Oct. 20, 1953 R. S. KAFKA 2,656,063

LABELING APPARATUS

Filed April 2, 1948 6 Sheets-Sheet 1

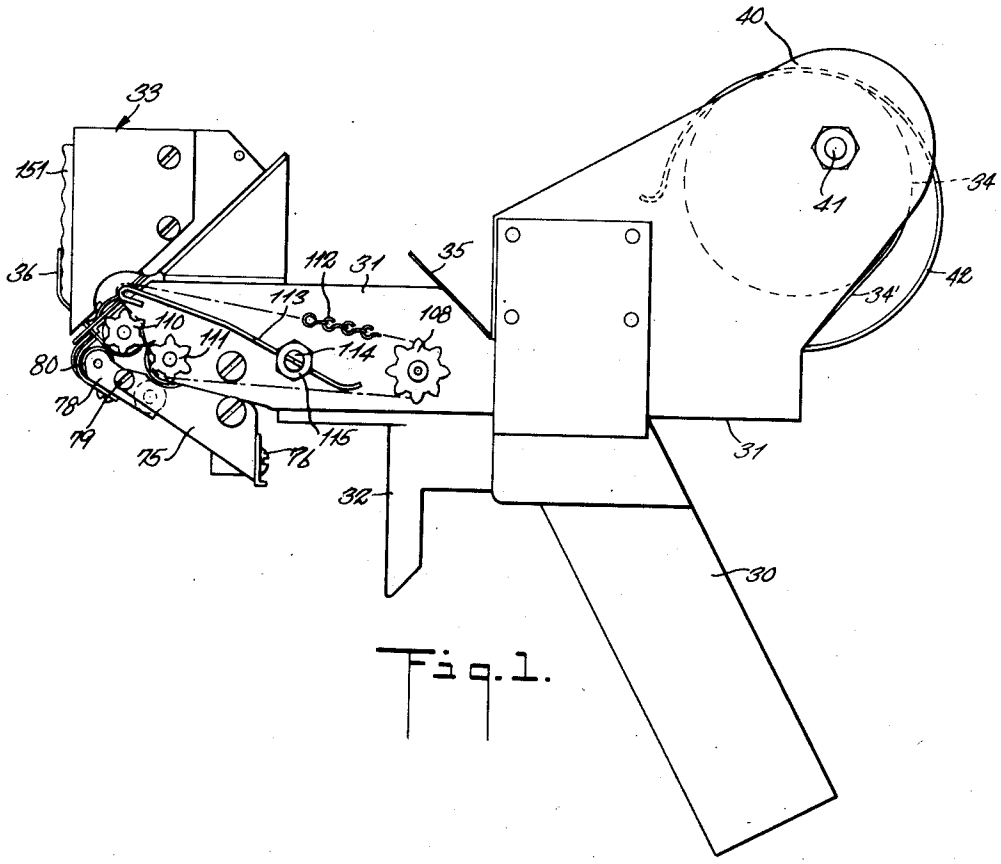


Fig. 1.

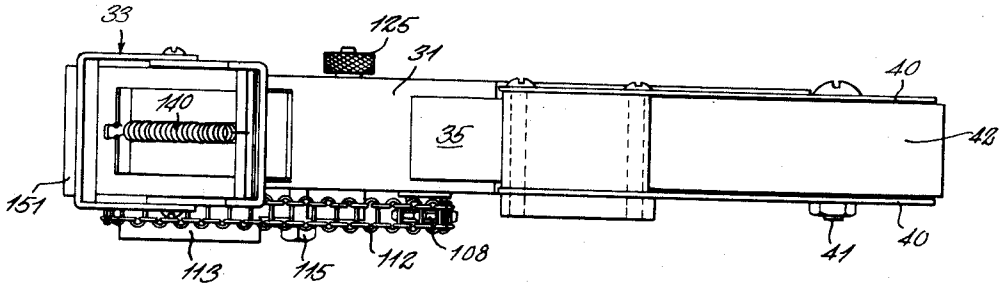


Fig. 2.

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LABELING APPARATUS

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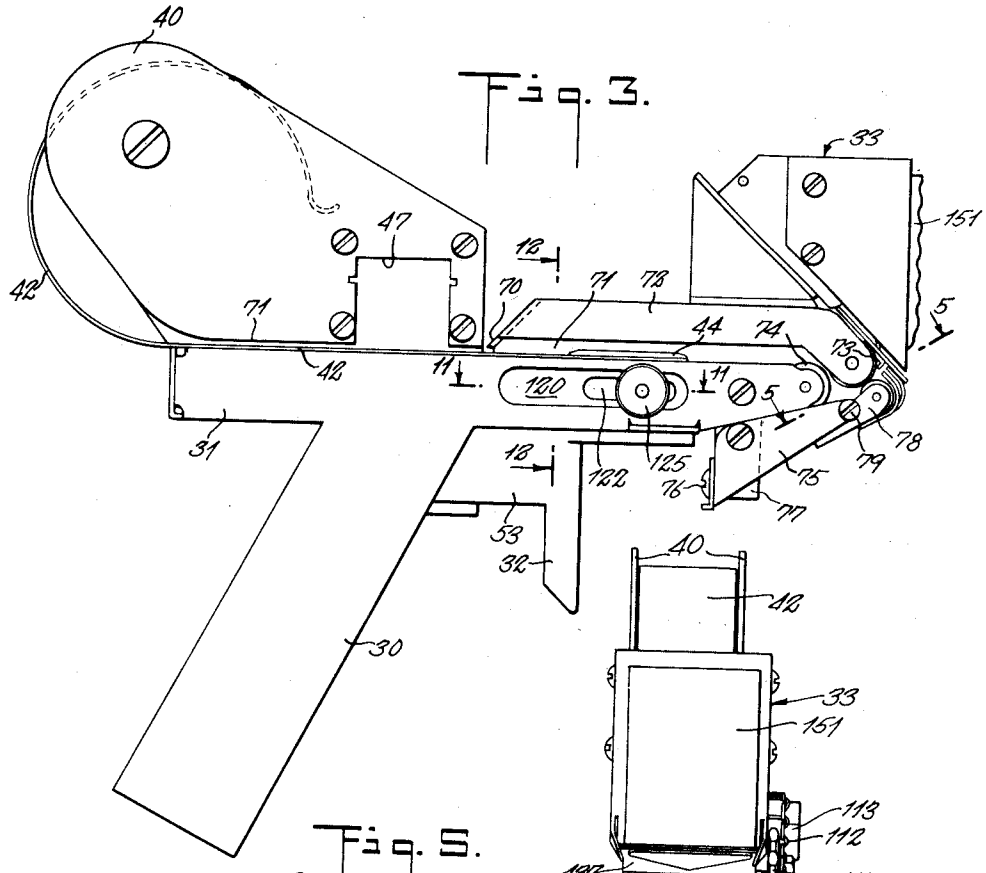


