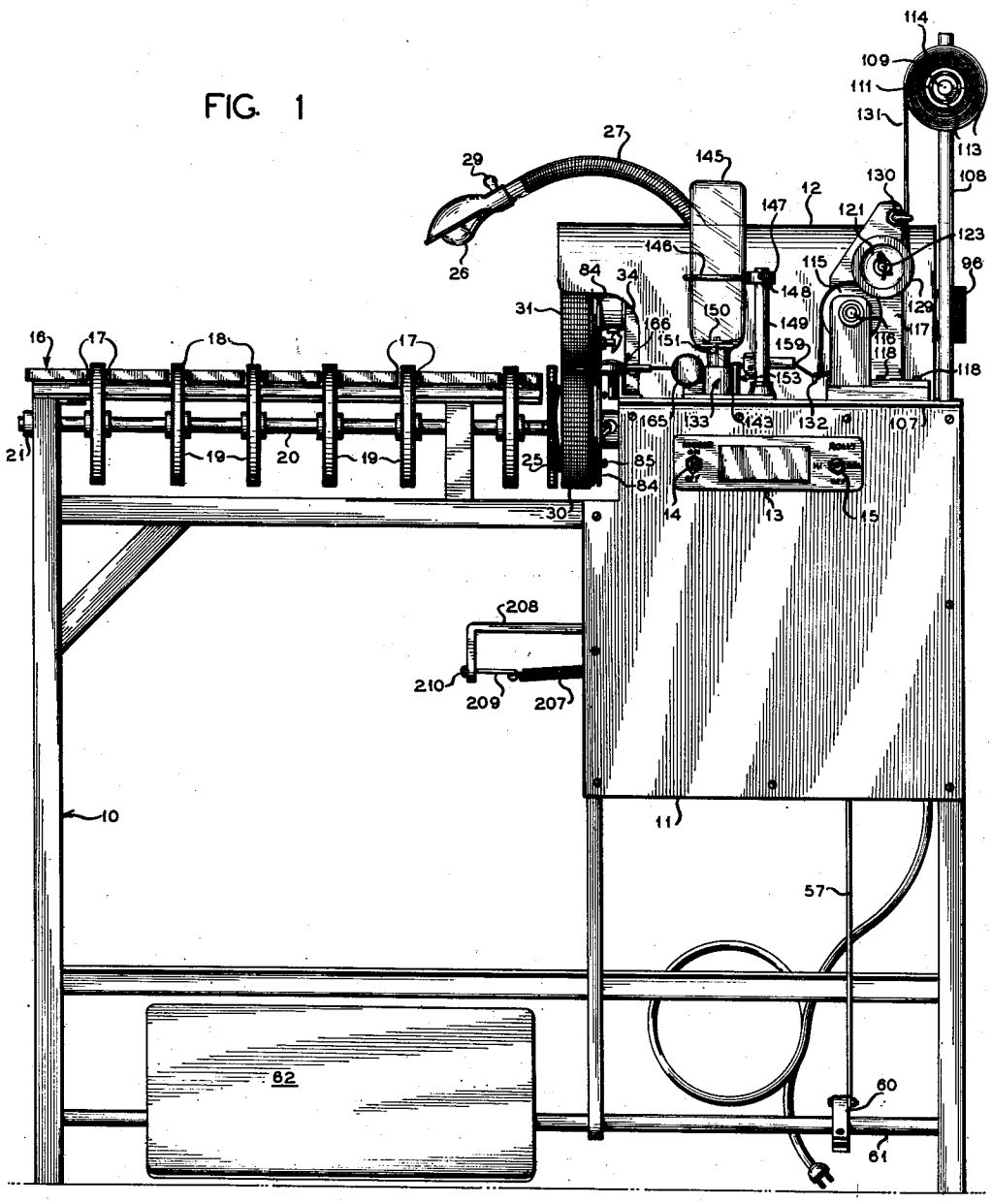
Sept. 23, 1952 J. M. HUMPHREY ET AL 2,611,725

HEAT SEAMER

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FIG. 1



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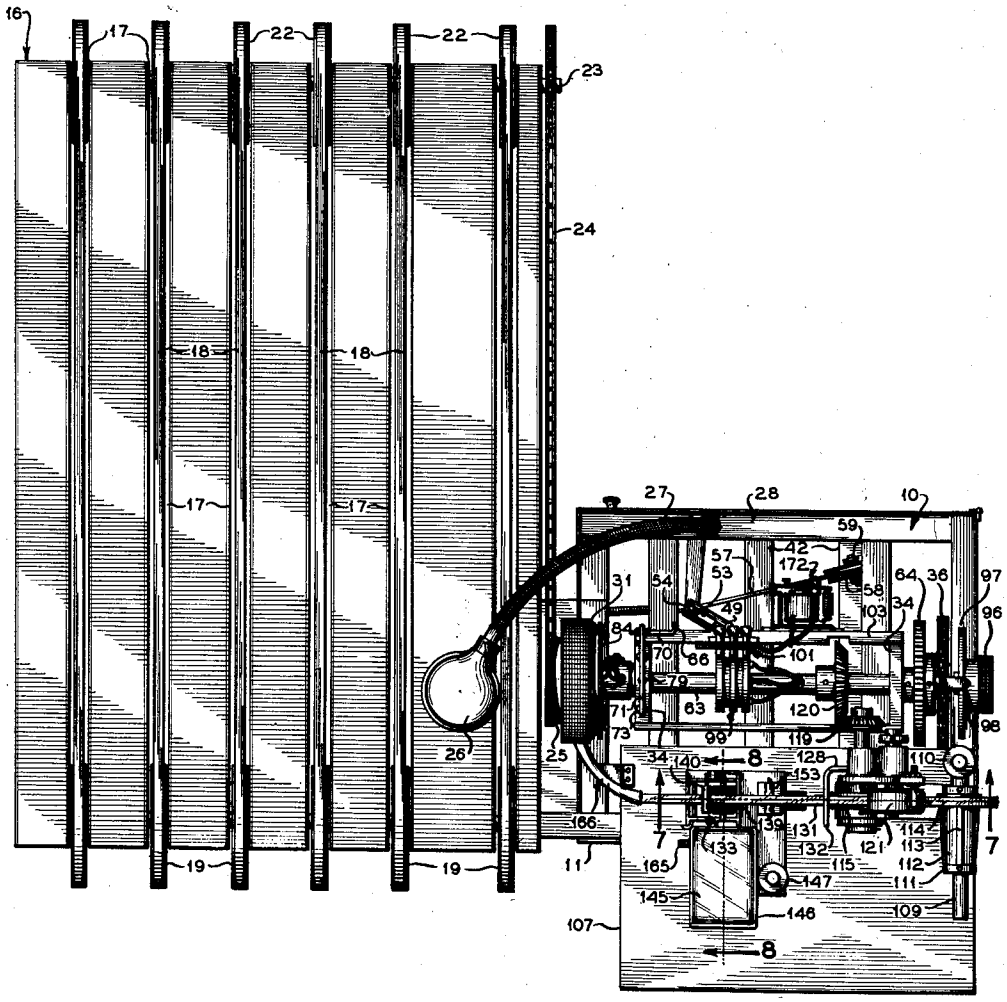
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FIG. 2



