Sept. 21, 1926. 1,600,937

A. M. ENGLISH

HAND SEALING MACHINE

Filed August 31, 1922 4 Sheets-Sheet 1

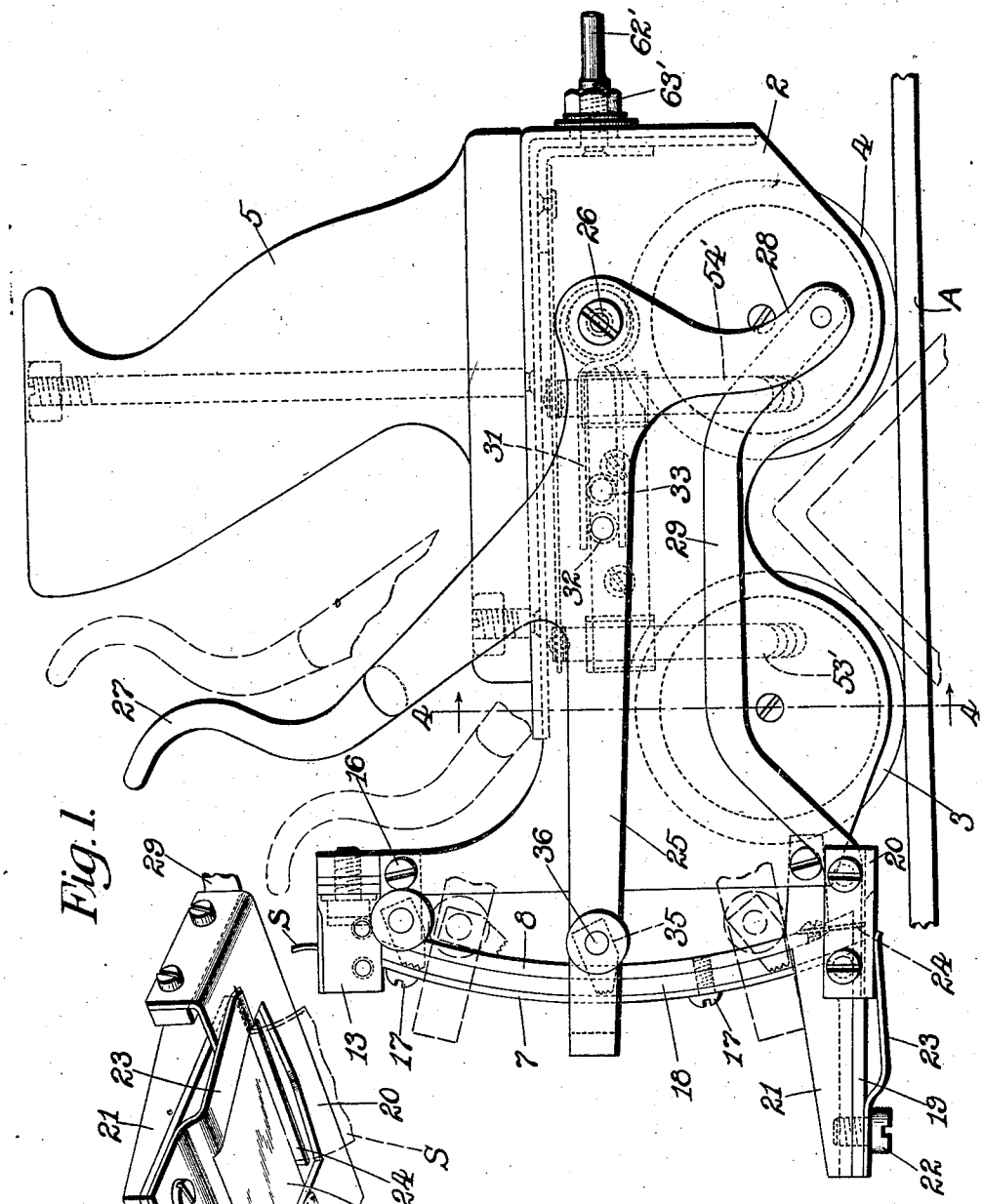


Fig. 1.

Fig. 6.