Fig. 3.

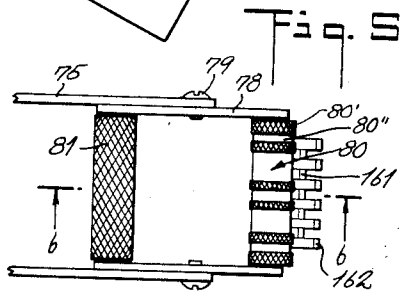


Fig. 5.

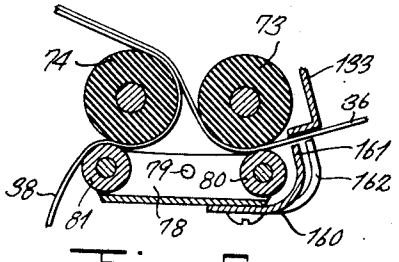


Fig. 6.

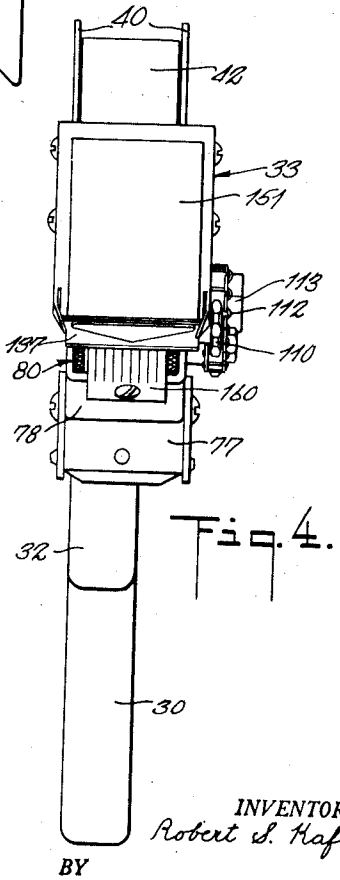


Fig. 4.

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LABELING APPARATUS

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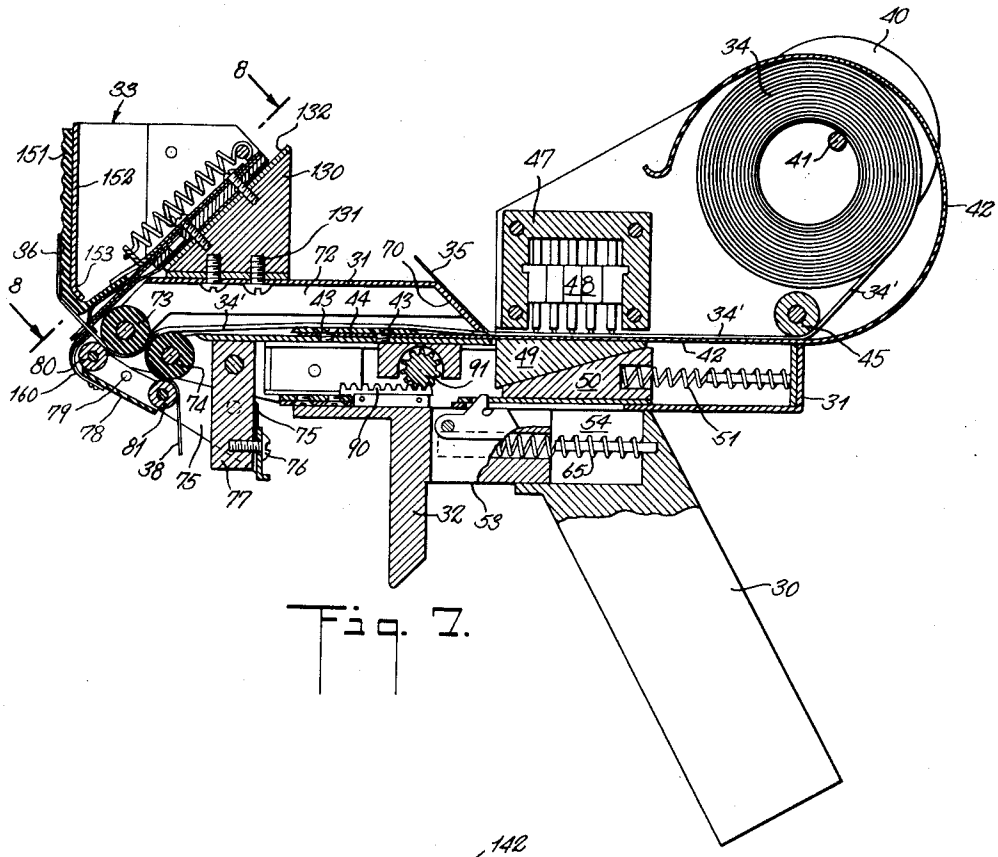


Fig. 7.

