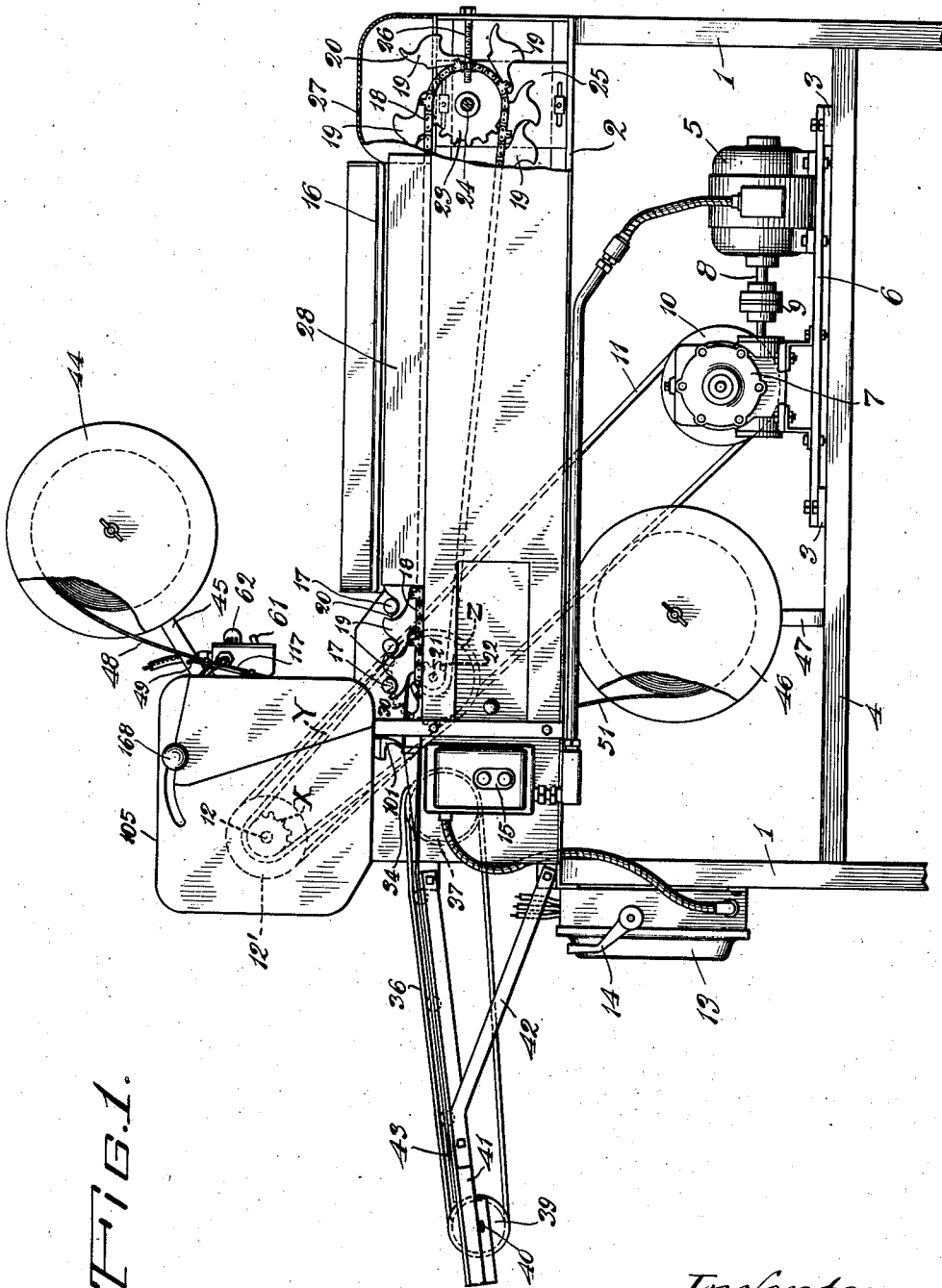


Fig. 1.