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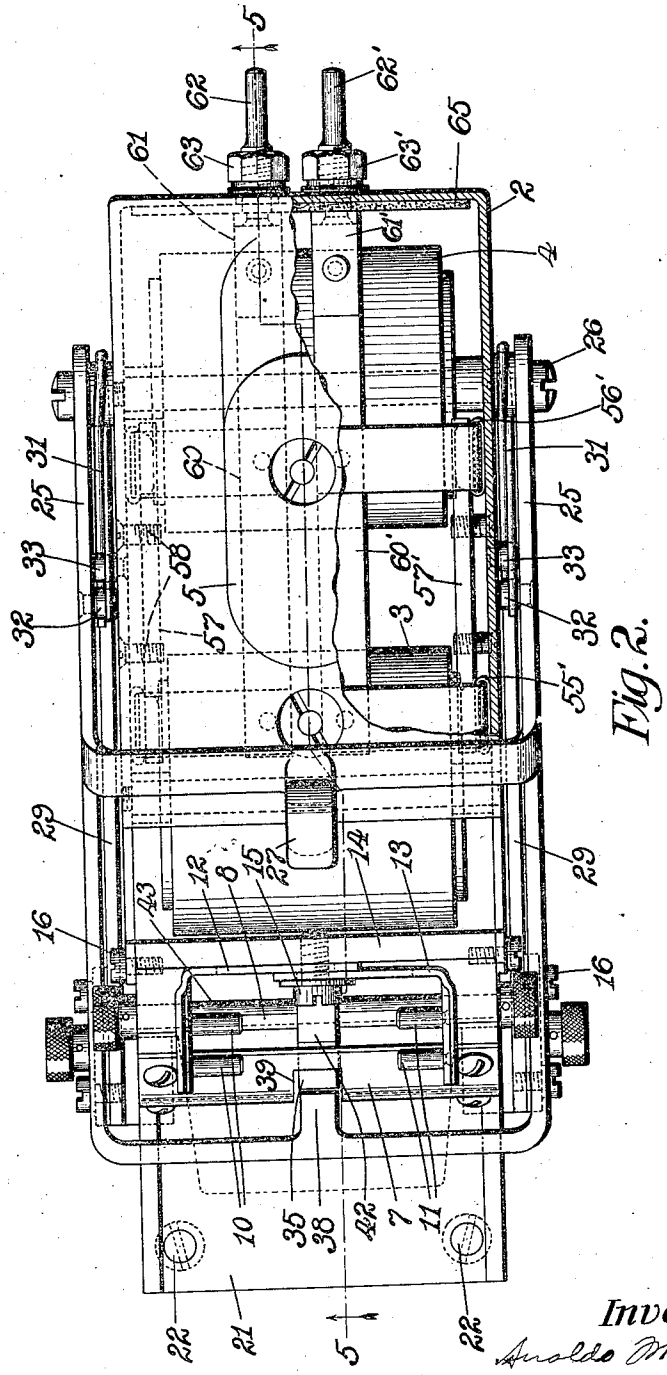


Fig. 2.

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Fig. 3.