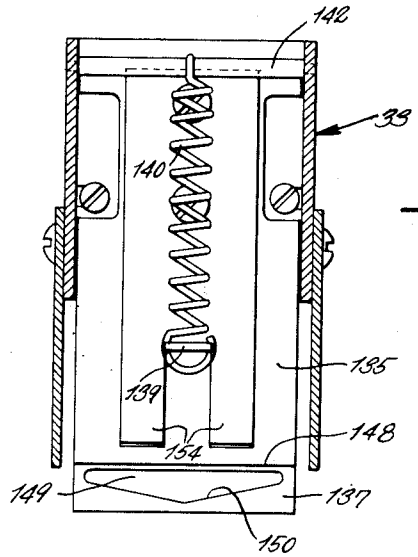


Fig. 8.

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LABELING APPARATUS

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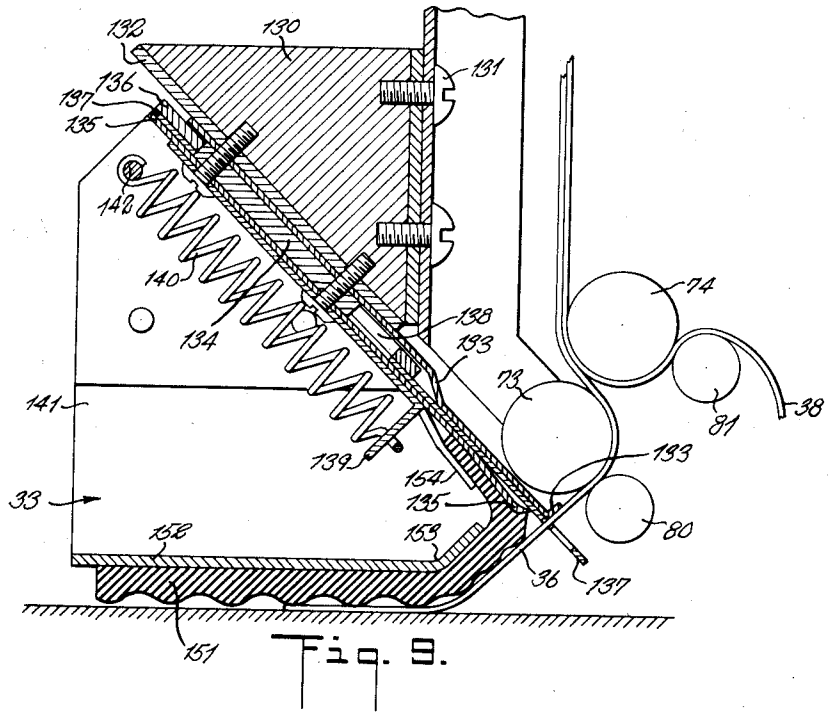


Fig. 9.

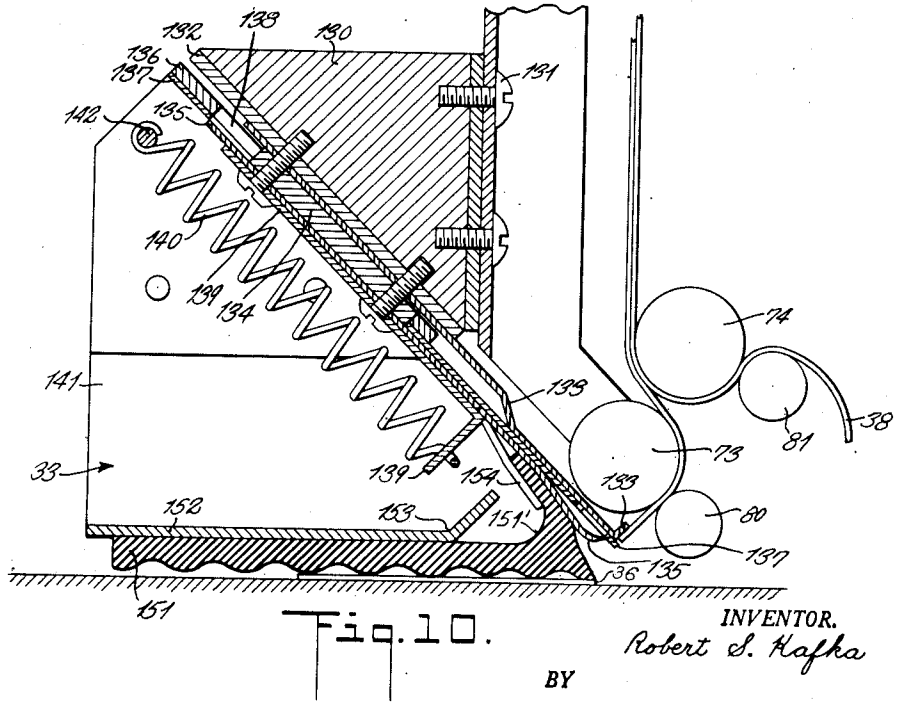


Fig. 10.

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LABELING APPARATUS

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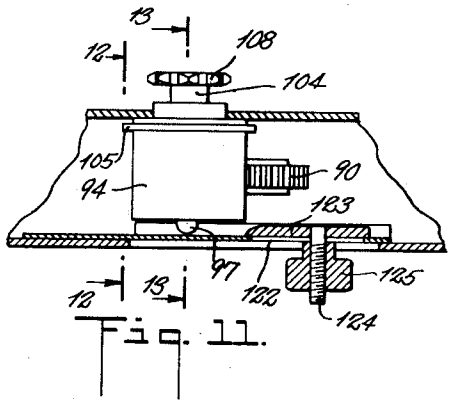


Fig. 11.

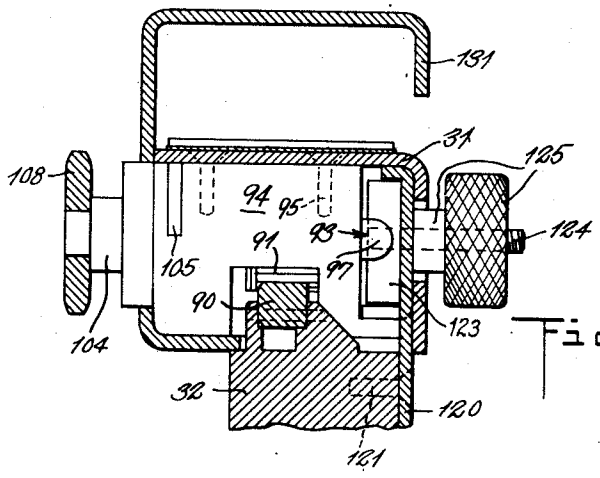


Fig. 12.

