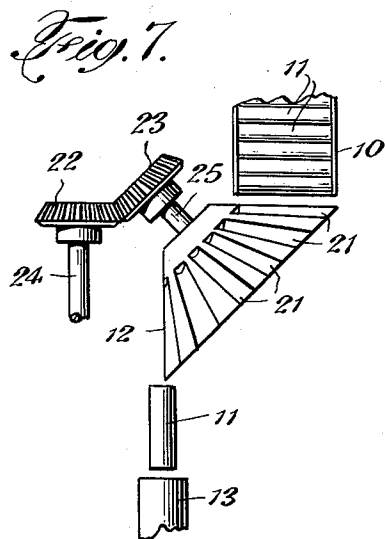
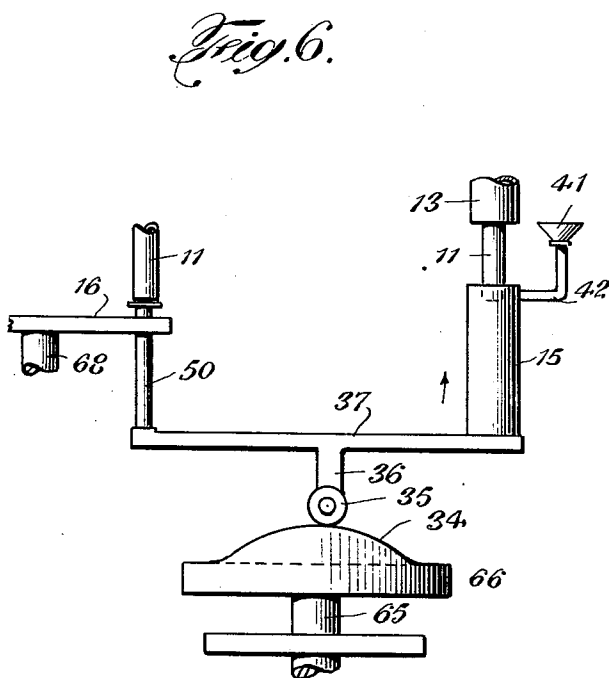
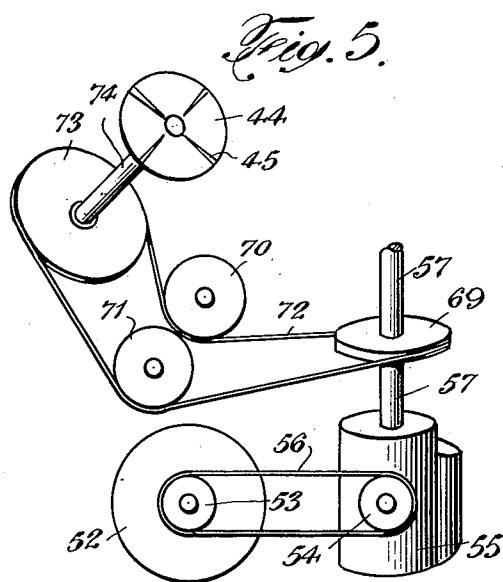
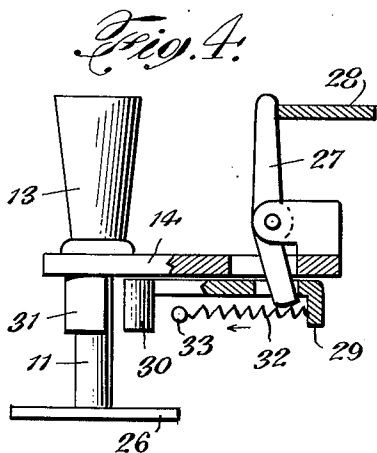
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MACHINE FOR CAPPING TUBES

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4 Sheets-Sheet 4



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MACHINE FOR CAPPING TUBES

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17 Claims. (Cl. 154—1)

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The present invention relates to a machine for capping tubes, and more particularly to the capping of Celluloid tubes or the like.

The object of the present invention is to provide a simple and efficient machine for capping the ends of Celluloid tubes, and more particularly to tubes used for barrels and caps of an inexpensive grade of fountain pen, pencils, thermometer cases, or the like.