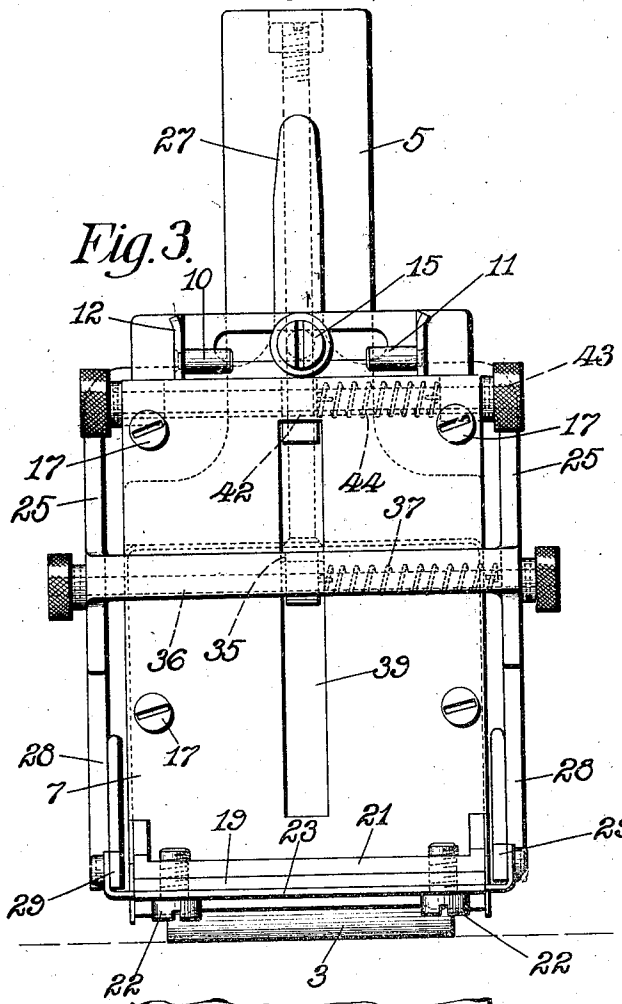
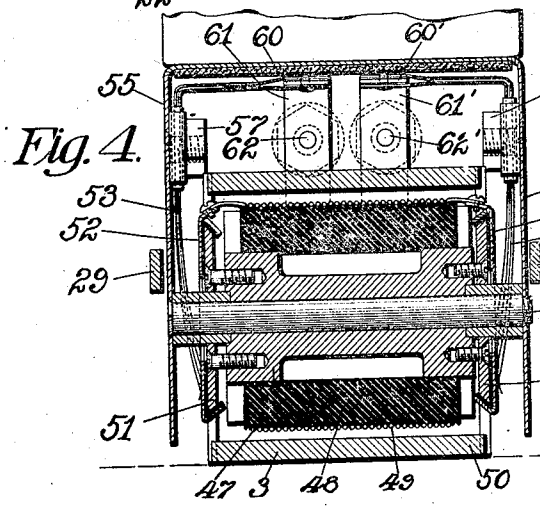


Fig. 4.



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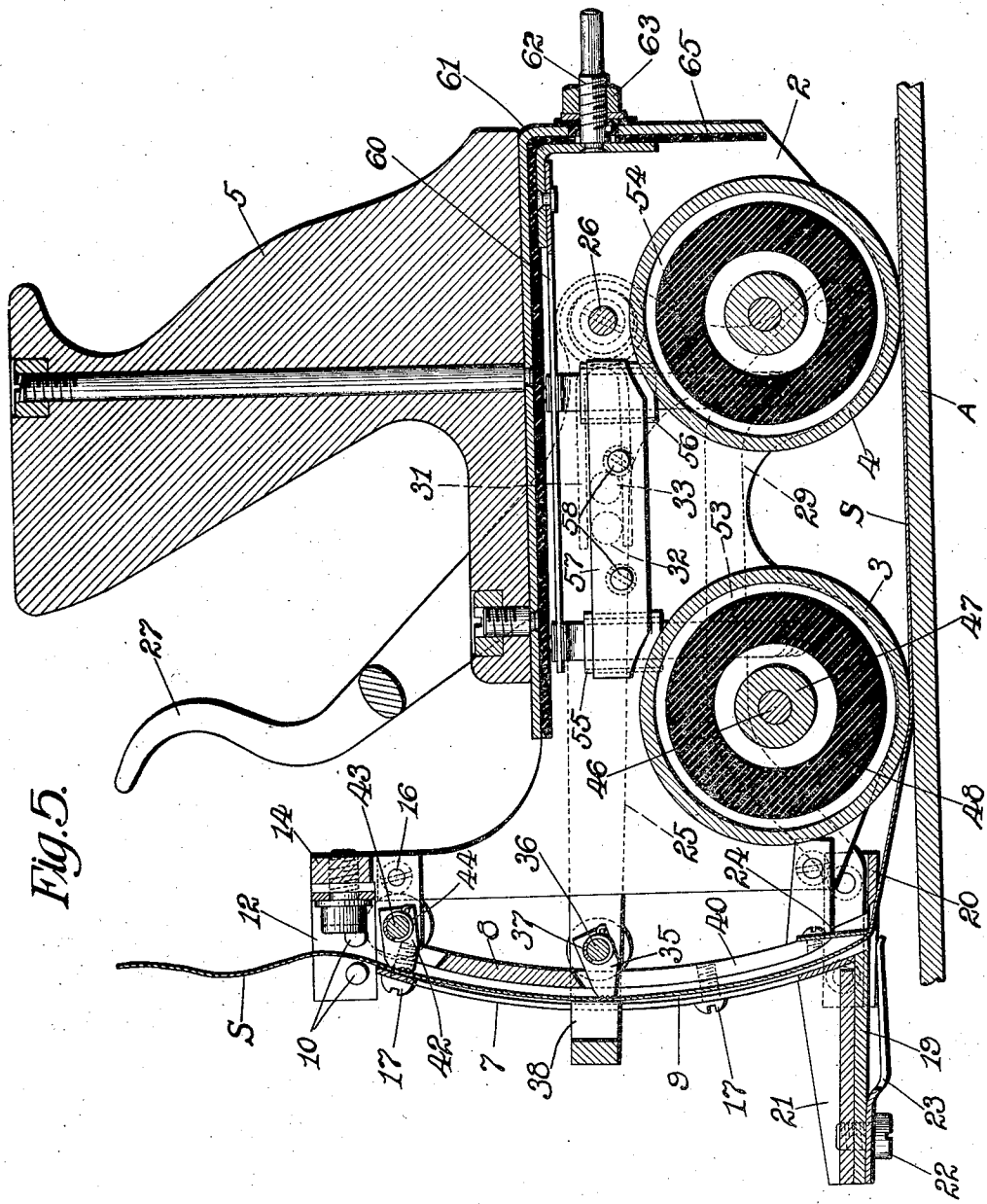