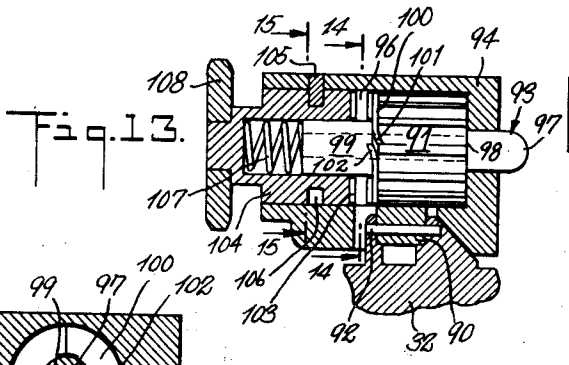


Fig. 13.

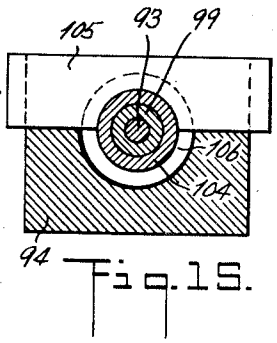


Fig. 15.

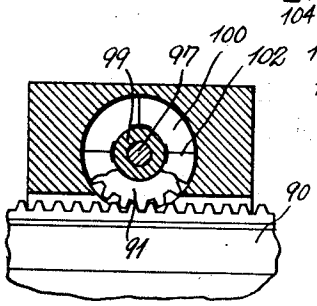


Fig. 14.

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LABELING APPARATUS

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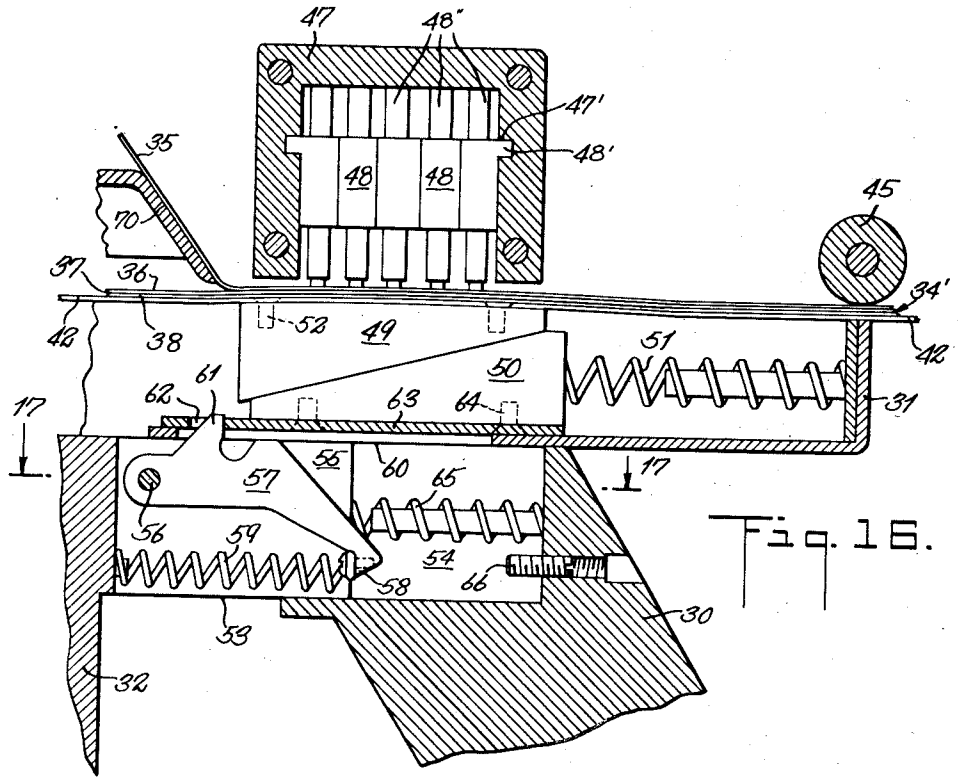
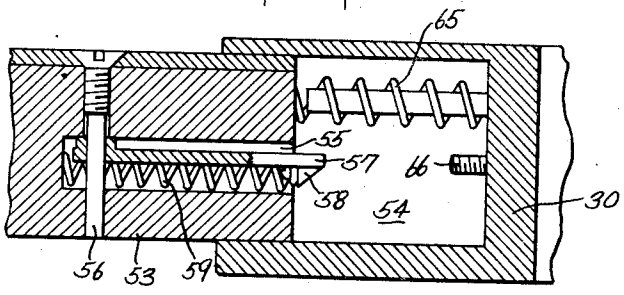


Fig. 16.

Fig. 17.



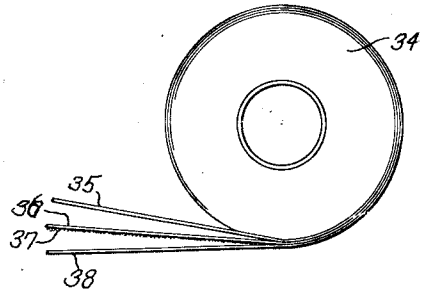


Fig. 18.

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Patented Oct. 20, 1953

2,656,063

UNITED STATES PATENT OFFICE

2,656,063

LABELING APPARATUS

Robert S. Kafka, Woodside, N. Y., assignor to Midland Equipment Corp., New York, N. Y., a corporation of New York

Application April 2, 1948, Serial No. 18,507

24 Claims. (Cl. 216—2)

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This invention relates to labelling apparatus.