The present machine provides for feeding tubes from a stationary hopper by gravity into a conical feeder which in turn feeds the tubes by gravity into a perpendicular holder which receives the tubes and allows them to drop part way through, so that the bottom of the tube will contact a guide plate, which fixes the position of the bottom of the tube so that when it is intermittently rotated on a turntable it will overlie or register with a small receptacle containing an adhesive or solvent such as acetate, or the like.

When the tube is rotated so that the bottom thereof is in registry with the adhesive receptacle, the receptacle is then raised up to immerse a substantial amount of the bottom of the tube.

The tube is then rotatably carried over to a recessed disc which in turn carries a plurality of preferably Celluloid buttons or discs, coming from a disc or button hopper.

When the bottom of the tube, after having been dipped, is in registry with the button, a plunger raises one of the buttons out of one of the recesses up into contact with the bottom of the tube.

The tube with the button adhered thereto, is then rotatably advanced to the ejection station where mechanism in the holder is released by a cam to permit the tube and the attached button to fall down a chute by gravity.

The present invention also provides for the capping of various diameters and lengths of tubes by substituting a circular plate having recesses therein adjacent the button hopper with larger or smaller recesses therein for receiving various diameters of buttons corresponding with the various diameters of tubes to be capped.

The conical feeder that feeds the tubes into the holders has a plurality of channels along the frustrums which are large enough to receive the minimum and maximum diameters of tubes which this machine will accommodate.

This invention also provides a turntable to accommodate a plurality of holders for the tubes, and a second turntable to accommodate a plurality of buttons or discs corresponding to the number of holders on the first turntable.

The turntable carrying the tubes and the turn-

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table carrying the buttons or discs are both rotated intermittently so that, one of the tubes will always be in registry with one of the buttons or discs while the turntables are both at rest.

Still another novel feature of the present invention is to provide a machine wherein the tubes are all held in a vertical position during all of the operations, for the reason that it is very important to dip the tube into the adhesive receptacle in an upright position so that the adhesive or solvent will run down on the outside and inside of the tubes to contact the surface of the buttons, and after the button is raised into contact with the bottom of the tube there will be a sufficient amount of adhesive within the tube to provide a very substantial bond between the inner wall of the tube and the flat surface of the button or disc. Since the acetate is a solvent it is very important that the acetate should not be permitted to run along the length of the tubes which so often happens with machines where the buttons are applied to the tubes in a horizontal position.

It is of course obvious that any cross section of a tube such as a hexagonal, or the like, may be used in this machine without changing this machine in the slightest.

It is also obvious that other than fountain pen tubes and caps may be capped in a like machine wherein the solvent or adhesive will readily adhere, so that ejection of the finished capped tube may be accomplished very quickly.

Other objects and advantages of the present invention will be obvious as brought out in the following specification.

Reference will be had to the accompanying drawings, forming a part of this specification, in which similar reference characters indicate corresponding parts throughout the several views, in which,

Figure 1 is a front elevation, of the present invention;

Fig. 2 is a rear elevation;

Fig. 3 is an enlarged fragmentary view of the driving mechanism;

Fig. 4 is a detail of the tube holder;

Fig. 5 is a perspective of the drive for feeding the buttons in the button hopper;

Fig. 6 is a detail of the cam mechanism for raising the dipping tank and the plunger for removing the buttons from the feeder, and;

Fig. 7 is a detail of the conical feeder for feeding the tubes.

Referring to the drawings wherein I have shown by way of illustration merely, a tube capping

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machine comprising, a hopper 10 for holding a plurality of tubes 11, which are dropped by gravity into a conical feeder 12, and when the feeder 12 rotates one-half a revolution the tubes 11 are dropped into holders 13, which are mounted on a turntable 14.

The bottom of the tubes 11 are dipped or immersed in a small receptacle 15 of acetate or the like, after which they are carried over a turntable 16, to register with a button turntable which carries the buttons 17.

One of the buttons 17 is raised and adhesively fixed to the bottom of the tube 11 which is then carried over to register with a chute 18, where the tube 11 with the button 17 is ejected from the holders 13 and dropped by gravity down the chute 18.