Fig. 5.

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UNITED STATES PATENT OFFICE.

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HAND SEALING MACHINE.

Application filed August 31, 1922. Serial No. 585,485.

This invention relates to machines for applying sealing tape to cartons, boxes, packages, and the like, and it will be herein disclosed as embodied in a hand machine for applying sealing tape coated with an adhesive which is not tacky or sticky at normal temperatures but becomes sticky when heated to a point somewhat above normal temperatures. It is contemplated, however, that certain features of the invention may be used in machines of other types and that such machines may be designed to handle either tape of the character mentioned or other forms of sealing tape.

The invention has for its chief object to devise a machine of the character indicated with which any desired length of sealing tape may be applied, which will be convenient to use, economical to manufacture, which will apply the tape to packages of various shapes and around edges, if desired, and which generally will satisfy the practical requirements of a machine of this character.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a side elevation of a hand sealing machine embodying the invention in the form at present preferred;

Fig. 2 is a plan view of the machine shown in Fig. 1, the frame being broken away in places to show the parts contained therein;

Fig. 3 is a front elevation of the machine shown in Figs. 1 and 2;

Fig. 4 is a cross sectional view on the line 4—4, Fig. 1;

Fig. 5 is a cross sectional view on the line 5—5, Fig. 2; and

Fig. 6 is a perspective view of the cutter and adjacent parts.

The machine shown comprises a casing or frame 2 supporting the operating parts of the machine, and front and rear rolls 3 and 4, respectively, which are mounted in the casing and support it. A handle 5 is secured to the top of the frame 2 and is made like the hand grip used on planes and similar tools, so that it may be conveniently grasped to push the machine.

At the front of the machine two curved plates 7 and 8, respectively, Fig. 5, are secured to the frame 2, these plates being spaced apart to provide a guideway 9 between them through which the strip S of sealing tape is led. It is contemplated that the source of supply of sealing tape will consist of a large roll supported on trunnions mounted above the machine, and that the strip of tape will be drawn from this supply and inserted in the guideway 9. The tape is led into the upper end of the guideway between two pairs of pins designated at 10 and 11, respectively, Figs. 2, 3 and 5, the pins 10 being secured in an L-shaped plate 12, while the pins 11 are secured in a similar plate 13. The bases of the two plates are overlapped and fastened securely to a bar 14 by means of a screw 15 projecting through slots in said bases whereby the plates may be adjusted toward and from each other. The bar 14 is integral with the plate 8 and is secured to the two side members of the frame or casing 2 at the forward end thereof by screws 16—16. Several screws 17 tapped into the plate 8 secure the front plate 7 in position, a strip 18, Fig. 1, being interposed between the plates 7 and 8 at each side of the machine to hold them properly spaced from each other.

The guideway 9 extends to a point in front of and adjacent to the lower edge of the foremost roll 3, and the strip S is fed through the guideway, when the machine is moving forward, due to the fact that it is progressively pressed against the article to which it is to be affixed by the rolls 3 and 4.