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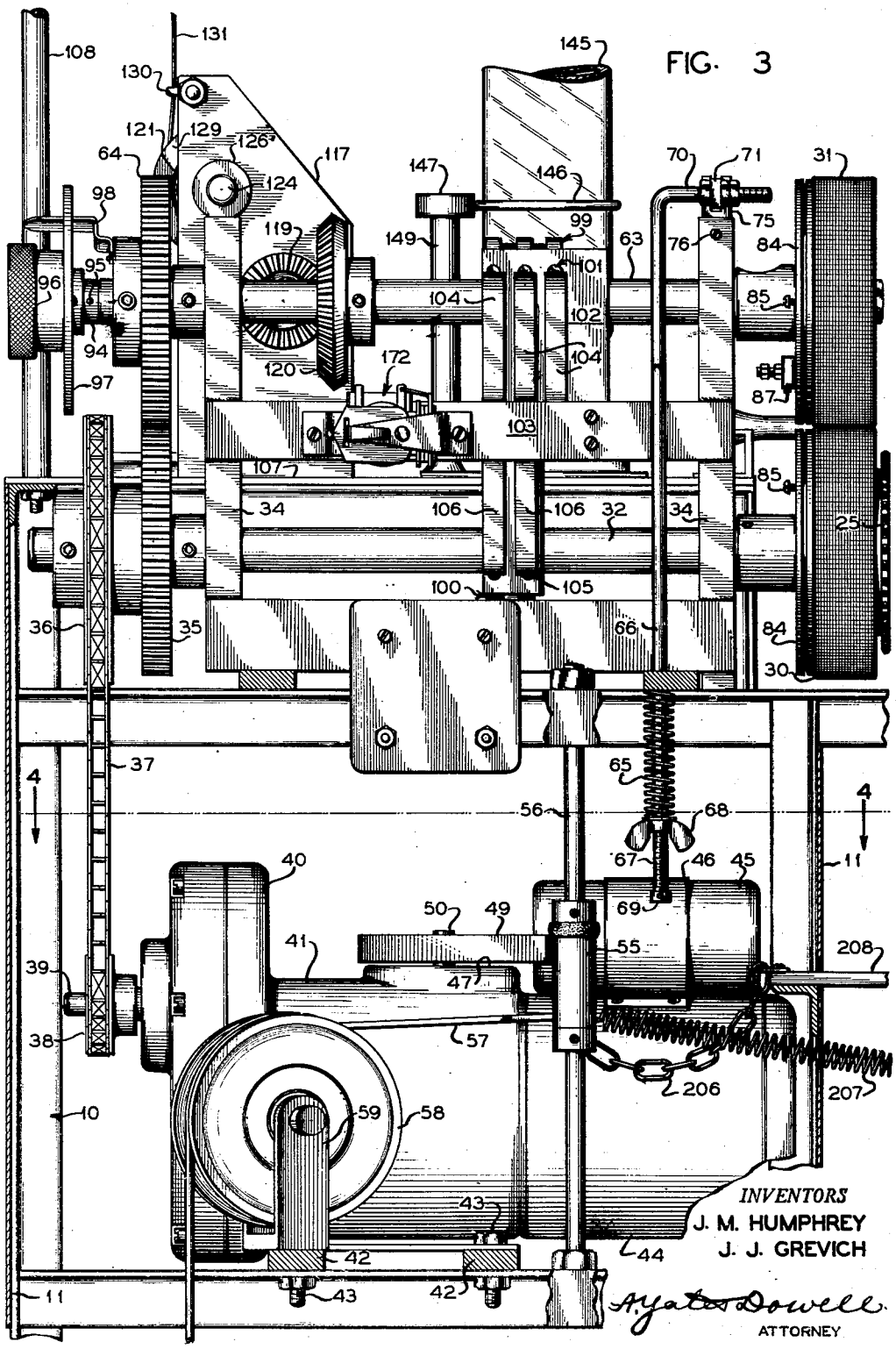
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FIG. 3



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FIG. 4

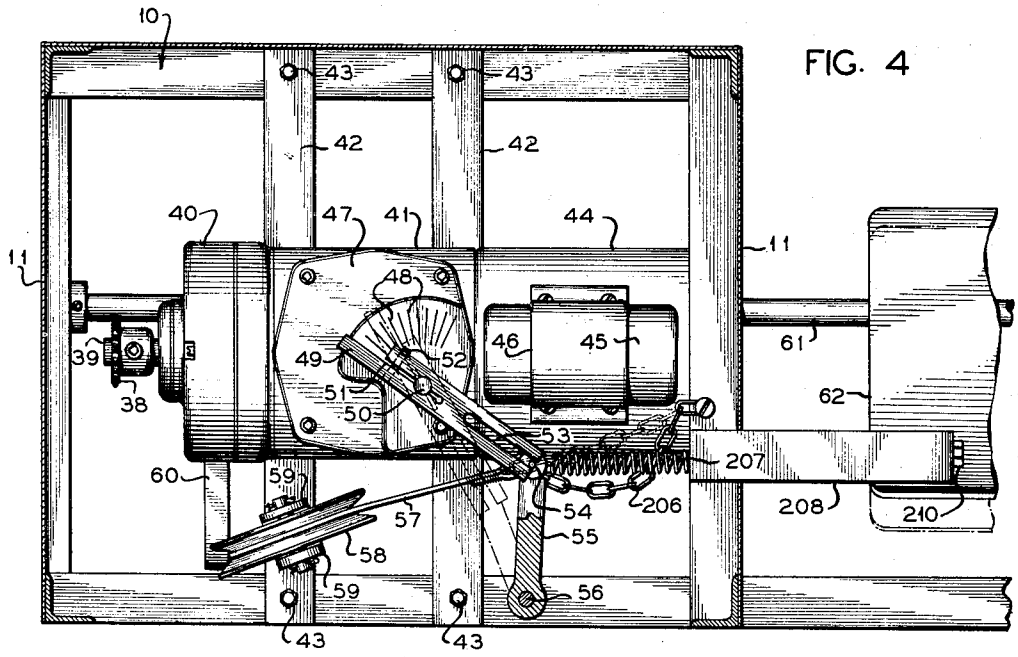


FIG. 5

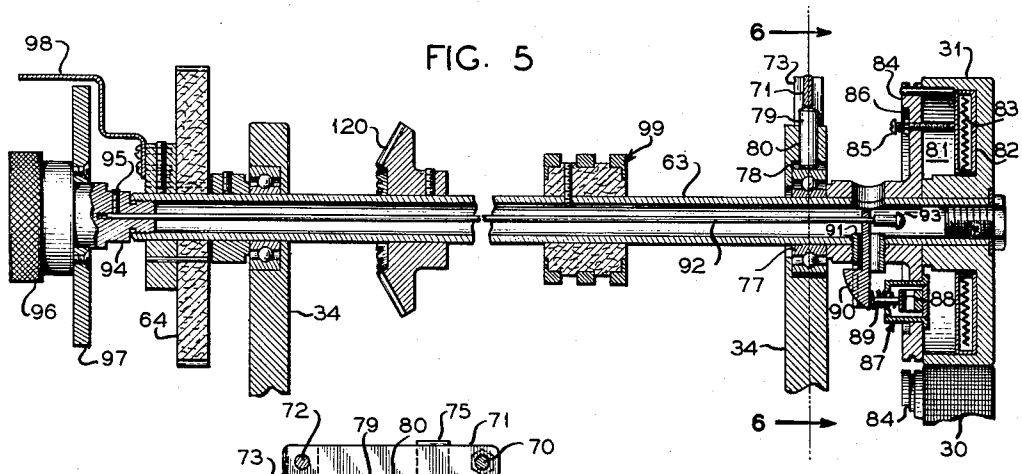
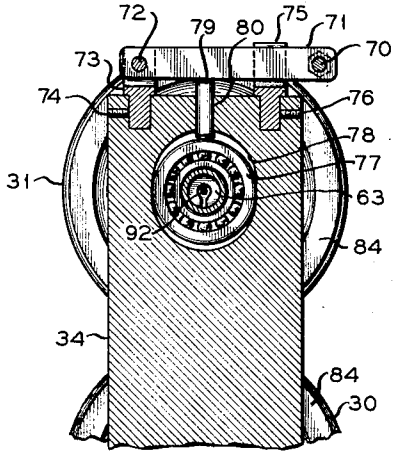


FIG. 6



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FIG. 10

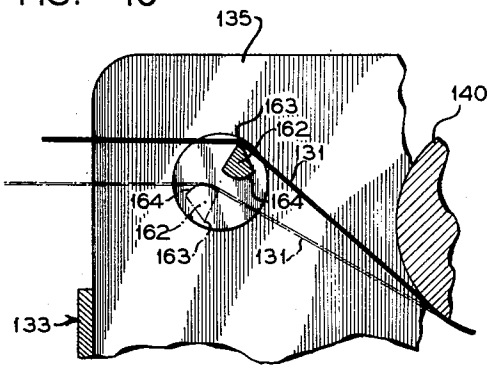
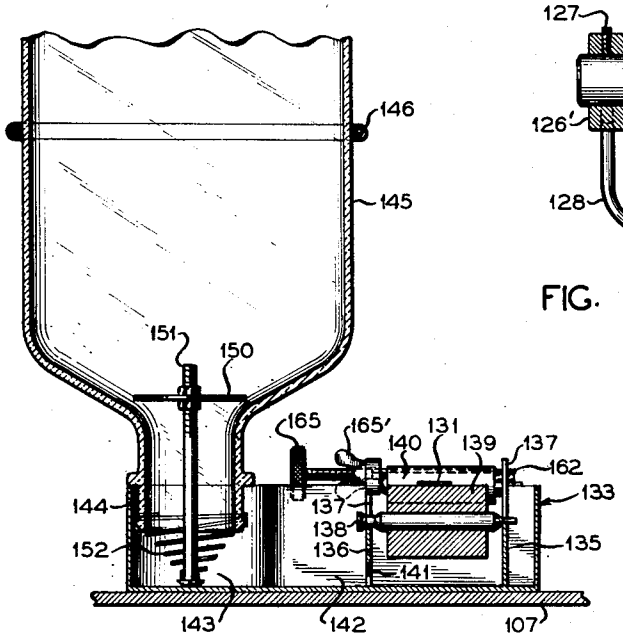