In stores, and particularly in stores where large numbers of articles are to be price-tagged, the labor of affixing the price tags is very great. For instance, if 1,000 glasses are to be labelled "$.39" it is necessary to take a thousand labels, write, print, or type the price upon each one, after which the operator is required to separate the protective backing tape from the adhesive side of the label and apply the label to the glass. This entire operation is done by hand. The complexity of the operation is immeasurably increased by the number of articles that are to be labelled for sale and by the variety of prices at which the articles are to be sold.

It is an object of this invention to make a hand labeller which will print the proper price mark and apply a price label by adhesive to an article.

The objects of the invention are accomplished, generally speaking, by a labeller having a frame or barrel, a grip, a support for a supply of adhesive tape, a pressure foot by which the tape is applied to the article, and a printing device to stamp the correct price, stock number, and other information on the label before application. Within the outline of the generic invention thus described, there are a number of dependent inventions which contribute to the perfect functioning of the machine.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is an elevational left side view of an apparatus constructed in accordance with the principles of the invention.

Fig. 2 is a plan view of the apparatus shown in Fig. 1.

Fig. 3 is an elevational right side view of the same apparatus.

Fig. 4 is a front elevational view of the apparatus.

Fig. 5 is a section on line 5—5 of Fig. 3, illustrating a dependent invention.

Fig. 6 is a vertical section through the delivery rollers that move and separate the layers of the tape, taken on line 6—6 of Fig. 5.

Fig. 7 is a vertical section through the apparatus of Fig. 1.

Fig. 8 is a section on line 8—8 of Fig. 7, showing a dependent invention.

Fig. 9 is a vertical sectional view through the pressure foot of Fig. 3 as pressure is first applied, showing a dependent invention.

Fig. 10 is a view similar to Fig. 9 but with the pressure foot in almost fully operated position.

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Fig. 11 is a section on line 11—11 of Fig. 3.

Fig. 12 is a vertical section on the line 12—12 of Fig. 11 and Fig. 3.

Fig. 13 is a section on the line 13—13 of Fig. 11.

Fig. 14 is a section on the line 14—14 of Fig. 13.

Fig. 15 is a section on the line 15—15 of Fig. 13.

Fig. 16 is a vertical sectional enlargement through the printing mechanism, reference being had to Fig. 7 for a complementary view.

Fig. 17 is a section on the line 17—17 of Fig. 16.

Fig. 18 is an elevational view of the dependent invention of the roll used in the machine.

In the figures, the numeral 30 is the handle of the labeller, which carries a frame 31 and a trigger 32. The frame is rigidly mounted on the handle. The trigger can be drawn back, being mounted on the frame and grip for such movement. Supported on the front end of the frame is a pressure foot 33 which applies the pressure necessary to make the tape stick to the object to which it is applied. On the rear end of the frame is mounted a roll 34 of adhesive tape. This roll constitutes a dependent invention in itself.

The tape that is employed in this machine has two or three layers, a middle layer consisting of a strip of paper, cellophane or the like which bears upon one side a pressure sensitive adhesive which is protected until application by a cover strip of paper or other suitable material having a low coefficient of attachment for the particular adhesive employed. On the other side of the adhesive-coated layer is a third layer composed of carbon paper, a typewriter ribbon or other printing assistant. A detail of the roll is shown in Fig. 18, in which 34 is the roll, 35 is a strip of carbon paper that covers the back of the center, adhesive layer, 36 is the label layer with its adhesive 37 on the lower face thereof, and 38 is the protective or cover layer which completes the assemblage by protecting the adhesive until it is applied. The carbon paper can be omitted when the printing device is self-inking or when a roll of preprinted labels is used.

A pair of wings 40 project upwardly and rearwardly from the frame of the machine. As shown in Fig. 1 the wings are actually made by extending the metal of the frame upwardly. A bolt 41 through the wings 40 serves as an axle for the roll 34.

The frame of the gun, 31, is hollow and is covered for a good portion of its length by a leaf spring 42 which curls upwardly at the rear and applies to the roll 34 sufficient pressure to keep it from unwinding accidentally. The spring 42 is attached to the metal of the frame by screws 43

and a plate 44 in which the screws are countersunk. The spring 42, which serves as a top for the frame of the gun, also serves as a guide for the tape 34', which is laterally guided in the forward parts of the apparatus by the side of the frame and by the roller mechanism hereinafter described.

The first mechanism to which the tape 34' is brought after it leaves the roll 34 and passes under the guide roller 45 (which is mounted in the wings 40 with space enough to permit the strip to pass between it and the spring 42) is the printing device. The frame 31 carries a housing 47 which is open at one side as shown in Fig. 7 and receives printing type 48. The type 48 extends close to the path of the strip of tape 34', almost touching the outer layer 35 of carbon paper. Inside the frame 31, with one flat side normally in contact with the bottom of spring 42, is a wedge block platen 49, its diagonal face tilted rearwardly; beneath this is a slidable block 50 which is normally thrust forward by coil spring 51 so that its forwardly inclined diagonal face 52 engages its rearwardly inclined diagonal face 49, tending to thrust that block upward toward the printing type and against the spring 42.

Reference should now be had to Figs. 7, 16, and 17, the latter of which show enlarged details. The block 49 is attached by screws 52 (Fig. 16), to the spring 42.

The trigger has a rearwardly projecting portion 53 that can be retracted into a hollow place 54 within the grip 30 of the gun. The rearwardly extending portion 53 has a slot 55 within which, upon a pivot pin 56, is pivotally mounted a key 57 having an offset end 58 which is spring pressed by spring 59 bearing against the forward end of the slot 55. The upper portion of the key 57 has an abutment that bears against the underside of the bottom 60 of the frame 31 where it overlies the grip 30 and the trigger 32, thus limiting the upward motion of the key. Projecting upwardly from the key and forwardly of said abutment is a prong 61 that projects through an opening 62 in a plate 63 which is fixedly mounted by screws 64 on the block 50. This plate 63 and the block 50 are movable backward in the frame against the thrust of spring 51, by the mechanism that has just been described and operates as follows.