Referring to Fig. 5, it will be obvious that as the machine is moved forward over the surface of the carton or other article A, the tape S will be drawn through the guideway 9 due to the relative movement of the machine and the carton.

When the desired length of tape has been applied to the carton it must be severed, and for this purpose a cutting device has been provided at the lower end of the guideway 9. This device comprises a stationary blade 19, Figs. 5 and 6, and a reciprocating knife 20. The machine frame is provided at this point with an extension 21, and the knife 20 consists of a U-shaped bar embracing the extension 21 and having a V-shaped cutting edge formed thereon. The station-

ary blade 19 is fastened to the lower side of the extension 21 by means of screws 22—22, and these screws also secured in position a spring 23 having fingers that press the cutter 20 against the lower face of the blade 19. A plate 24, Fig. 5, secured transversely across the lower end of the guideway holds the strip of tape S normally out of contact with the cutter 20.

For the purpose of operating the cutter, a U-shaped lever 25 which embraces the frame 2 is pivoted to said frame on a stud 26 that extends through the frame from side to side. An extension 27 of this lever projects upwardly in front of and closely adjacent to the hand grip 5 in convenient position to be reached by the fingers of the hand that grasps the grip 5. Additional extensions 28—28, Fig. 1, of this lever extend downwardly at each side of the machine and are connected by links 29—29 to the opposite sides of the cutter 20. Consequently, when the finger piece 27 of the lever 25 is moved backwardly toward the hand grip 5 the cutter 20 will be moved forward past the edge of the blade 19, thus severing the strip S. Due to the V-shaped notch in the blade 20 the cutting operation on the strip will begin at each side thereof and proceed toward the center of the strip. Any tendency to move the strip in either direction thus is avoided and a clean cut is assured.

In order to return the cutter 20 to its initial position after the strip has been severed, two hairpin springs 31—31 are provided, one at each side of the machine, the coiled portions of these springs encircling the pivot rod 26 and the legs of each spring straddling two pins 32 and 33, respectively. The pins 32 at opposite sides of the machine are secured fast in the lever 25 while the two pins 33 are mounted in the frame 2. The springs 31—31 tend to hold these two pins as closely together as possible and they tend, therefore, to hold the lever 25 in its normal position. Consequently, as soon as the finger piece 27 of the lever is released after the strip has been severed, the springs 31—31 immediately return the lever again to its initial position.

After the sealing strip has been severed in the manner just described it is necessary to advance the end of the strip on the supply side of the cutter into operative relationship to the roll 3 before the feeding of the strip, as above described, can be resumed. This initial strip feeding or advancing operation is performed by means of an auxiliary hand operated feeder comprising a feed dog 35 which is pivotally mounted on a rod 36 having its ends supported in opposite sides of the U-shaped lever 25, as best shown in Figs. 1, 3 and 5. A coiled spring 37 encircling the rod 36 acts on the feed dog 35 with a tendency to rotate it in a clockwise direction, Fig. 5, and thus holds this dog constantly in engagement with the strip S. The central portion of the U-shaped lever 25 has a lug 38 extending inwardly therefrom into a slot 39, Figs. 2 and 3, formed in the front plate 7. This lug is located immediately in front of the feed dog 35 so that the movement of the feed dog 35 by the spring 37 results in pinching the sealing strip between the toothed end of the dog and the rearward face of the lug 38. This will be very clear from an inspection of Fig. 5.

It will now be evident that when the finger piece 27 is moved forward away from the hand grip 5, the parts 35 and 38 will carry the feed strip S downwardly through the groove 9, the dog 35 travelling in a slot 40 formed in the rear plate 8. This feeding movement carries the end of the strip under the roll 3, thus enabling the main tape feeding operation to be resumed in the manner previously described. During the latter operation the sealing strip moves downwardly past the dog 35, tipping the dog in a counter-clockwise direction, Fig. 5, so that it offers no appreciable resistance to the movement of the tape.

When the finger piece 27 is moved backwardly to sever the tape, as above described, the dog 35 is tipped into an inoperative position by its engagement with the plate 8 at the upper end of the slot 40, the dog at this time being moved out of contact with the sealing strip and carried into the upper dotted line position, Fig. 1. As soon as the finger piece 27 has been released, after completing the initial feeding movement of the strip, the springs 31—31 immediately return this member to its normal position again. These springs thus hold the actuating lever 27 normally in an intermediate position. It is moved backward out of this position to sever the strip and forward to feed the strip, but it is returned again to its intermediate position by the springs as soon as it is released.