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FIG. 2.

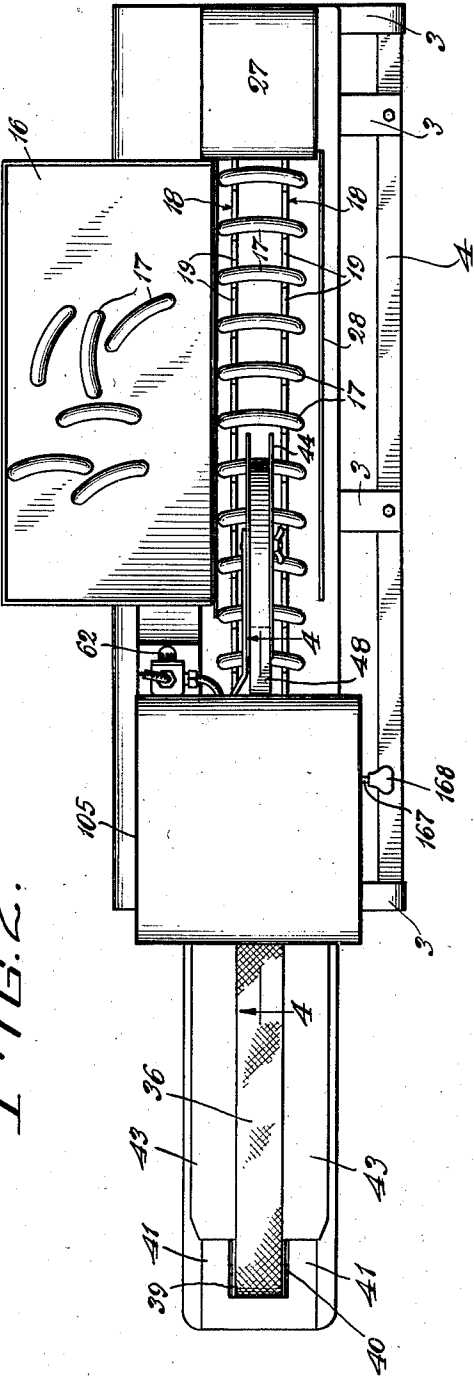
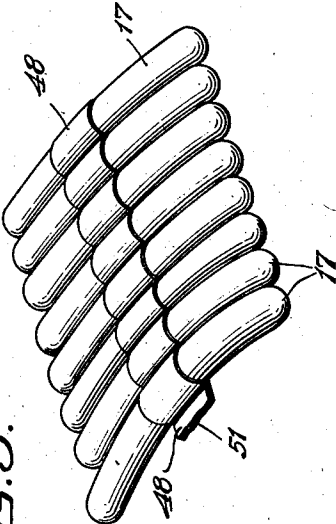


FIG. 3.