FIG. 7

FIG. 8



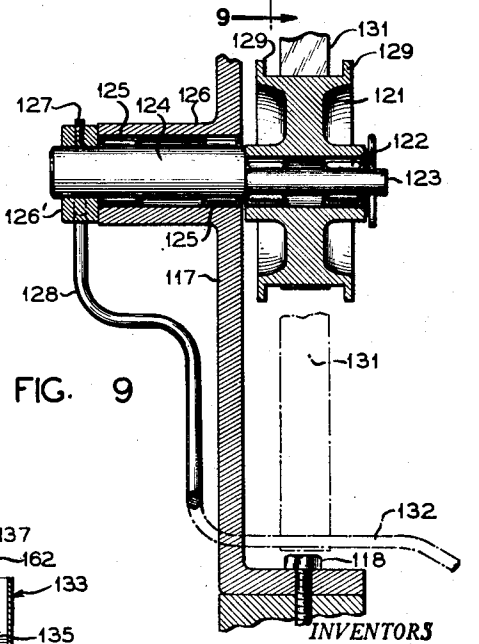


FIG. 9

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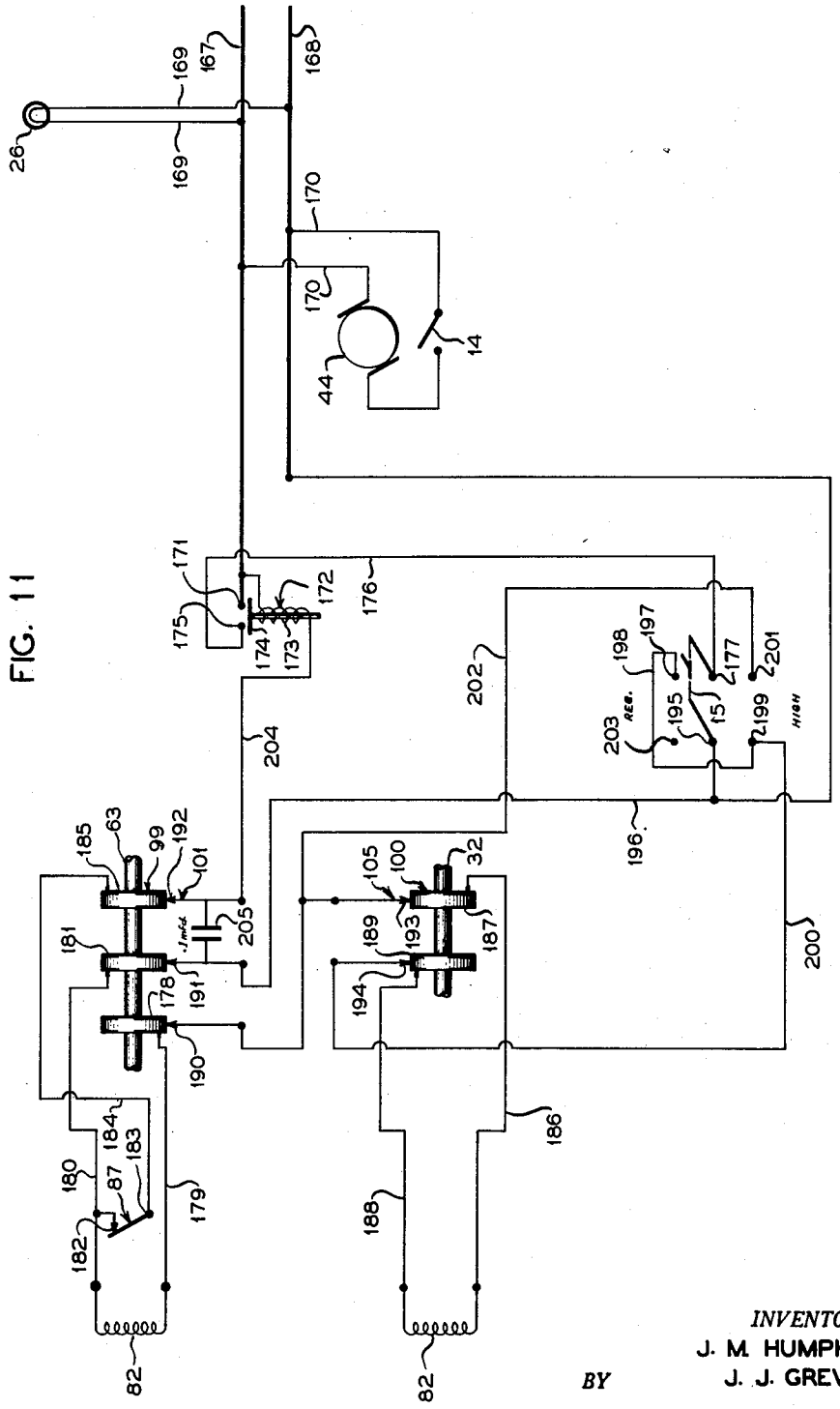
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FIG. 11



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Patented Sept. 23, 1952

2,611,725

UNITED STATES PATENT OFFICE

2,611,725

HEAT SEAMER

James M. Humphrey, New Richmond, Wis., and John Joseph Grevich, St. Paul, Minn., assignors, by mesne assignments, to Harris Trust and Savings Bank and W. H. Milsted, as trustees

Application October 16, 1950, Serial No. 190,391

20 Claims. (Cl. 154—42.3)

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This invention relates to sealing and more particularly to a machine for providing a seam on thermoplastic articles or for forming a continuous sheet of such material from a plurality of sheets thereof and in which the seam may be provided with a binding strip if desired. This application is a continuation in part of copending application, Serial No. 715,576, filed December 11, 1946 which has resulted in U. S. Patent No. 2,554,360.

In the forming of seams on thermoplastic materials three main factors are involved, these being time, temperature, and pressure. Many of the sealing machines heretofore utilized provided no means for varying these factors and consequently were only applicable to predetermined types and weights of material. In certain types of seams an added factor may be included by applying a solvent to the materials which assists in forming the seams, and in making this type of seam it is desirable to control the quantity of solvent utilized. Many of the prior art machines were also cumbersome and were also relatively costly to manufacture and in many instances required highly skilled operation.

It is accordingly an object of this invention to provide a simple, inexpensive practical heat seamer of relatively light weight which can be used to efficiently and satisfactorily join sheets or bodies with or without employing a joining or binding strip at the seam and in which the seam will be of the desired strength and of pleasing appearance.

A further object of the invention is to provide a sealing machine which may be operated continuously or intermittently much in the manner of a conventional sewing machine in order to provide a seam on thermoplastic articles or materials.

A further object of the invention is to provide a sealing machine in which the rate of feed of articles or materials between the sealing elements may be very closely controlled in order to control the time factor in the sealing operation.

It is a further object of the invention to provide a sealing machine in which the temperature of the sealing elements may be closely controlled, which temperature may also be varied during the operation of the machine and in which means is further provided to accurately control the pressure between the sealing elements.

A still further object of the invention is to provide a sealing machine in which a thermoplastic tape may be longitudinally folded and fed to the sealing elements in order to provide a binding for

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the seam being formed and in which means is provided to apply a solvent to one side of the tape and to control the amount of solvent applied.

It is a further object of the invention to provide a sealing machine in which thermoplastic tape to form a binding for the seam is supplied from a roll and in which means is provided to pull the tape from the roll and to render this tape-pulling means inoperative when the tape is not being utilized.

It is a further object of the invention to provide a sealing machine which may be economically constructed of readily available parts and which may be operated by relatively unskilled labor.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is an elevational view showing the front or operator's side of the sealing machine of this invention;

Fig. 2, a top plan view of the sealing machine shown in Fig. 1;

Fig. 3, a fragmentary elevational view from opposite side, as shown in Fig. 1, with the housings and covers removed and showing the arrangement of the mechanism in the sealing machine of this invention;

Fig. 4, a fragmentary sectional view on the line 4—4 of Fig. 3 and showing the variable speed drive for feeding material to the sealing machine;

Fig. 5, a longitudinal sectional view showing one of the sealing elements, the drive means therefor, and the means for controlling the temperature of such heating elements;

Fig. 6, a fragmentary sectional view on the line 6—6 of Fig. 5 and showing the means for applying pressure between the sealing elements;

Fig. 7, a sectional view on the line 7—7 of Fig. 2 and showing the means for applying solvent to the binding tape and the tape-pulling means utilized with the machine of this invention;

Fig. 8, a fragmentary sectional view on the line 8—8 of Fig. 2 and showing the means for supplying solvent to the solvent-applying means;

Fig. 9, a fragmentary sectional view on the line 9—9 of Fig. 7 and showing the means for rendering the tape-puller inoperative during periods in which binding tape is not utilized;

Fig. 10, a fragmentary sectional view showing the means for removing excess solvent from the tape; and

Fig. 11, a schematic circuit diagram on the elec-

trical connections utilized in the sealing machine of this invention.

With continued reference to the drawings, there is shown in Fig. 1 a sealing machine constructed in accordance with this invention and having a frame 10 of angle iron or other suitable construction, there being a cover plate 11 secured to the frame 10 and a housing 12 which serve to enclose the moving mechanism. Plate 11 conveniently serves to receive a name plate 13 and control switches 14 and 15, switch 14 controlling the motor which drives the sealing rolls and switch 15 controlling the heating elements in such rolls, there being three positions in the latter switch: Off, Hi-heat, and Regular heat.