There is sometimes a tendency for the sealing strip to pull backwardly out of the slot 9, and in order to prevent such a retrograde movement a dog 42, similar to the dog 35, is mounted on a stationary rod 43 supported in the side pieces at the upper end of the plate 8. A spring 44, Fig. 3, coiled about the rod 43, acts on the dog to hold it in contact with the sealing tape S. When the tape tends to move backward, the dog 42 presses the strip against the portion of the plate 7 at the upper end of the slot 39, as clearly shown in Fig. 5, and thus effectually prevents any retrograde movement.

As above stated, this machine is designed especially to handle sealing tape coated with an adhesive which is not sticky or tacky at ordinary temperatures but which must be

heated in order to render it tacky. The machine shown, therefore, includes means for electrically heating the rolls 3 and 4.

Referring to Fig. 4, it will be seen that the roll 3 is mounted on a stationary shaft 46 which is supported in the opposite side members of the frame or casing 2. This roll comprises a central body 47 mounted to rotate freely on the shaft 46 and carrying an insulating cylinder 48 made of soap stone, lava, or any other suitable material. This insulating body has a spiral groove cut in its surface, in which is wound a high resistance wire 49 of any suitable composition. The walls of the grooves hold the adjacent turns of wire out of contact with each other. A metal shell 50 encircles the insulator 48 and is held in properly spaced relationship thereto by means of end pieces 51—51′ screwed thereto and having holes therein through which the ends of the resistance wire are led. Mounted on these end pieces 51—51′ but insulated therefrom are two annular metal plates 52—52′ to which, respectively, the terminal wires of the coil 49 are connected. Brushes 53—53′ of conducting material bear against the flat rings 52—52′, respectively.

The construction of the rear roll 4 is exactly like that just described. A pair of brushes 54—54′ bear against the opposite ends of this roll.

The shanks of the two brushes 53 and 54 are encircled by insulating sleeves 55 and 56, Figs. 4 and 5, and they are clamped against the side of the casing 2 by means of a bar 57 which bears against the insulating sleeves 55 and 56, this bar being drawn toward the sides of the casing by means of screws 58—58, Fig. 2. Above the insulating sleeves 55 and 56 the shanks of the brushes 53 and 54 are bent inwardly (see Fig. 4) and are both connected to a metal bar or strip 60 which is riveted to an L-shaped strip 61 secured fast to the casing 2 by means of a terminal stud 62 having a nut 63 threaded thereon, as clearly shown in Fig. 2. The same construction is used at the opposite side of the machine, the parts being designated by primed numerals corresponding to those used for like parts in the foregoing description. All these conductors are effectually insulated from the casing 2 by an insulating strip 65 and by suitable insulating washers used at the points where the studs 62 and 61 extend through the casing.

Current is led to the machine from any suitable source, the terminals 62 and 62′ being adapted to receive an electrical connector of the ordinary commercial form. Assuming for the moment that the terminal stud 62 is positive, current will flow from this member to the parts 61 and 60 and the brushes 53 and 54, and thence through the heating coils 49 of the two rolls 3 and 4 to the brushes 53′ and 54′ at the opposite ends of the rolls. From these brushes the current will be conducted to the strip 60′ and thence through the part 61′ to the opposite terminal stud 62′. This arrangement has the advantage of heating the rolls 3 and 4 with practically no danger of electrical troubles, the parts all being of sturdy and substantial construction, well insulated, and the conductors of opposite polarity being well spaced from each other.

In using the machine the sealing strip S is first inserted properly in the groove 9, the machine is placed on the carton or other article to which the strip is to be affixed, and the feeding of the strip is initiated by pushing the finger piece 27 forward away from the handle 5. This forces the end of the strip of tape down under the forward roll 3. The operator next pushes the machine forward, thus causing the roll 3 to press the sealing strip against the carton. As he continues to move the machine forward, the sealing strip is drawn from the source of supply and is progressively pressed against the carton by the rolls 3 and 4, the heat of these rolls softening the adhesive on the sealing strip and rendering it tacky so that it adheres firmly to the carton. The pressure of the rolls of course increases this adhesion. As soon as substantially the desired length of tape has been applied the workman pulls the finger piece 27 backwardly, thus operating the cutter and severing the strip just in front of the roll 3. The machine preferably is moved forward until the rear roll 4 has passed over the end of the strip so that it is securely united to the carton. The operations are then repeated on the next carton or other article to be sealed.