In operating the machine, a plurality of tubes or barrels 11 are placed in a hopper 10 in a uniform manner so that, all of the tubes lie parallel to each other and transversely of the hopper 10, where they are then led by gravity down an inclined base portion 19 of the hopper 10, to an opening 20 which is in registry with one of the recesses 21 in the frustum of the conical feeder 12.

The conical feeder 12 is provided with a suitable cover plate to prevent the tubes or barrels 11 from falling out of the feeder until they reach the bottom of the feeder where they drop by gravity into the holders 13.

The conical feeder 12 is rotated intermittently with the turntable 14 by a pair of beveled gears 22 and 23. The bevel gear 22 is mounted on the turntable shaft 24 and meshes with the gear 23 on a stub shaft 25, (see Fig. 7).

The recesses 21 in the frustum of the cone are horizontal and parallel with the bottom of the hopper when they are adjacent thereto, but when they are in a position diametrically opposite they are perpendicular, so that when the tube 11 is received in the recess 21 at the top of the conical feeder it is in a horizontal position and when the conical feeder is rotated to 180°, the recesses are in a perpendicular position relative to the holder 13.

When the tube 11 is dropped into the holder 13 (see Fig. 4), they strike a horizontal guide plate 26, which fixes the bottom of the tube in a predetermined position for subsequent operations. When the tube 11 and holder 13, attached to the turntable 14, is rotated, the bottom of the tube 11 rides along the guide plate 26 until the arm 27 drops off the cam 28 to permit the sliding plate 29 to move inwardly against the tube 11, so that the arcuate plate 30 will impinge upon the tube 11 and hold it firmly against an opposed arcuate plate 31 while the tube undergoes subsequent operations, hereinafter explained.

The spring 32 having one end fixed to a rigid part of the machine 33 and the other end fixed to a depending portion of the slide plate 29 is expanded as shown so as to urge the arcuate plate 30 into engagement with the tube 11, when the bottom of the arm 27 is released by means of the cam 28.

After the arm 27 rides off the cam 28 the tube 11 is carried over to a receptacle 15 containing an adhesive such as acetate or the like (see Fig. 6).

When the tube 11 is in registry with the receptacle 15, the high spot of the cam 34 engages the roller 35 on an arm 36 and raises the platform 37 carrying the receptacle 15 upwardly in the direction of the arrow to immerse a substantial

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amount of the bottom of the tube 11 into the acetate in the receptacle 15.

The acetate in the receptacle 15 is kept at a predetermined level and supplied by drops from a reservoir 38 through the valve 39, pipe 40, funnel 41, and pipe 42.

The valve 39 is opened slightly to permit a continuous dropping of acetate into the receptacle 15 to compensate for the acetate which was placed upon the bottom of the tube 11.

After the tube 11 has been immersed in the acetate the platform 37 is lowered by reason of the roller 35 riding to the low spot on the cam 34 which permits the tube 11 to advance to a button turntable 16 where the button 17 is applied to the bottom of the tube 11 and at the same time the advancing tube 11 is immersed in the acetate.

The buttons 17 are fed into the turntable 16 as follows: a quantity of buttons 17 are placed in the hopper 43 where they are picked up by a rotatable disc 44 having a plurality of pickers 45 thereon extending at right angles to the disc 44, for carrying the buttons 17 up to the end of a slide 46. The slide feeds by gravity a succession of buttons down into a recess 47 in the fixed ring 48 surrounding the turntable 16 and in line with the recesses 49 in the turntable 16.

When the turntables 16 and 14 are rotated intermittently and synchronously, one of the buttons 17 is always under the bottom of one of the tubes 11 and when in this position the plunger 50 mounted on the platform 37 with the receptacle 15 will be raised up simultaneously with the receptacle 15 by the cam 34 to cap one tube 11, and dip the next succeeding tube as clearly shown in Fig. 6.

When the button 17 is raised up in contact with the bottom of the tube 11 it will adhere thereto and be carried around by the turntable 14 to the chute 18 and ejected.

The ejection is brought about by the cam 51 which is similar to the cam 28 on the opposite side of the machine.