Secured to the top of frame 10 is a work supporting table 16 which is provided with a plurality of parallel, spaced, longitudinally extending slots 17 each of which serves to receive a belt 18 extending throughout the length of the table 16, these belts serving to receive and convey work deposited thereon. Belts 18 are received over pulleys 19 at one end thereof, which pulleys are mounted on shaft 20 which in turn is journaled in bearings 21 mounted on the frame 10. The opposite ends of belts 18 are received over pulleys 22 mounted on shaft 23 also journaled on bearings secured to the frame 10, shaft 23 being driven by a sprocket mounted thereon, which sprocket serves to receive a chain 24, which chain in turn is received over a sprocket 25 mounted on one of the sealing rolls, the structure of which will be later described.

To adequately inspect the work in progress a lamp 26 is provided which is mounted on a flexible conduit 27 of familiar goose neck type which permits adjustment of lamp 26 to any desired position. Conduit 27 is mounted on a portion 28 of the frame 10 and suitable electrical connections are provided to energize the lamp 26. An on and off switch 29 may be provided on the lamp socket to conveniently control the same.

The sealing elements of the machine of this invention comprise a pair of sealing rolls 30 and 31 rotatably mounted one above the other and between which the work is adapted to pass. These rolls may be provided with knurled surfaces or serrations in order to indent the work and provide a more efficient seal. Roll 30 is fixed to a shaft 32 which in turn is journaled in bearings received in uprights 34 which are secured to the frame 10. Roll 30 also serves to support the sprocket 25 which drives chain 24 and the conveyor belts 18. The shaft 32 is provided adjacent the end remote from the roll 30 with a spur gear 35 and a sprocket 36. Sprocket 36 serves to receive a drive chain 37 which is trained over a sprocket 38 mounted on a shaft 39 extending from a speed reducer 40. Speed reducer 40 forms a part of and is directly attached to a variable speed drive mechanism 41 which is supported by cross members 42 secured to frame 10 by screw-threaded fastening means or the like 43. Variable speed drive mechanism 41 also is attached to and supports a drive motor 44 of conventional type which is provided with a capacitator 45 mounted on the top thereof by a strap 46.

Variable speed drive mechanism 41 is of conventional commercially available construction and includes a top plate 47 which may be provided with indicia 48 to facilitate adjustment of a control arm 49 which is attached to a control shaft 50 extending within the mechanism 41, arm 49 being split as at 51 to permit convenient adjustment thereof on the shaft 50. The arm 49 is clamped to shaft 50 by screw-threaded fastening means or the like 52.

The outer end of arm 49 is provided with a slot 53 which serves to slidably receive a pin 54 secured to an arm 55 pivotally mounted at 56 on frame 10. Arm 55 is pivoted about its mounting 56 by a cable 57 which leads over a pulley 58 journaled in bearings 59 mounted on one of the cross members 42, the cable 57 extending downwardly as shown in Fig. 1 to an arm 60 which is fixed to a shaft 61 journaled in frame 10 adjacent the lower portion thereof. Shaft 61 is also provided with a treadle 62 disposed in a position convenient to the operator in order to control the speed of operation of the sealing machine.

Actuation of treadle 62 will, as seen from the drawings, rotate or pivot the arm 55 about its mounting 56 in a counter-clockwise direction, as seen in Fig. 4, to move the arm 49 and thus actuate the control shaft 50 of the variable speed mechanism 41 to rotate the shaft 39 at a speed in accordance with the movement of the arm 49. With the arm 49 in the position shown in full lines in Fig. 4 the shaft 39 and elements driven thereby are at rest and with the arm 49 at its extreme position after movement in a clockwise direction as shown in dotted lines in Fig. 4, the shaft 39 will be driven at its maximum speed. It will thus be seen that the above-described mechanism provides a convenient means for adjusting or controlling the time in which the thermoplastic material passing between the sealing elements is subjected to the pressure and heat imparted thereto, thus materially affecting the efficiency of the seal produced.

The upper sealing roll 31 is mounted on a shaft 63 journaled in uprights 34 and is disposed directly above the lower roll 30. Shaft 63 is provided adjacent the end thereof opposite the roll 31 with a spur gear 64 which meshes with spur gear 35 mounted on shaft 32, thus providing a driving means for the upper roll 31. The spur gears 35 and 64 are provided with the same number of teeth and consequently the shaft 63 is driven at the same speed as the shaft 32 and since the rolls 30 and 31 are of the same diameter the surface speed of the two is the same and consequently there will be no slippage between the thermoplastic material and the rolls during the sealing operation.

Since it is necessary that a variable downward pressure be applied to the upper roll 31 in order to effectively seal the material passing between this roll and the lower roll 30 there is provided means for accomplishing this result in the form of a coil compression spring 65 received about a rod 66 extending upwardly through the frame 10, the rod 66 having a threaded lower end 67 which receives a wing nut 68 serving to adjust the compressive effect of spring 65. The rod 66 may be provided with a collar 69 at its lower end to prevent inadvertent removal of the wing nut 68.

Rod 66 extends upwardly and is provided with a laterally extending portion 70 which, as shown in Figs. 3 and 6, is pivotally received in one end of a link 71, the opposite end of which is pivotally mounted at 72 on a stud 73 secured in the upper end of one of the uprights 34 by a set screw 74. The link 71 is guided by a slotted stud 75 which is also mounted in the upright 34 by a set screw 76.

The shaft 63 supporting the upper sealing roll 31 which passes through the upright 34 is jour-

naled therein by an anti-friction bearing 77 which in turn is received in an elongated or oval aperture 78 provided in the upright 34. Directly above the bearing 77 there is provided a pin 79 slidably mounted in an aperture 80 in the upright 34, the lower end of pin 79 engaging the upper surface of bearing 77 and the upper end of pin 79 engaging the lower surface of link 71. It will thus be seen that the compressive force exerted by compression spring 65 will tend to move the rod 66 downwardly and thus pivot the link 71 in a clockwise direction as viewed in Fig. 6 to move the pin 79 downwardly and exert a downward pressure on the bearing 77, shaft 63 and thus on the upper roll 31. Any upward pressure exerted on the roll 31 will tend to move the shaft 63 upwardly and through link 71 the rod 66 will move upwardly against the action of compression spring 65. Adjustment of the wing nut 68 provides a convenient means for controlling the pressure exerted by the upper roll 31 upon the material passing between this roll and the lower roll 30 thus varying the bond secured in the seam being made at the time.

The sealing rolls 30 and 31 are each provided with an annular recess 81 in the rear surface thereof and in these recesses there is positioned a heating element 82 having resistance wire 83 disposed therein to provide the necessary heat to effect the seal between the surfaces of the thermoplastic material. The recesses 81 are closed by cover plates 84 which cover plates are provided with spacing screws 85 threadedly received therein and locked in position by lock nuts 86, screws 85 serving to tightly position the heating elements 82 against the forward face of the recess 81 in the rolls 30 and 31. Also positioned in the plate 84 of the upper roll 31 is a thermostat 87 which may be of conventional construction and provided with a bi-metallic element which will move in either direction upon a change in temperature of the heating element 82. The bi-metallic strip or element 88 serves to open and close contacts which control the flow of electrical current to the heating element 82, the position at which the contacts are opened and closed being controlled by a pin 89 extending through the thermostat and engaging the bi-metallic element 88. The position of the pin 89 and consequently the opening and closing points of the contacts associated with the bi-metallic element 88 is controlled by a pivoted member 90 extending through a nipple 91 to the interior of shaft 63 which is hollow. The inner end of member 90 serves to receive a rod 92 provided with a head 93 on the outer end thereof. Rod 92 extends through shaft 63 to the opposite end thereof and is connected to an adjusting member 94 by a set screw 95, member 94 being threadedly received in the end of shaft 63. Member 94 is also provided with a finger-engaging operating knob 96 and a dial 97 which may carry indicia indicating the degree of heat in the rolls 30 and 31, there being a pointer 98 secured to and rotating with the upper spur gear 64 whereby the dial 97 and setting of the thermostat 87 may be conveniently adjusted. By this means the temperature of the rolls 30 and 31 may be adjusted to very close limits even during operation of the machine or, in other words, while the rolls 30 and 31 are rotating.

The heating elements 82 disposed in rolls 30 and 31 receive their energizing electrical current from slip rings 99 mounted on shaft 63 and slip rings 100 mounted on shaft 32. Slip rings 99 are engaged by brushes 101 slidably mounted in a bracket of insulating material 102 which in turn is secured to a member 103 mounted on uprights 34. Brushes 101 are urged inwardly against the slip rings 99 by spring contact members 104. The slip rings 100 on the lower shaft 32 are engaged by brushes 105 slidably mounted in bracket 102, these brushes being urged inwardly against the slip rings 100 by spring contact members 106. The conductors from slip rings 99 and 100 which are connected to the heating elements 82 are disposed within the hollow shafts 32 and 63 but for clarity of illustration these conductors are not shown in the drawings although they are illustrated in the circuit diagram of Fig. 11.