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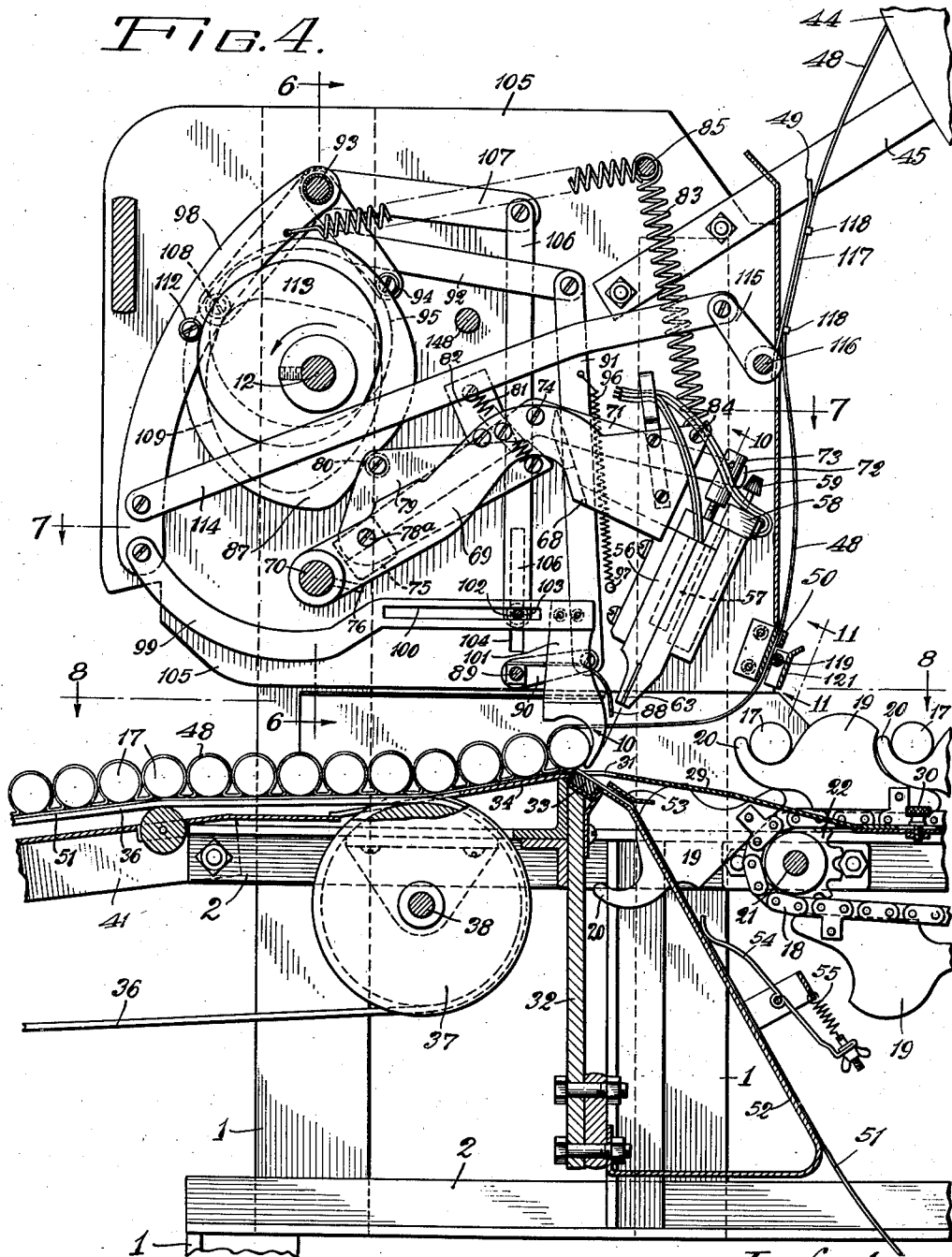
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FIG. 5.