When the arm 27 approaches the cam 51 it rides upon the edge of the cam and retracts the plate 29 and releases the arcuate plate 30 from engagement with the tube 11 and permits the tube 11 to ride down the chute 18 as shown in Fig. 4.

The movement from the button station to the chute is timed to permit the adhesive to dry.

The mechanism for driving the machine consists of a motor 52 having a pulley or gear 53 thereon which drives a pulley or gear 54 on a gear reduction box 55 by a belt or chain 56.

The conventional gear reduction box 55 has a main drive shaft 57 running up through the base plate of the machine as shown in Fig. 3, and carries an eccentric arm 58 engaging with a bell crank lever 59 in the turntable shaft 24, and has a pawl 60 pivoted thereon which in turn engages notches 61 in a fixed disc 62 fixed to the shaft 24.

When the shaft 57 makes a complete revolution it pulls one end of the eccentric arm 58 around and actuates the bell crank lever 58 to release the pawl 60 from one of the notches 61, which causes the pawl 60 to move around the disc 62 to engage the next succeeding notch 61 to rotate the shaft 24 60° on each pull of the pawl 60. This causes the holders 13 carrying the tubes 11 to come to intermittent stops at the proper stations during the dipping and buttoning operations.

The turntable shaft 24 carries a gear 63 which

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meshes with an idler gear 68 on a stub shaft 69, which in turn meshes with a gear 67 on the button turntable shaft 66 so that the turntables 14 and 16 rotate in unison.

The gear 64 also meshes with a gear 67 for rotating the shaft 65 carrying the cam 66.

The main drive shaft 57 has a pulley thereon carrying a belt 72 which leads over pulley 70 and 71 to engage with a large pulley 73 to rotate shaft 74 which carries the disc 44 for lifting the buttons 17 in the button hopper 43 up to the slide 46.

A safety friction coupling or clutch 75 is mounted on the shaft 24 to prevent any breakage of the machine in the event any parts should jam.

Many modifications may be made in the present invention without departing from the spirit thereof.

I claim:

1. In a machine for adhesively applying a cap to fountain pen barrels or the like having a horizontal rotatable turntable with perpendicularly mounted tubular holders thereon for the reception of said fountain pen barrels; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with a barrel feeder including, a gravity feed hopper, a rotatable cone adjacent the bottom of said hopper having longitudinal grooves or recesses therein along the frustum thereof for the reception of said barrels and positioned in respect to said hopper and said holders on said turntable for conveying said barrels from a horizontal position from said hopper to a vertical position to said holders upon a 180° rotation of said cone, and gravity means for dropping said barrels into said holders.

2. In a machine for adhesively securing a cap to fountain pen barrels or the like having a horizontal rotatable turntable with perpendicularly mounted tubular barrel holders thereon for holding said barrels in a vertical position; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with a barrel feeder including, a gravity feed hopper, a rotatable cone adjacent the bottom of said hopper having longitudinal grooves or recesses therein along the frustum thereof for the reception of said barrels and positioned in respect to said hopper and said holders on said turntable for conveying said barrels from a horizontal position from said hopper to a vertical position to said holders upon a 180° rotation of said cone, and gravity means for dropping said barrels into said barrel holders.

3. In a machine for adhesively securing a cap to fountain pen barrels or the like having a horizontal rotatable turntable with perpendicularly mounted tubular holders thereon for the reception of said fountain pen barrels; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with a barrel feeder including, a gravity feed hopper having an inclined surface adjacent the bottom thereof and communicating with an opening large enough to permit one barrel to pass thru, a rotatable cone adjacent the opening in the bottom of said hopper having longitudinal grooves or recesses therein along the frustum thereof for the reception of said barrels and positioned in respect to said hopper and said holders on said turntable for conveying said barrels from a horizontal position from the bottom of said hopper to a vertical position to said holders upon a 180° ro-

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tation of said cone, and gravity means for dropping said barrels into said holders.