Where two sheets of thermoplastic material are to be sealed together it is often desirable to provide the seam with a binding strip and for this purpose there is provided in the machine of this invention a binding tape supply means which may be mounted on a shelf or bracket 107 secured to the frame 10. The tape supply means comprises an upstanding rod 108 which serves to receive and support a shaft 109 extending at substantially right angles thereto. Shaft 109 may be conveniently secured to upstanding rod 108 by a collar 110 which serves to threadedly receive a set screw, not shown, for clamping the same to the rod 108. Rotatably mounted on shaft 109 and held in proper position thereon by collars 111 is a mandrel 112 which may be provided with a plurality of longitudinally extending spring fingers 113, the outer diameter of mandrel 112 being slightly less than the inner diameter of a roll of tape 114. The spring fingers 113 serve to firmly engage the inner surface of the tape roll 114 to hold the same in proper position on the mandrel and permit rotation and feeding of the tape therefrom.

Mounted adjacent the upstanding rod 108 on the bracket or shelf 107 is a tape-pulling mechanism comprising a friction or drive pulley 115 mounted on a shaft 116 which is journaled for rotation in an upstanding bracket 117 secured to the shelf 107 by screw-threaded fastening means or the like 118. Shaft 116 extends through the cover or housing 12 and is provided on its inner end with a bevel gear 119 which meshes with bevel gear 120 fixed on upper roll shaft 63. Thus friction drive pulley 115 will rotate with shaft 63 and the rolls 30 and 31 in synchronized relation thereto.

Mounted adjacent the drive pulley 115 and in parallel relation thereto is a pressure pulley 121 which is rotatably mounted on anti-friction bearings 122 carried by a stub shaft 123. Stub shaft 123 is eccentrically supported by a shaft 124 rotatably mounted in anti-friction bearings 125 in a boss 126 extending from the inner side of bracket 117. Shaft 124 is provided at its inner end with a collar 126' which may be secured in adjusted position by a set screw or the like 127. Also extending from collar 126' is an actuating arm 128, the purpose and operation of which will be presently described. Pressure pulley 121 is provided with flanges 129 on each side thereof to guide and retain the tape passing thereover in a manner which will presently appear. A tape guide 130 comprising a loop of wire or other suitable material is mounted on the bracket 117 directly above the pressure pulley 121 and serves to guide tape being fed thereto.

As best shown in Figs. 1 and 7, tape 131 from the roll 114 passes through the guide loop

130 and under the pressure pulley 121 from which pulley it passes over the friction or drive pulley 115 and under a laterally extending portion 132 of the arm 128. Movement of the laterally extending portion 132 from the full line position to the dotted line position, as shown in Fig. 7, rotates the shaft 124 and due to the eccentric arrangement of stub shaft 123 connected thereto moves the pressure pulley 121 toward or away from the friction or drive pulley 115, as shown in full and dotted lines in Fig. 7. This mechanism serves to operate and stop the tape-pulling mechanism depending upon the demand for tape by the sealing machine.

The binding tape 131 is fed from the tape-pulling mechanism above-described to a tape-moistening apparatus by which a solvent is applied to one surface of the tape. The tape-moistening apparatus comprises a receptacle 133 for receiving a suitable solvent, this receptacle being supported on the shelf 107. The solvent is maintained at a level indicated by the line 134 in a manner to be presently described. Mounted within the container 133 are partitions 135 and 136, these partitions being provided with vertically extending slots 137. Rotatably mounted within the slots 137 and for vertical sliding movement is a shaft 138 which serves to support a roller 139 the lower portion of which is immersed in the solvent within the container 133, the slots 137 providing a convenient means for permitting removal of the roller 139 for cleaning purposes. Also rotatably mounted on partitions 135 and 136 in substantially parallel relation with the roller 139 is a guide roller 140, the purpose and operation of which will presently appear.

The container 133 is supplied with solvent through an aperture 141 in the partition 136, this aperture communicating with a channel 142 which in turn communicates with a well 143. Well 143 serves to receive the neck 144 of a bottle or other suitable solvent reservoir 145, this bottle being supported in inverted position, as best shown in Figs. 1 and 3, by a looped wire 146 or other suitable material extending around the bottle and being supported by a collar 147 secured by a set screw or the like 148 to a pedestal 149 mounted on the shelf 107. The bottle or reservoir 145 provides a barometric feed for the solvent since the lower end of neck 144 is normally disposed below the level of the solvent indicated by line 134. The bottle is supplied with a valve in the form of a washer 150 disposed inwardly of the neck 144 of the bottle 145, this washer being of sufficient diameter to close the neck when contacting the inner walls thereof and being supported by a rod 151 extending outwardly of the neck 144, there being a compression spring 152 secured to the lower end of rod 151 and to the neck 144. Thus upon removal of the bottle 145 upwardly from the well 143 the spring 152 acting downwardly on the rod 151 will move the valve washer 150 into engagement with the side walls of the neck 144 and close the same. This valve structure is similar to that used in the tanks of conventional home oil stoves or ranges and operates to provide a substantially constant level of solvent within the container 133.

Disposed between the tape-moistening apparatus and the tape-puller is a tape-tensioning means comprising a box-like structure 153 having upstanding side walls 154 provided with vertical slots 155 and downwardly curved converging upper walls 156 which provide a surface for engaging the tape 131. Slidably and rotatably mounted within the slots 155 is a shaft 157 which serves to support a roller 158 of sufficient weight to urge the tape 131 against the curved surfaces 156 to provide a sufficient tension in the tape between the same and the tape-moistening mechanism. A tape guide 159 is secured to the box-like structure 153 by screw-threaded fastening means or the like 160 and upstanding spaced flanges 161 are provided to properly guide the tape 131 to the tensioning roller 158.

Since it is desirable that excess solvent be removed from the surface of the tape 131 and since the quantity of solvent applied thereto may need to be varied in accordance with the character of the material and the thickness of the plies to be joined there is provided a wiper in the form of a rod 162 extending transversely of the tape 131 and rotatably mounted in the partitions 135 and 136. Rod 162, as best shown in Fig. 10, is of irregular cross section and provides a relatively sharp edge 163 and a rounded or smooth surface 164. In Fig. 10 the sharp edge 163 is shown in full lines in engagement with the tape 131 and the rounded or smooth surface 164 is shown in dotted lines in engagement with the tape. The rod 162 operates to wipe excess solvent from the tape 131 and return this solvent to the container 133. Adjusting means for the rod 162 is provided in the form of a knurled finger-engaging knob 165 attached thereto, there being also provided a wing-type lock-nut 165', threadedly received on the rod 162 to lock the same in adjusted position.

In operation tape is fed from the roll 114 through the guide loop 130 and under the pressure pulley 121, the flanges 129 serving to retain the tape 131 thereon. From pulley 121 the tape 131 passes over the friction drive pulley 115 and under the lateral extension 132 of arm 128. From extension 132 the tape passes over guide 159 and between flanges 161 thence under the tension roller 158 which holds the same in engagement with the downwardly curved surfaces 156. From here the tape passes over the moistening roller 139 which applies solvent thereto and beneath the roller 140 which, as shown in Fig. 7, depresses the tape downwardly to insure that the lower surface thereof remains in contact with the surface of the roller 139 at all times. From roller 140 the tape passes over rod 162 at which time any excess solvent on the lower surface thereof is removed and returned to the container 133. From this point the tape 131 is supplied to a folding mechanism 166, shown in general in Fig. 1, the details of which form no part of this invention and therefore will not be specifically described. From the folding mechanism 166 the tape moves to the sealing rolls 30 and 31 and is applied to the sheets which are being fed therebetween by the conveyor belts 18. Since the friction drive pulley 115 rotates in synchronism with the sealing rolls 30 and 31, the tape 131 will be fed thereto at the same speed. However, if the tape 131 breaks or, for some reason it is not desired to utilize the tape, release of tension thereon allows the lateral extension 132 of arm 128 to move from the dotted line position in Fig. 7 to the full line position. This movement results in rotating the shaft 124 and eccentrically mounted stub shaft 123 to move the pressure pulley 121 away from the friction drive pulley 115, therefore interrupting the feed of the tape in that there will not be sufficient friction between the pulley 115 and the tape 131 to pull the same from roll 114. Upon reapplying tension to the

tape 131 the extension 132 of arm 128 will move from the full line position shown in Fig. 7 to the dotted line position, thus moving the pressure pulley 121 to press the tape 131 against the surface of friction drive pulley 115 thereby re-establishing the feed of the tape.