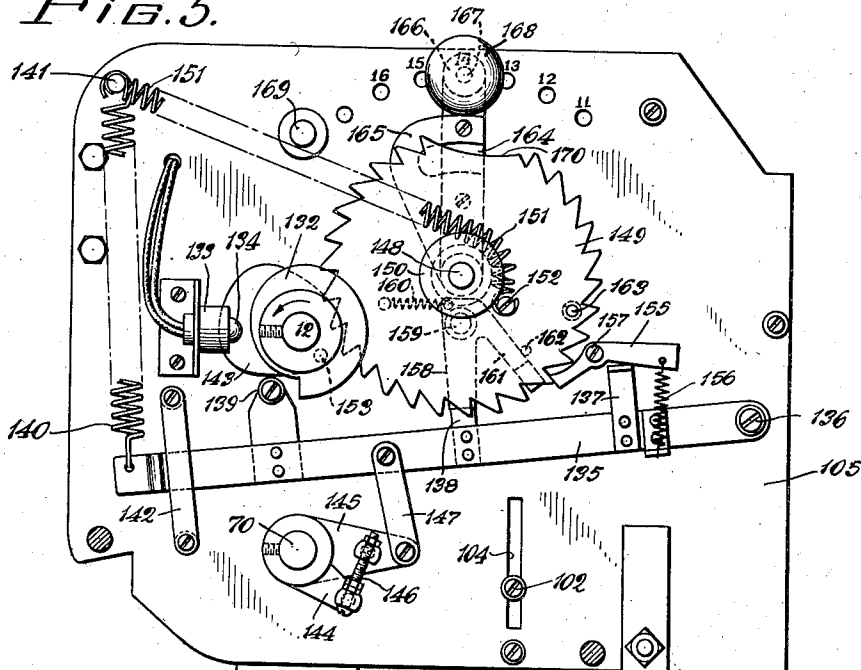
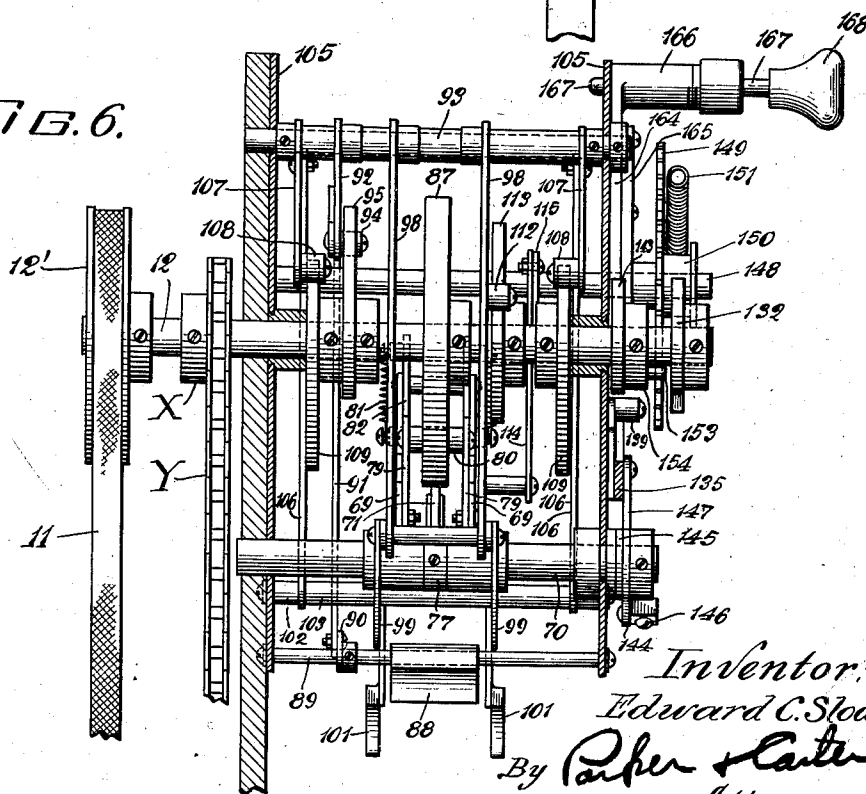


FIG. 6.