As the trigger 32 is pulled the prong 61 pulls the plate 63 and the block 50 backward against the thrust of spring 51 and against the thrust of a spring 65 which bears upon the trigger itself. An adjustable stop 66, consisting of a headless screw, is mounted in line with the end of offset portion 58 of key 57. When that portion of the key strikes the screw 66 the key is pivoted downwardly about pivot 56 moving the prong 61 out of the slot 62. The block 50 is instantly shot forward against block 49, the inclined faces transferring the shock vertically through the spring 42 and forcing the top layer of the strip against the type, printing by impact. The trigger is then released and is moved forward by spring 65 to its inoperative position, allowing the prong 61 to enter the slot 62 in readiness for application of another label. The type 48 can be changed by the simple expedient of withdrawing them from the housing 47. The housing is provided with slots 47' which receive flanges 48' on the type. The type are also provided with extensions 48'' that bear against the upper portion of the housing and transmit the shock. The impact can be regulated, by choosing the strength of spring, from ordinary typewriter stroke to a stroke sufficient to cut a stencil. Thus, this machine is capable of not only printing but of cutting a stencil in stencil material if desired.

After having been stamped the strip 34' passes by a doctor blade 70 which removes the upper layer 35 of the strip. The right hand side of the gun is open just above the spring 42, as indicated at 71 in Fig. 3, so that the strip can be threaded into the apparatus from the side without displacing any portions of the frame or of the auxiliary structure carried by the frame. When the strip is threaded into the machine the layer 35 is taken out over the edged blade 70, the printed strip 36 and the cover strip 38 continuing on over the block 44 under the forward raised portion 72 of the frame 31. Thence, it passes between two rollers 73, 74 which are driven by the trigger 32 and act to advance the strip and to separate the cover 38 from the adhesive label 36. The rollers 73, 74 do not necessarily, and in fact preferably do not, grip the tape between them.

A U-shaped support 75, attached by a screw 76 to a depending portion 77 of the frame, supports at its ends a pivoted carriage 78 by means of pintles 79 at the ends of which are pivotally mounted two rollers 80, 81. The rollers 73, 74 are preferably covered with soft rubber, and the rollers 80, 81 are of knurled metal. In addition the roller 80 has knurled lands 80' and grooves 80'' between the lands. This structure constitutes a dependent invention of considerable importance because the roller 80 is in contact with the pressure sensitive adhesive itself and in its set position constitutes an idler roller between which and the roller 73 the tape is gripped and driven. The roller pair 74—81 serves to grip and drive the layer 38 in the same way. The knurling 80' should be as sharp-pointed as possible, as it is my discovery that the use of such sharp-pointed knurled lands acts to move the adhesive covered layer without sticking to it. The rollers 80, 81 are so spaced that they act to separate the cover layer from the adhesive layer with a maximum of efficiency. Thus, the layer 36 is projected outwardly from between rollers 73—80 at a tangent to their line of contact.

The trigger-operated mechanism to turn the rollers 73 and 74 involves a mechanism for adjusting the length of stroke so that tickets of different sizes can be cut off. The trigger 32 has a rack bar 90 which engages a pinion 91, as shown in Figs. 7 and 11–15 inclusive. The rack bar 90 is mounted by a pin 92 in a yoke in the trigger 32. The pinion 91 is mounted upon a shaft 93 which projects at one end from a casing 94 which is attached to the frame 31 by screws 95. The casing 94 has a chamber 96 extending inward from the left. The shaft 93 has a rounded projecting end 97 and is reduced at 98 to form an abutment against which the gear 91 rests. A sleeve 99 has a forced fit over the inner reduced end of shaft 93 and against the gear 91. The gear is thus held rigid with respect to the shaft. It may be keyed on additionally if desired. Between the end of the sleeve 99 and the gear is a clutch ring 100 having prongs 101 that engage the teeth of the gear and prongs 102 that engage splines 103 on the inner face of a rotatable member 104 which is held in the housing by a key 105 which fits in the keyway 106 and in a slot in the upper portion of housing 94. Thus, the rotatable member 104 can be turned with respect to the housing whenever clutch prongs 102 are moved into engagement with the splines 103. A

spring 107 is placed within a recess within the member 104 and bears against the end of sleeve 99, keeping the clutch out of engagement except when the end 97 is thrust inward by mechanism provided for that purpose. Mounted upon the outer end of rotatable member 104 is a gear 108.

The rollers 73, 74 have projecting axles, on the same side of the gun as the gear 108, upon which are keyed sprockets 110, 111. A chain 112 passes over sprockets 108, 110, 111 and transmits the motion imparted by the trigger 32 to the rollers 73—80, 74—81. A spring 113 serves as a positioning guide for the chain 112. This spring is held on the frame by a split screw 114 and a nut 115.

It will be seen from the foregoing that there has been provided a mechanism which holds a supply of tape, prints the adhesive layer, separates the printed layer, removes the cover layer, and projects the adhesive layer to a position of application.

In order to advance the tape a selected distance, an adjustment is provided which regulates the length of each stroke. Referring to Figs. 3, 11, and 12 a support 120 extends upward from the trigger 32, to which it is attached by means of screws 121 and fits snugly against the inside of the frame 31 on the right hand side of the gun. This support is provided with a slot 122. A cam block 123 is held against the inside of the support 120 by a screw 124 which projects outwardly through the slot and by a nut 125 which bears against the outside of the support 120. By loosening the nut, the cam block 123 can be moved throughout the length of the slot 122. When that block is advanced to the right as shown in Figs. 11 and 3, the trigger 32 will travel a certain distance before the cam on the block engages the rounded end 97 of the shaft 93. Consequently, the clutch will be engaged to drive the gear 108 only during a small part of the stroke. On the other hand, when the block 123 is moved to the left so that the cam engages shaft 97 at the start of each stroke, the sprocket 108 will be driven throughout the length of each stroke and advance the tape a longer distance. As soon as the trigger is released the block 123 is thrown out of engagement with the shaft 97 and the spring 107 moves the clutch 100 out of engagement with splines 103, terminating the motion of the tape.