The electrical circuit of the sealing machine of this invention, as shown in Fig. 11, is supplied with electrical current through conductors 167 and 168 which are connected to a flexible supply cord provided with a conventional male-type connector at the outer end thereof. Connected to conductors 167 and 168 are conductors 169 which serve to supply current to the lamp 26 mounted on the end of goose neck 27. Also connected to conductors 167 and 168 are conductors 170 which serve to supply electrical current to motor 44, the operation of this motor being controlled by on and off switch 14.

Conductor 167 is connected to one contact 171 of a normally open relay 172. Conductor 167 is also connected to one side of the coil 173 forming the solenoid of relay 172 and which, when energized, serves to actuate the movable contact 174 to closed position. The other contact 175 of relay 172 is connected through a wire 176 to one movable contact 177 of a double pole, double throw switch 15.

The heating element 82 in upper roll 31 is provided with electrical current from the slip rings 99 mounted on shaft 63, there being one slip ring 178 connected to one side of the heating element 82 through a conductor 179, the opposite side of the heating element 82 being connected through a wire 180 with a second slip ring 181. The thermostat 87 disposed in the upper roll 31 has one contact 182 connected to the wire 180 and the opposite contact 183 connected by a wire 184 with the third slip ring 185.

The heating element 82 disposed in the lower heating roll 30 is provided with electrical current from slip rings 100, one one side of the element 82 being connected by a wire 186 with slip ring 187 and the opposite side of the element 82 being connected by a wire 188 with the second slip ring 189. Slip rings 178, 181 and 185 are contacted by brushes 190, 191, and 192, respectively, while slip rings 187 and 189 are contacted by brushes 193 and 194, respectively. The second movable contact 195 on double pole double throw switch 15 is connected through a wire 196 with the brush 191 engaging slip ring 181 and with the supply conductor 168. Contact 197 of switch 15 is connected through a wire 198 with contact 199 which in turn is connected by a wire 200 with brush 194 engaging slip ring 189. Contact 201 of switch 15 is connected through a wire 202 with brush 193 engaging slip ring 100 and with brush 190 engaging slip ring 178. No connection is made to contact 203 of the switch 15 and this contact plays no part in the control of the sealing machine. Brush 192 in contact with slip ring 185 is connected by a wire 204 with the coil 173 of the relay 172. In order to prevent excessive arcing between the contacts 182 and 183 of the thermostat 87 a .1 mfd. condenser 205 is connected across the brushes 191 and 192 in contact with slip rings 181 and 185 which in turn are connected across the contacts 182 and 183 of the thermostat 87. This condenser materially increases the life of the thermostat contact points.

Assuming the sealing machine of this invention to be at rest and the heating elements 82 in the rolls 30 and 31 to be cold the operation of the electrical supply and control circuit is as follows: current is supplied through the conductors 167 and 168 and the light 26 may be turned on or off at will, as well as may be the drive motor 44 by actuation of the switch 14. Current will further flow from conductor 167 through coil 173 of solenoid 172 to actuate the movable contact 174 thus closing the contacts 171 and 175 since the complete circuit of the coil 173 will be to conductor 204 to brush 192 engaging slip ring 185 through conductor 184 to the contact 183 of thermostat 87 and since in the cold condition of the heating elements the thermostat will be closed current will flow through contact 182, conductor 180, slip ring 181, brush 191 and conductor 196 to conductor 168 which represents the opposite side of the power line.

Assuming the double pole, double throw switch 15 to be in the high or downward position, as shown in Fig. 11, current will flow from contact 175 of relay 172 through conductor 176 to movable contact 177 of the switch 15 and through contact 201 and conductor 202 to brush 190 engaging slip ring 178 and through conductor 179 to heating element 82, thence through conductor 180 to slip ring 181 and through brush 191 and conductor 196 to the opposite side of the power line 168 thus energizing heating element 82 to heat the same.

Likewise the current flowing through conductor 202 will flow through brush 193 engaging slip ring 100 and through conductor 186 heating element 82 in the lower roll 30 thence through conductor 188 to slip ring 189 and brush 194 and through conductor 200, contact 199 of switch 15 and contact 195 to conductor 196 and to the opposite side of the power line conductor 168. In this condition the heating elements 82 will continue to supply heat until the temperature of the rolls 30 and 31 reach the point at which the thermostat 87 is set, at which time the contacts 182 and 183 will separate thus de-energizing the coil 173 of relay 172 and opening the contacts 171 and 175 to interrupt the flow of current to the heating elements 82.

With the double pole throw switch 15 in the regular or upper position, as shown in Fig. 11, current will flow from contact 175 to the relay 172 through conductor 176 to the movable contact 177 of switch 15 thence through contact 197, conductor 198 and conductor 200 to brush 194 which engages slip ring 189, thence through conductor 188 to the heating element 82 in the lower roll 30 through conductor 186 to the slip ring 187 and through brush 193 and conductor 202 to the brush 190 engaging slip ring 178 thence through conductor 179 to heating element 82 in the upper roll 31 which point the current flows through conductor 180 to slip ring 181 engaged by brush 191 from which the current flows through wire 196 to conductor 168 forming the opposite side of the supply circuit. This position of the switch 15 places the heating elements 82 in series, thus resulting in a lower wattage consumption and consequently lower potential heat in the rolls 30 and 31. As before, the temperature will be controlled by opening and closing of the thermostat 87 which controls operation of the relay 172 and thus the supply of current to the heating elements. The electrical supply and control system above-described is relatively simple and adequately controls the operation of the sealing machine of this invention.

The operation of the sealing apparatus as a whole is believed apparent from the above description but briefly reviewing the same it is assumed that the motor switch 14 is in the "on" po-

sition and that the heating element control switch 15 is in either the "high" or "regular" position depending upon the temperature required. It is further assumed that the thermostat 87 is adjusted to the desired temperature. The binding strip or tape 131 is threaded through the tape-feeding means and the tape-moistening means as well as through the folding mechanism 166 and sheets of plastic or objects to be formed of a thermoplastic material are positioned on the table 16 with the folded tape disposed around the edges and with the edges in a position to be introduced between the sealing rolls 30 and 31. At this time the treadle 62 is actuated to move the control cable 57 and actuate the arm 49 on the variable speed transmission 41 to rotate the rolls at the desired speed. The extent of movement of arm 39 is controlled by a flexible member such as a chain 206 attached to the arm 55 and to the frame of the machine and the arm 55 and control arm 49 is returned to its original position upon release of the treadle 62 by a spring or other suitable tension means 207 secured to the arm 55 and to a bracket 208 attached to the frame 10 of the machine. The tension spring 207 may be adjusted by a rod 209 and screw-threaded means or the like 210 received thereon.

The work progresses through the machine and through the sealing rolls 30 and 31 by the friction therebetween as well as by the conveyor belts 18 and upon completing of the seal the work is removed from the rolls and packaged or otherwise disposed of. Control of the speed of rotation of the rolls 30 and 31 by actuation of the treadle 62 controls the time in which the sealing heat and pressure is applied to the work, this being dependent upon the nature of the material as well as the thickness thereof.

It will be seen that by the above invention there has been provided a relatively simple and inexpensive sealing machine which adequately performs the functions for which it is intended.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. A sealing machine for forming a seam between two sheets of thermoplastic material comprising in combination a frame, a work table on said frame for supporting superimposed sheets to be joined with two adjacent edges in substantial alignment, conveyor means associated with said table for feeding said sheets longitudinally thereof, spaced substantially parallel hollow shafts journaled in said frame one above the other, a sealing roll fixed to one end of each shaft adjacent an edge of said table, means for driving said rolls comprising a motor and a variable speed transmission, treadle means mounted on said frame for controlling the output of said transmission whereby the speed of rotation of said rolls may be infinitely varied between zero and maximum, means on one of said rolls for driving said conveyor in synchronism therewith, a heating element disposed in each roll, slip rings fixed on said shafts and brushes in contact therewith, conductors connected to said heating elements and said slip rings and extending through said hollow shafts whereby electrical energy may be supplied to said heating elements, a relay connected in an electrical supply circuit for said heating elements, an adjustable thermostat disposed in one roll and connected through said slip rings to said relay whereby the temperature of said heating elements may be controlled, means for adjusting said thermostat, means for permitting movement of one roll away from the other, adjustable yieldable means for biasing said rolls towards each other whereby the pressure applied to work therebetween may be varied, means for supporting a supply of thermoplastic binding tape on said frame, tape-pulling means driven by said sealing roll drive means in synchronism therewith, means for rendering said tape-pulling means operative or inoperative in accordance with the tension in the tape fed therefrom, means for applying solvent to one surface of said tape, means for removing excess solvent from said tape, means for longitudinally folding said tape upon itself and applying the same over the edges of said sheets to be joined whereby upon passing between said sealing rolls said sheets will be joined to said binding tape under the action of heat and pressure to form a continuous sheet.