It will be appreciated that the invention provides a machine which is very convenient to use, is economical to manufacture, and which is especially adapted to the applying of indeterminate lengths of sealing tape to cartons or packages of various shapes and sizes. The fact that the rolls 3 and 4 are spaced apart, and that the frame or casing 2 is cut away between them, as best shown in Fig. 1, enables the machine to apply tape across the edge of a carton or similar article. This is particularly advantageous in sealing cartons having two flaps that meet in the middle of one side, since it is desirable, after uniting the flaps with tape, to extend the sealing tape for a distance at each end of the carton.

The sealing of cartons has been particularly mentioned herein because an important use of this machine is in the sealing of the fibre board or pasteboard cartons which are now widely used in place of wooden boxes for the purpose of shipping goods of various kinds. It is especially desirable that these boxes be sealed with an adhesive, such

as that mentioned above, which is not soluble in water, particularly if the shipment is to be made by boat, since otherwise the carton may become unsealed due to the action of atmospheric moisture on the adhesive coating of the sealing strip. The use of a waterproof sealing strip also has the further advantage of making it very difficult to open a box or container without leaving behind evidence that it has been opened.

It will be understood, however, that the machine is adapted for other uses and that many features of the invention may be embodied in machines differing substantially from that shown without departing from the spirit or scope of the invention.

Having thus described my invention, what I desire to claim as new is:

1. In a machine for applying sealing tape to articles, the combination of a frame, a roll supported in said frame, means for guiding a strip of sealing tape into position to be pressed by said roll against the article to which the tape is to be affixed, a heated device behind said roll for pressing said tape against said article, means for severing the tape in front of said roll, and means operative independently of said roll for advancing tape from the supply side of said severing means into operative relationship to said roll after the severing operation has been performed.

2. In a machine for applying sealing tape to articles, the combination of a frame, a roll supported in said frame, means for guiding a strip of sealing tape into position to be pressed by said roll against the article to which the tape is to be affixed, whereby the tape is drawn from the supply by the relative movement of the machine and said article, means behind said roll for pressing said tape against said article, means for severing the tape in front of said roll, means for advancing tape from the supply side of said severing means into operative relationship to said roll after the severing operation has been performed, and a common actuator for said severing and advancing means.

3. In a machine for applying sealing tape to articles, the combination of means operative through the relative movement of the machine and the article to which the tape is to be affixed for drawing the tape from a source of supply, a cutter for severing said tape, a feeder operative after the tape has been severed to advance the strip of tape from the supply side of the cutter into position to resume said drawing operation, and a common actuator for said feeder and cutter.

4. In a machine for applying sealing tape to articles, the combination of means operative through the relative movement of the machine and the article to which the tape is to be affixed for drawing the tape from a source of supply, a cutter for severing said tape, a feeder operative after the tape has been severed to advancing the strip of tape from the supply side of the cutter into position to resume said drawing operation, a device movable in one direction to operate said feeder and in the opposite direction to operate said cutter, and a spring for normally holding said device in an intermediate position.

5. In a hand machine for applying sealing tape in indeterminate lengths to articles, the combination of a frame, a pair of rolls mounted in said frame and supporting it, said rolls being arranged one in advance of the other and serving to press the tape against the surface of the article to which it is to be affixed, a hand grip carried by said frame, and means for guiding a strip of sealing tape into operative relationship to the foremost roll.

6. In a hand machine for applying sealing tape in indeterminate lengths to articles, the combination of a frame, a pair of rolls mounted one in advance of the other in said frame and supporting the frame, said rolls serving to press the tape against the surface of the article to which it is to be affixed, a hand grip carried by said frame, means for guiding a strip of sealing tape into a position in front of and adjacent to the lower edge of the foremost roll, a cutter for severing the tape in front of said foremost roll, and means for advancing the strip of tape from the supply side of the cutter into operative relationship to said foremost roll after said severing operation has been performed.