4. In a machine for adhesively applying a cap to fountain pen barrels or the like having a horizontal rotatable turntable with perpendicularly mounted tubular holders thereon for the reception of said fountain pen barrels; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with a barrel feeder including, a gravity feed hopper, a rotatable cone adjacent the bottom of said hopper having longitudinal grooves or recesses therein along the frustum thereof for the reception of said barrels and positioned in respect to said hopper and said holders on said turntable for conveying said barrels from a horizontal position for said hopper to a vertical position to said holders upon a 180° rotation of said cone, a cover plate surrounding said cone having a longitudinal opening therein adjacent the bottom of said hopper for holding said barrels in said recesses during the 180° rotation of said cone.

5. In a machine for adhesively securing a cap to fountain pen barrels or the like having a horizontal rotatable turntable with perpendicularly mounted tubular holders thereon for holding said barrels in a vertical position, said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with a barrel feeder including, a gravity feed hopper, a rotatable cone adjacent the bottom of said hopper having longitudinal grooves or recesses therein along the frustum thereof for the reception of said barrels and positioned in respect to said hopper and said vertical holders on said turntable for conveying said barrels from a horizontal position from said hopper to a vertical position to said holders upon a 180° rotation of said cone and a cover plate surrounding said cone for holding said barrels in said recesses during the 180° rotation of said cone.

6. In a machine for adhesively securing a cap to the end of a fountain pen barrel or the like having a circular horizontally mounted rotatable turntable with perpendicularly mounted and equally spaced tubular holders thereon for the reception and conveying of said fountain pen barrels; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with a barrel feeder including a gravity feed hopper for holding said barrels parallel with said turntable, a rotatable cone adjacent the bottom of said hopper for conveying said barrels from said hopper having a longitudinal and equally spaced grooves or recesses therein along the frustum thereof for the reception of said barrels and positioned in respect to said hopper and said holders on said turntable for conveying said barrels from a horizontal position from the bottom of said hopper to a vertical position to said holders upon a 180° rotation of said cone, a cover plate surrounding said cone having longitudinal openings adjacent the bottom of the hopper for holding said barrels in said recesses during the rotation of said cone.

7. In a machine for adhesively securing a cap to the ends of fountain pen barrels or the like having a horizontally mounted and intermittently rotatable turntable with barrel holders perpendicularly mounted thereon for the reception of said barrels being fed from a hopper, said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with means comprising a base plate for fixing the position of the bottom of said barrel in respect to the

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bottom of said barrel holders, and means including a trigger mechanism actuated by a stationary cam plate for holding and releasing said barrel from said holder.

8. In a machine for adhesively securing a cap to the ends of fountain pen barrels or the like having a longitudinally mounted and intermittently rotatable circular turntable with equally spaced barrel holders perpendicularly mounted thereon for the reception of said barrels being fed from a hopper; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with means comprising a base plate for fixing the position of the bottom of said barrel in respect to the bottom of said barrel holders, and means including a trigger mechanism actuated by a spring and a stationary cam plate for holding said barrel in said holder and releasing said barrel from said holder.

9. In a machine for adhesively securing a cap to the ends of fountain pen barrels or the like having a longitudinally mounted and intermittently rotatable circular turntable with barrel holders perpendicularly mounted and equally spaced thereon for the reception of said barrels being fed from a hopper; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with means comprising a base plate for fixing the position of the bottom of said barrel when said barrel is fed into said holder in respect to the bottom of said holder, and means including an arcuate plate and spring trigger mechanism actuated by a stationary substantially circular cam plate for holding said barrel within said holder and releasing said barrel from said holder.

10. In a machine for adhesively securing a cup to the ends of fountain pen barrels or the like having a longitudinally mounted and intermittently rotatable circular turntable with barrel holders perpendicularly mounted thereon for the reception of said barrels being fed from a hopper, said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with means comprising a cam for actuating a mechanism for applying an adhesive to the bottom of one of said barrels, and means including the aforesaid cam actuating mechanism for simultaneously applying a cap to the bottom of another preceding barrel which had already been supplied with adhesive.

11. In a machine for adhesively securing a cap to the ends of fountain pen barrels or the like having a longitudinally mounted and intermittently rotatable circular turntable with barrel holders perpendicularly mounted thereon for conveying said barrels being fed from a hopper, said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with means comprising a cam actuated mechanism for applying adhesive to the bottom of one of said barrels, and means including the aforesaid cam actuated mechanism for simultaneously applying a cup to the bottom of another preceding barrel which had already been supplied with adhesive.