2. A sealing machine for forming a seam between two sheets of thermoplastic material comprising in combination a frame, a work table on said frame for supporting superimposed sheets to be joined with two adjacent edges in substantial alignment, spaced substantially parallel hollow shafts journaled in said frame one above the other, a sealing roll fixed to one end of each shaft adjacent an edge of said table, means for driving said rolls comprising a motor and a variable speed transmission, treadle means mounted on said frame for controlling the output of said transmission whereby the speed of rotation of said rolls may be infinitely varied between zero and maximum, a heating element disposed in each roll, slip rings fixed on said shafts and brushes in contact therewith, conductors connected to said heating elements and said slip rings and extending through said hollow shafts whereby electrical energy may be supplied to said heating elements, a relay connected in the electrical supply circuit for said heating elements, an adjustable thermostat disposed in one roll and connected through said slip rings to said relay whereby the temperature of said heating elements may be controlled, means for adjusting said thermostat, means for permitting movement of one roll away from the other, adjustable yieldable means for biasing said rolls towards each other whereby the pressure applied to work therebetween may be varied, means for supporting a supply of thermoplastic binding tape on said frame, tape-pulling means driven by said sealing roll drive means in synchronism therewith, means for rendering said tape-pulling means operative or inoperative in accordance with the tension in the tape fed therefrom, means for applying solvent to one surface of said tape, means for removing excess solvent from said tape, means for longitudinally folding said tape upon itself and applying the same over the edges of said sheets to be joined whereby upon passing between said sealing rolls said sheets will be joined to said binding tape under the action of heat and pressure to form a continuous sheet.

3. A sealing machine for forming a seam between two sheets of thermoplastic material comprising in combination a frame, a work table on said frame for supporting superimposed sheets to be joined with two adjacent edges in substantial alignment, spaced substantially parallel shafts journaled in said frame one above the other,

a sealing roll fixed to one end of each shaft adjacent an edge of said table, means for driving said rolls comprising a motor and a variable speed transmission, treadle means mounted on said frame for controlling the output of said transmission whereby the speed of rotation of said rolls may be infinitely varied between zero and maximum, a heating element disposed in each roll, slip rings fixed to said shafts and brushes in contact therewith, conductors connected to said heating elements and said slip rings whereby electrical energy may be supplied to said heating elements, a relay connected in the electrical supply circuit for said heating elements, an adjustable thermostat disposed in one roll and connected through said slip rings to said relay whereby the temperature of said heating elements may be controlled, means for adjusting said thermostat, means for permitting movement of one roll away from the other, adjustable yieldable means for biasing said rolls towards each other whereby the pressure applied to work therebetween may be varied, means for supporting a supply of thermoplastic binding tape on said frame, tape-pulling means driven by said sealing roll drive means in synchronism therewith, means for rendering said tape-pulling means operative or inoperative in accordance with the tension in the tape fed therefrom, means for applying solvent to one surface of said tape, means for removing excess solvent from said tape, means for longitudinally folding said tape upon itself and applying the same over the edges of said sheets to be joined whereby upon passing between said sealing rolls said sheets will be joined to said binding tape under the action of heat and pressure to form a continuous sheet.

4. A sealing machine for forming a seam between two sheets of thermoplastic material comprising in combination a frame, a work table on said frame for supporting superimposed sheets to be joined with two adjacent edges in substantial alignment, spaced substantially parallel shafts journaled in said frame one above the other, a sealing roll fixed to one end of each shaft, means for driving said rolls including a variable speed transmission, means mounted on said frame for controlling the output of said transmission whereby the speed of rotation of said rolls may be infinitely varied between zero and maximum, a heating element disposed in each roll, slip rings fixed to said shafts and brushes in contact therewith, conductors connected to said heating elements and said slip rings whereby electrical energy may be supplied to said heating elements, a relay connected in the electrical supply circuit for said heating elements, an adjustable thermostat disposed in one roll and connected through said slip rings to said relay whereby the temperature of said heating elements may be controlled, means for adjusting said thermostat, means for permitting movement of one roll away from the other, adjustable yieldable means for biasing said rolls towards each other whereby the pressure applied to work therebetween may be varied, means for supporting a supply of thermoplastic binding tape on said frame, tape-pulling means driven by said sealing roll drive means in synchronism therewith, means for rendering said tape-pulling means operative or inoperative in accordance with the tension in the tape fed therefrom, means for applying solvent to one surface of said tape, means for removing excess solvent from said tape, means for longitudinally folding said tape upon itself and applying the same over the edges of said sheets to be joined whereby upon passing between said sealing rolls said sheets will be joined to said binding tape under the action of heat and pressure to form a continuous sheet.

5. A sealing machine for forming a seam between two sheets of thermoplastic material comprising in combination a frame, a work table on said frame for supporting superimposed sheets to be joined with two adjacent edges in substantial alignment, spaced substantially parallel shafts journaled in said frame one above the other, a sealing roll fixed to one end of each shaft, means for driving said rolls including a variable speed transmission, means mounted on said frame for controlling the output of said transmission whereby the speed of rotation of said rolls may be infinitely varied between zero and maximum, a heating element disposed in each roll, means for supplying electrical energy to said heating elements, a relay connected in the electrical supply circuit for said heating elements, an adjustable thermostat disposed in one roll and connected to said relay whereby the temperature of said heating elements may be controlled, means for adjusting said thermostat, means for permitting movement of one roll away from the other, adjustable yieldable means for biasing said rolls towards each other whereby the pressure applied to work therebetween may be varied, means for supporting a supply of thermoplastic binding tape on said frame, tape-pulling means driven by said sealing roll drive means in synchronism therewith, means for rendering said tape-pulling means operative or inoperative in accordance with the tension in the tape fed therefrom, means for applying solvent to one surface of said tape, means for removing excess solvent from said tape, means for longitudinally folding said tape upon itself and applying the same over the edges of said sheets to be joined whereby upon passing between said sealing rolls said sheets will be joined to said binding tape under the action of heat and pressure to form a continuous sheet.

6. A sealing machine for forming a seam between two sheets of thermoplastic material comprising in combination a frame, a work table on said frame for supporting superimposed sheets to be joined with two adjacent edges in substantial alignment, spaced substantially parallel shafts journaled in said frame one above the other, a sealing roll fixed to one end of each shaft, means for driving said rolls including a variable speed transmission, means mounted on said frame for controlling the output of said transmission whereby the speed of rotation of said rolls may be infinitely varied between zero and maximum, a heating element disposed in each roll, means for supplying electrical energy to said heating elements, an adjustable thermostat disposed in one roll and connected to said means for supplying electrical energy whereby the temperature of said heating elements may be controlled, means for adjusting said thermostat, means for permitting movement of one roll away from the other, adjustable yieldable means for biasing said rolls toward each other whereby the pressure applied to work therebetween may be varied, means for supporting a supply of thermoplastic binding tape on said frame, tape-pulling means driven by said sealing roll drive means in synchronism therewith, means for rendering said tape-pulling means operative or inoperative in accordance with the tension in the tape fed therefrom, means for applying solvent to one

surface of said tape, means for removing excess solvent from said tape, means for longitudinally folding said tape upon itself and applying the same over the edges of said sheets to be joined whereby upon passing between said sealing rolls said sheets will be joined to said binding tape under the action of heat and pressure to form a continuous sheet.

7. A sealing machine for forming a seam between two sheets of thermoplastic material comprising in combination a frame, a work table on said frame for supporting superimposed sheets to be joined with two adjacent edges in substantial alignment, spaced substantially parallel shafts journaled in said frame one above the other, a sealing roll fixed to one end of each shaft, means for driving said rolls including a variable speed transmission, means mounted on said frame for controlling the output of said transmission whereby the speed of rotation of said rolls may be infinitely varied between zero and maximum, a heating element disposed in each roll, means for supplying electrical energy to said heating elements, an adjustable thermostat disposed in one roll and connected to said means for supplying electrical energy whereby the temperature of said heating elements may be controlled, means for adjusting said thermostat, means for permitting movement of one roll away from the other, adjustable yieldable means for biasing said rolls toward each other whereby the pressure applied to work therebetween may be varied, means for supporting a supply of thermoplastic binding tape on said frame, tape-pulling means driven by said sealing roll drive means in synchronism therewith, means for rendering said tape-pulling means operative or inoperative in accordance with the tension in the tape fed therefrom, means for applying solvent to one surface of said tape, means for longitudinally folding said tape upon itself and applying the same over the edges of said sheets to be joined whereby upon passing between said sealing rolls said sheets will be joined to said binding tape under the action of heat and pressure to form a continuous sheet.

8. A sealing machine for forming a seam between two sheets of thermoplastic material comprising in combination a frame, a work table on said frame for supporting superimposed sheets to be joined with two adjacent edges in substantial alignment, spaced substantially parallel shafts journaled in said frame one above the other, a sealing roll fixed to one end of each shaft, means for driving said rolls including a variable speed transmission, means mounted on said frame for controlling the output of said transmission whereby the speed of rotation of said rolls may be varied between zero and maximum, a heating element disposed in each roll, means for supplying electrical energy to said heating elements, an adjustable thermostat disposed in one roll and connected to said means for supplying electrical energy whereby the temperature of said heating elements may be controlled, means for adjusting said thermostat, means for permitting movement of one roll away from the other, adjustable yieldable means for biasing said rolls towards each other whereby the pressure applied to work therebetween may be varied, means for supporting a supply of thermoplastic binding tape on said frame, tape pulling means driven by said sealing roll drive means in synchronism therewith, means for applying solvent to one surface of said tape, means for longitudinally folding said tape upon itself and applying the same over the edges of said sheets to be joined whereby upon passing between said sealing rolls said sheets will be joined to said binding tape under the action of heat and pressure to form a continuous sheet.