7. In a hand machine for applying sealing tape in indeterminate lengths to articles, the combination of a frame, a pair of rolls mounted one in advance of the other in said frame and supporting the frame, said rolls serving to press the tape against the surface of the article to which it is to be affixed, a hand grip carried by said frame, means for guiding a strip of sealing tape into a position in front of and adjacent to the lower edge of the foremost roll, a reciprocating cutter for severing the tape at a point in advance of said foremost roll, a reciprocating feeder for advancing the strip of tape from the supply side of the cutter after said strip has been severed by said cutter, and a single actuator for both said cutter and feeder.

8. In a hand machine for applying sealing tape in indeterminate lengths to articles, the combination of a frame, a pair of rolls mounted one in advance of the other in said frame and supporting the frame, said rolls serving to press the tape against the surface of the article to which it is to be affixed, a hand grip carried by said frame, means for guiding a strip of sealing tape into a position in front of and adjacent to the lower

edge of the foremost roll, a reciprocating cutter for severing the tape at a point in advance of said foremost roll, a reciprocating feeder for advancing the strip of tape from the supply side of the cutter after said strip has been severed by said cutter, a lever mounted adjacent to said hand grip and movable in one direction to actuate said feeder and in the opposite direction to actuate said cutter, and a spring for holding said lever normally in an intermediate position.

9. In a hand machine for applying sealing tape in indeterminate lengths to articles, the combination of a frame, a pair of rolls mounted one in advance of the other in said frame and supporting the frame, said rolls serving to press the tape against the surface of the article to which it is to be affixed, a hand grip carried by said frame, means for guiding a strip of sealing tape into operative relationship to the foremost roll, means for electrically heating at least one of said rolls, a cutter for severing the tape in front of said foremost roll, and means for advancing tape from the supply into operative relationship to said foremost roll after said cutter has severed the tape.

10. In a hand machine for applying sealing tape in indeterminate lengths to articles, the combination of a frame, a pair of rolls mounted one in advance of the other in said frame and supporting the frame, said rolls serving to press the tape against the surface of the article to which it is to be affixed, a hand grip carried by said frame, means for guiding a strip of sealing tape into operative relationship to the foremost roll, a cutter for severing the tape in front of said foremost roll, means for advancing tape from the supply into operative relationship to said foremost roll after said cutter has severed the tape, an electric heating unit in each of said rolls, and means for conducting current to and from said units including sliding connections at the ends of the rolls.

11. In a hand machine for applying sealing tape in indeterminate lengths to articles, the combination of a frame, a pair of rolls mounted one in advance of the other in said frame and supporting the frame, said rolls serving to press the tape against the surface of the article to which it is to be affixed, a hand grip carried by said frame, means for guiding a strip of sealing tape into operative relationship to the foremost roll, an electric heater in one of said rolls, conductors leading from said heater to opposite ends of the latter roll, and electric conductors supported in said frame at opposite sides thereof for conducting current to and from the last mentioned roll, said conductors including brushes bearing against the opposite ends of said roll.

12. In a hand machine for applying sealing tape in indeterminate lengths to articles, the combination of a frame, a roll supported in said frame, means for guiding a strip of sealing tape into position to be pressed by said roll against the article to which the tape is to be affixed, whereby the tape may be drawn from the supply by the relative movement of the machine and said article, a hand grip carried by said frame, cutting mechanism for severing the tape in front of said roll, an auxiliary tape feeding device arranged to advance the tape from the supply side of said cutting mechanism into operative relationship to said roll after the tape has been severed, and a lever adjacent to said hand grip for manually operating said auxiliary tape feed.

13. In a hand machine for applying sealing tape in indeterminate lengths to articles, the combination of a frame, a hand grip carried by said frame, two rolls spaced apart by a substantial distance and located one in advance of the other, two shafts supported by said frame and supporting said rolls, respectively, for rotation about axes fixed with reference to the frame, means for guiding a strip of sealing tape into operative relationship to the foremost roll, whereby said rolls are operative to press said strip of tape against the article to which it is to be affixed, and cutting mechanism for severing the tape in front of said foremost roll, said frame being shaped to permit the free entrance of an edge of a carton between said rolls, whereby the machine may be used to apply tape across the edge of a carton or similar article.

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