12. In a machine for adhesively securing a cap to the ends of fountain pen barrels or the like having a longitudinally mounted and intermittently rotatable turntable with barrel holders perpendicularly mounted thereon for the reception of said barrels being fed from a hopper; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with means for ejecting the capped barrel from

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the machine including, a trigger mechanism actuated by a stationary cam and spring for releasing said barrel from said holder so that the barrel may drop out of the holder by gravity.

13. In a machine for adhesively securing a cap to the ends of fountain pen barrels or the like having a longitudinally mounted and intermittently rotatable circular turntable with barrel holders perpendicularly mounted thereon for conveying said barrels being fed from a hopper; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with a cap feeding mechanism for holding circular caps including, an inclined hopper having a rotatable base plate therein with pickers thereon for carrying said circular caps up to a slide, and intermittently rotatable disc adjacent the bottom of said slide having a plurality of arcuate recesses in the periphery thereof for the reception of said circular caps, and means comprising a mechanism interconnected with said turntable mechanism for intermittently stopping said disc simultaneously with the stopping of said turntable.

14. In a machine for adhesively securing a cap to the ends of fountain pen barrels or the like having a longitudinally mounted and intermittently rotatable circular turntable with barrel holders perpendicularly mounted thereon for the reception of said barrels being fed from a hopper; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with a cap feeding mechanism for holding circular caps including, an inclined hopper having a rotatable base plate therein with pickers thereon for carrying said circular caps up to a gravity slide, an intermittently rotatable disc adjacent the bottom of said gravity slide having a plurality of arcuate recesses in the periphery thereof for the reception of said circular caps coming from said slide, and means comprising a mechanism interconnected with said turntable mechanism for intermittently stopping the rotation of said disc simultaneously with the stopping of the rotation of said turntable.

15. In a machine for adhesively securing a cap to the ends of fountain pen barrels or the like having a longitudinally mounted and intermittently rotatable turntable with barrel holders perpendicularly mounted thereon for the reception of said barrels being fed from a hopper; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with means for ejecting the capped barrel from the machine including, a trigger mechanism actuated by a stationary circular cam for releasing said barrel from said holder so that the barrel may drop out of the holder by gravity.

16. In a machine for adhesively securing a cap to the ends of fountain pen barrels or the like having a longitudinally mounted and intermittently rotatable turntable with barrel holders perpendicularly mounted thereon for the reception of said barrels being fed from a hopper; said turntable adapted to be intermittently rotated by a suitable mechanism; in combination with a cap feeding mechanism for holding circular caps including, an inclined hopper having a rotatable base plate therein with pickers thereon for carrying said circular caps up to a slide, an intermittently rotatable disc adjacent the bottom of said slide having a plurality of arcuate recesses in the periphery thereof for the reception of said circular caps, and means comprising a mechanism interconnected with said turntable mechanism for

intermittently stopping said disc simultaneously with the stopping of said turntable.

17. A machine for adhesively securing a plastic cap to the end of a plastic tube, comprising, a substantially circular turntable horizontally mounted and adapted to be intermittently rotated by suitable mechanism, a plurality of tubular holders perpendicularly mounted upon said turntable and equally spaced thereon for conveying said plastic tubes to various operating stations on said machine, a gravity feed hopper containing said plastic tubes, a conical feeder having longitudinal recesses therein along the frustum of said cone, a cover plate surrounding said cone having an opening therein so said plastic tube can pass from said hopper into said recesses in said cone, said cone being situated in a position to convey said tube from a horizontal position from said hopper to a vertical position to said tubular holders, an arcuate plate adjacent the bottom of said holders actuated by a trigger mechanism and stationary cam for releasing and holding said tube within said holder, a second hopper containing plastic caps having means therein for feeding said caps to a gravity slide, an intermittently rotatable disc having equally spaced recesses around the pe-

riphery thereof for the reception of said caps coming from said gravity slide, suitable mechanism for intermittently rotating said disc synchronously with said turntable, and a cam actuating mechanism for simultaneously dipping the bottom end of a plastic tube into an adhesive and securing a cap to the preceding tube that has already been dipped into the adhesive.

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