9. A sealing machine for forming a seam between two sheets of thermoplastic material comprising in combination a frame, a work table on said frame for supporting superimposed sheets to be joined with two adjacent edges in substantial alignment, spaced substantially parallel shafts journaled in said frame one above the other, a sealing roll fixed to one end of each shaft, means for driving said rolls including a variable speed transmission, means mounted on said frame for controlling the output of said transmission whereby the speed of rotation of said rolls may be infinitely varied between zero and maximum, a heating element disposed in each roll, means for supplying electrical energy to said heating elements, an adjustable thermostat disposed in one roll and connected to said means for supplying electrical energy whereby the temperature of said heating elements may be controlled, means for adjusting said thermostat, means for permitting movement of one roll away from the other, adjustable yieldable means for biasing said rolls toward each other whereby the pressure applied to work therebetween may be varied, means for supporting a supply of thermoplastic binding tape on said frame, tape pulling means driven by said sealing roll drive means in synchronism therewith, means for longitudinally folding said tape upon itself and applying the same over the edges of said sheets to be joined whereby upon passing between said sealing rolls said sheets will be joined to said binding tape under the action of heat and pressure to form a continuous sheet.

10. A sealing machine as defined in claim 1 in which said tape pulling means comprises a friction roll driven by said sealing roll driving means, a pressure roll mounted adjacent said friction roll for movement toward and away therefrom, a stub shaft rotatably receiving said pressure roll, a shaft eccentrically secured to said stub shaft and rotatably mounted on said frame, an arm secured to said shaft and having a lateral extension disposed in the path of movement of tape trained over said friction roll whereby tape under tension passing under said extension will rotate said shaft and move said pressure roll towards said friction roll to cause driving engagement between said friction roll and said tape to feed the same and upon release of tension in said tape said pressure roll will move away from said friction roll to interrupt said driving engagement.

11. A sealing machine as defined in claim 7 in which said tape pulling means comprises a friction roll driven by said sealing roll driving means, a pressure roll mounted adjacent said friction roll for movement toward and away therefrom, a stub shaft rotatably receiving said pressure roll, a shaft eccentrically secured to said stub shaft and rotatably mounted on said frame, an arm secured to said shaft and having a lateral extension disposed in the path of movement of tape trained over said friction roll whereby tape under tension passing under said extension will rotate said shaft and move said pressure roll towards said friction roll to cause driving engagement between said friction roll and said tape to feed the same and upon release of tension in said

tape said pressure roll will move away from said friction roll to interrupt said driving engagement.

12. A sealing machine as defined in claim 7 in which said tape pulling means comprises a friction roll driven by said sealing roll driving means, a pressure roll mounted adjacent said friction roll for movement toward and away therefrom, eccentric means for mounting said pressure roll on said frame, an arm secured to said eccentric means and having a lateral extension disposed in the path of movement of tape trained over said friction roll whereby tape under tension passing under said extension will move said pressure roll towards said friction roll to cause driving engagement between said friction roll and said tape to feed the same and upon release of tension in said tape said pressure roll will move away from said friction roll to interrupt said driving engagement.

13. A sealing machine as defined in claim 7 in which said tape pulling means comprises a friction roll driven by said sealing roll driving means, a pressure roll mounted adjacent said friction roll for movement toward and away therefrom, means disposed in the path of movement of tape trained over said friction roll and connected to said pressure roll for moving the same toward and away from said friction roll whereby tape under tension passing under said means will move towards said friction roll to cause driving engagement between said friction roll and said tape to feed the same and upon release of tension in said tape said pressure roll will move away from said friction roll to interrupt said driving engagement.

14. A sealing machine as defined in claim 7 in which said solvent applying means comprises an open top container, spaced substantially parallel partitions in said container, opposed vertical slots in said partitions, a solvent applying roller having a shaft removably received in said slots with the lower portion of said roller immersed in solvent in said container and with the upper portion of said roller above the level of the solvent, a second roller substantially parallel to said applying roller and rotatably mounted on said partitions with the lower portion of said second roller below the upper portion of said applying roller whereby tape passing over said applying roller and under said second roller will be held in firm engagement with said applying roller to receive solvent therefrom, a well adjacent said container, a channel communicating with said container and said well, a solvent reservoir having a filling and discharge opening formed by a neck, a valve disposed in said neck for closing the same, resilient means for biasing said valve to closed position and means to open said valve, said reservoir being disposed in inverted position with said neck in said well and with said valve open whereby a barometric feed is provided to maintain a substantially constant level of solvent in said container.

15. A sealing machine as defined in claim 7 in which said solvent applying means comprises a container, spaced partitions in said container, opposed vertical slots in said partitions, a solvent applying roller having a shaft removably received in said slots with the lower portion of said roller immersed in solvent in said container and with the upper portion of said roller above the level of the solvent, a second roller rotatably mounted on said partitions with the lower portion of said second roller below the upper portion of said applying roller whereby tape passing over said applying roller and under said second roller will be held in firm engagement with said applying roller to receive solvent therefrom, a well adjacent said container, a channel communicating with said container and said well, a solvent reservoir having a filling and discharge opening formed by a neck, a valve disposed in said neck for closing the same, resilient means for biasing said valve to closed position and means to open said valve, said reservoir being disposed in inverted position with said neck in said well and with said valve open whereby a barometric feed is provided to maintain a substantially constant level of solvent in said container.

16. A sealing machine as defined in claim 7 in which said solvent applying means comprises a container, a solvent applying roller rotatably mounted in said container with the lower portion of said roller immersed in solvent in said container and with the upper portion of said roller above the level of the solvent, a second roller rotatably mounted in said container with the lower portion of said second roller below the upper portion of said applying roller whereby tape passing over said applying roller and under said second roller will be held in firm engagement with said applying roller to receive solvent therefrom, a well adjacent said container, a channel communicating with said container and said well, a solvent reservoir having a filling and discharge opening formed by a neck, a valve disposed in said neck for closing the same, resilient means for biasing said valve to closed position and means to open said valve, said reservoir being disposed in inverted position with said neck in said well and with said valve open whereby a barometric feed is provided to maintain a substantially constant level of solvent in said container.

17. A sealing machine as defined in claim 7 in which said solvent applying means comprises a container, a solvent applying roller rotatably mounted in said container with the lower portion of said roller immersed in solvent in said container and with the upper portion of said roller above the level of the solvent, means to maintain tape in firm engagement with said applying roller to receive solvent therefrom, a well adjacent said container, a channel communicating with said container and said well, a solvent reservoir having a filling and discharge opening formed by a neck, a valve disposed in said neck for closing the same, resilient means for biasing said valve to closed position and means to open said valve, said reservoir being disposed in inverted position with said neck in said well and with said valve open whereby a barometric feed is provided to maintain a substantially constant level of solvent in said container.

18. A sealing machine as defined in claim 7 in which said solvent applying means comprises a container, a solvent applying roller rotatably mounted in said container with the lower portion of said roller immersed in solvent in said container and with the upper portion of said roller above the level of the solvent, means to maintain tape in firm engagement with said applying roller to receive solvent therefrom, a well adjacent said container, a channel communicating with said container and said well and a solvent reservoir having a filling and discharge opening formed by a neck, said reservoir being disposed in inverted position with said neck in

said well whereby a barometric feed is provided to maintain a substantially constant level of solvent in said container.

19. A sealing machine as defined in claim 7 in which said solvent applying means comprises a container, a solvent applying roller rotatably mounted in said container with the lower portion of said roller immersed in solvent in said container and with the upper portion of said roller above the level of the solvent, means to maintain tape in firm engagement with said applying roller to receive solvent therefrom and means to maintain substantially constant level of solvent in said container.

20. A sealing machine as defined in claim 6 in which the means for removing excess solvent from the tape comprises a rod of irregular cross section disposed in the path of movement of tape of said solvent applying means, a relatively sharp edge on one side of said rod and a smooth surface on the opposite side and means to adjust said rod to selectively engage said sharp edge or said smooth surface with said tape to vary the wiping action whereby excess solvent is removed from said tape.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,115,828	Johnston	Nov. 3, 1914
1,195,310	White et al.	Aug. 22, 1916
1,638,664	Greenfield	Aug. 9, 1927
2,003,337	Brady et al.	June 4, 1935
2,126,908	Moore	Aug. 16, 1938
2,244,282	Bergstein	June 3, 1941
2,495,680	Andrews	Jan. 21, 1950