A pressure foot 33 is provided to press the adhesive coated layer 36 against the object to be marked. A support 130 is mounted by screws 131 (Figs. 7, 8, 9, and 10) in the raised portion 72 of the frame 31. The support is provided with an inclined face 132 upon which is mounted a guide 133 (Fig. 9) having a flanged end projecting toward the line of contact of rollers 73—80. The layer 36 is prevented by the flanged ends of the guide 133 from following the roller 73 around and becoming entrapped. A spacing block 134 rests upon the guide 133 and elevates a fixed scissor member 135 sufficiently to permit a travelling block 136 and a moving scissor member 137 to slide back and forth within the limits allowed by an aperture 138 in them. This aperture encloses the block 134. Mounted upon the fixed shear 135 is a spring connection 139. A spring 140 is connected at one end on the support 139 and at the other end to the sliding block 136. The sliding member, or pressure foot, 136 has upstanding walls 141 to which the spring 140 is attached by means of a pin or rod 142. This spring keeps the pressure foot 33—141—136 in an advanced position except when pressure is applied.

The cutter is composed, as shown in Fig. 8, of the upper spring member 135 having a convex forward cutting edge 148. This member is fixed by being mounted on the block 134 and the support 132. Beneath that cutter member is another, 137, having an approximately triangular opening 149 through which the adhesive layer projects. The cutting edge of this member is 150. When pressure is applied to the pressure foot 33 the foot slides upward against the tension of spring 140 drawing the knife member 137 and forcing the adhesive layer against the knife edges 148, 150. Cutting proceeds from the outer portions of the cutting edges toward the center. A true shearing action occurs and resistance is kept at a minimum.

In order to secure the proper adhesion of the tape to a surface, the pressure foot is provided with a soft rubber pad 151 which is fixedly attached to the forward wall 152 of the foot as far as the bend 153. From that point on the foot is free and is bent around and above the forward end of the upper knife 135 and is attached to a member 154 which projects forwardly from the fixed support 139. When the tape is to be applied, the gun of Fig. 3 is placed in the position shown in Fig. 9 and pressure is applied, the pad 151 forcing the adhesive on the bottom of layer 36 into close and sticking engagement with the surface. As the pressure overcomes the force of spring 140, the foot 33 is moved upwardly along the face of support 132 and the free end 151′ of member 151 is forced forwardly and down as shown in Fig. 10, thus acting to affix that part of the strip which is released by the action of the cutters 135—137.

In Fig. 6 is shown another dependent invention which contributes to the perfect functioning of the apparatus. In this figure a curved spring member 160 is attached to member 78. The end of this spring member is cut into teeth of prong type, 161, 162 of which teeth 161 are displaced from the plane of teeth 162 and ride more or less in the grooves 99′′ of the roller 99 with their ends projecting more or less tangentially toward the path of the tape 36. The other teeth 162 project toward guide 133 so that the strip 36 is guided on opposite sides as it leaves the rollers 73—80.

Among the advantages of this invention are the following:

This is a very useful labeller; uses a plain, unperforated tape; it will print and attach an adhesive price label to an article of merchandise; it is operable to cut off a selected length of tape; it employs the principle of impact printing or stencil cutting; in it the tape is threaded from the side and is visible to the operator at all times during the operation; it overcomes the problem of the adhesive sticking to the roller; it employs the principle of pyramidal knurling; the cutter is a novel and useful conception, employing the principle of a double scissors cut. It efficiently separates the layers of a tape.

As many apparently widely different embodiments of the present invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments.

What is claimed is:

1. A labelling gun for the application of adhesive tape having a plurality of layers of which one bears pressure-sensitive adhesive and

another covers the adhesive until use, comprising a frame, a grip, and a trigger, a tape supply holder, guide means on the frame for a strip of tape from the holder, printing means carried by the frame adjacent the path of the tape, means operable by the trigger to force the tape and the printing means together, gripping means operable by the trigger to advance the tape and to separate the adhesive layer from the cover layer, a label applier carried by the frame adjacent the path of the adhesive layer, and means to sever the adhesive layer as pressure is applied thereto by the label applier.

2. A labelling gun for the application of adhesive tape having a plurality of layers of which one bears pressure-sensitive adhesive and another covers the adhesive until use, comprising a frame, a grip, and a trigger, a tape supply holder, guide means on the frame for a strip of tape from the holder, printing means carried by the frame adjacent the path of the tape, means operable by the trigger to force the tape and the printing means together, edge means to separate a third layer from the tape, gripping means operable by the trigger to advance the tape and to separate the adhesive layer from the cover layer, a label applier carried by the frame adjacent the path of the adhesive layer, and means to sever the adhesive layer comprising trigger operated severing means operable by motion of the label applier.

3. A labelling gun for the application of adhesive tape having a plurality of layers of which one bears pressure-sensitive adhesive and another covers the adhesive until use, comprising a frame, a grip, and a trigger, a tape supply holder, guide means on the frame for a strip of tape from the holder, printing type supported over the frame adjacent the path of the tape, impact means operable by the trigger to force the tape and the printing means together, gripping means operable by the trigger to advance the tape and to separate the adhesive layer from the cover layer, a label applier carried by the frame adjacent the path of the adhesive layer, and means to sever the adhesive layer as pressure is applied thereto by the label applier.

4. A labelling gun for the application of adhesive tape having a plurality of layers of which one bears pressure-sensitive adhesive and another covers the adhesive until use, comprising a frame, a grip, and a trigger, a tape supply holder, guide means on the frame for a strip of tape from the holder, printing type supported over the frame adjacent the path of the tape, a wedge having a flat surface adjacent the path of the tape opposite the type, an impact wedge operable by the trigger to move the said wedge and the tape against the type, gripping means operable by the trigger to advance the tape and to separate the adhesive layer from the cover layer, a pressure foot carried by the frame adjacent the path of the adhesive, and means to sever the adhesive layer as pressure is applied thereto by the pressure foot.

5. A labelling gun for the application of adhesive tape having a plurality of layers of which one bears pressure-sensitive adhesive and another covers the adhesive until use, comprising a frame, a grip, and a trigger, a tape supply holder, guide means on the frame for a strip of tape from the holder, gripping means operable by the trigger to advance the tape and to separate the adhesive layer from the cover layer including a pair of rollers driven by the trigger and gripping the adhesive layer, means to separate the cover layer from the adhesive layer, the surface of the roller engaging the exposed adhesive being grooved and knurled, a pressure foot carried by the frame adjacent the path of the adhesive layer, and means to sever the adhesive layer as pressure is applied thereto by the pressure foot.

6. In labelling apparatus a driving member movable linearly, a driven member movable circularly, a driving mechanism connecting said members including a gear driven by the driving member, a clutch having a part moved by said gear and another part connected to the driven member, and means moved by the driving member to bring the parts of the clutch into engagement.

7. A labelling apparatus including means to move a strip of tape, printing type adjacent the path of the strip of tape, a wedge shaped platen adjacent the tape opposite the type, and impact means to force the tape into printing relation to the type comprising a spring loaded wedge and means to release the spring to drive the wedge against the platen.

8. Labelling apparatus including tape advancing means, and means to drive said tape advancing means including a rack and pinion, means to transmit the motion of the pinion to the advancing means, a clutch in said motion transmitting means, cam means operable by the rack, and clutch engaging means connected to said clutch comprising cam follower means operable by said cam means.

9. Labelling apparatus including means to hold a roll of adhesive tape, and means to grip and advance the tape including a pair of gripping rollers, one of said rollers having a sharply pointed pyramidal knurled surface, divided in small knurled areas by grooves, for contact with the adhesive, and means to drive said rollers.

10. A labelling machine for the printing of tape having a plurality of layers of which one bears pressure sensitive adhesive and another covers the adhesive until use, and for the separation of labels from the tape and their application to an object, comprising a frame, a tape holder mounted on the frame, tape advancing and layer separating means supported by the frame, tape printing means supported by the frame, a trigger carried by the frame, motion transmitting means energizing the advancing, printing, and separating means from the trigger, label applying means comprising a retractable pressure foot held by spring means in position to support and apply the tape, and cutter means activated by the retraction of the foot during the application of a label to separate the label from the tape.

11. The machine of claim 10 in which the frame comprises a barrel, and a grip adjacent the trigger.

12. The machine of claim 10 in which the advancing and separating means comprises a pair of rollers between which the tape passes and rollers in gripping engagement with said rollers.

13. The machine of claim 10 in which the advancing and separating means comprises a pair of gripping rollers for each of the said layers of the tape, said pairs of rollers being slightly separated a distance greater than the thickness of the tape.

14. The machine of claim 10 in which the motion transmitting means comprises means to vary the distance the tape is moved by the motion of the trigger.

15. The machine of claim 10 in which the adhesive face of the tape makes contact with a grip-

ping roller having circumferential grooves and sharply pointed, pyramidal knurling between the grooves.

16. The machine of claim 10 comprising a tape guide for the adhesive layer having a flat portion adjacent one side of the layer and staggered, spaced finger points normal to the adhesive side.

17. The machine of claim 10 in which the cutter means comprises shears having a blade with an opening to receive the tape and an internal knife edge, and a cooperating blade, said blades being activated by motion of the pressure foot.

18. A labelling machine for the printing of tape having a plurality of layers of which one bears pressure sensitive adhesive and another covers the adhesive until use, and for the separation of labels from the tape and their application to an object, comprising a frame, a tape holder mounted on the frame, tape advancing and layer separating means supported by the frame, tape printing means supported by the frame, power means for the apparatus comprising a linearly movable element supported by the frame, motion transmitting means operatively connecting the linearly movable element with the advancing, printing and separating means, label applying means comprising a retractable pressure foot held by spring means in position to support and apply the tape, and cutter means activated by the retraction of the foot during the application of a label to separate the label from the tape.

19. A labelling machine including, in sequential association tape supply means, tape printing means, tape severing means, and tape applying means having a face for pressing the tape against an object, means to guide the tape from the said supply means along a route to the said means in sequence, means to move the tape intermittently along said route to form tickets of selected length, means associated with said moving means to activate said printing means to print said tickets, and energizing means connected to and operated by said applying means as the tape is pressed against an object to activate said severing means.

20. The machine of claim 19 in which the said parts are mounted in sequence on a frame and are open to the tape from one side of the frame.

21. The machine of claim 19 in which the tape is comprised of plies, and the tape moving means includes a pair of spaced rollers between which the tape is received, each said roller being in gripping association with other rollers which are more widely spaced from each other, each pair of gripping rollers gripping a ply of the tape to separate the plies and being driven by said means to move.

22. The machine of claim 19 in which the said face is comprised of a resilient pad having an angularly arranged portion, and said applying means includes means to flatten the angularly arranged portion of said pad against the object in applying the ticket.

23. Labelling apparatus including a holder and tape advancing means adaptable to handling adhesive coated tape including a pair of tape gripping rollers of which one has tape-engaging, circumferential lands spaced by intervening circumferential grooves, said lands having sharp pointed knurling for engaging the adhesive coat of said tape, a flat guide paralleling the path of the tape where it issues from between the gripping rollers, and a pronged guide with staggered prongs on the said adhesive coated side of the tape, the longitudinal axes of the ends of the prongs whereof are approximately normal to the adhesive surface of the tape.

24. Labelling apparatus including roller means to move a strip of adhesive tape, and prong guide means having a plurality of prong like teeth beyond the roller, the points of said teeth being adjacent the adhesive side of said tape and the ends of the prongs being aligned approximately normal to the adhesive side of the tape.

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