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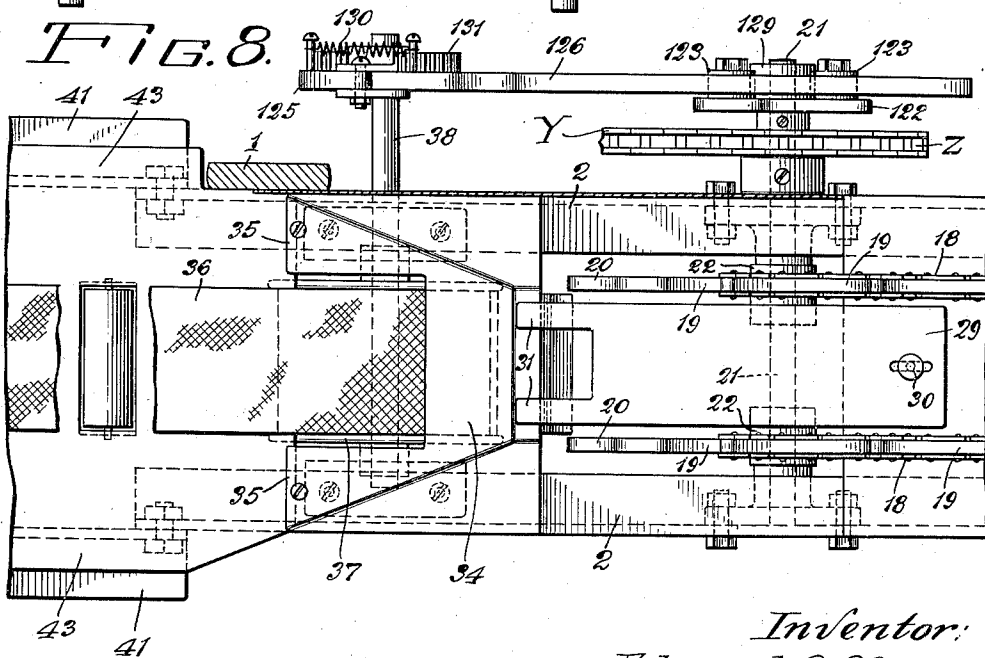
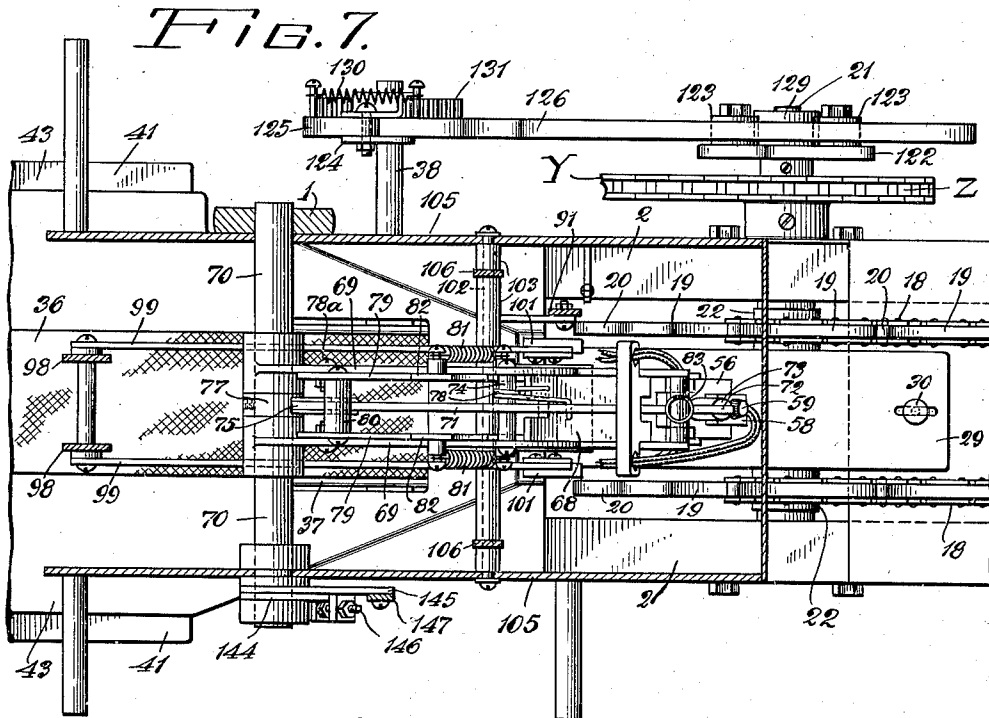
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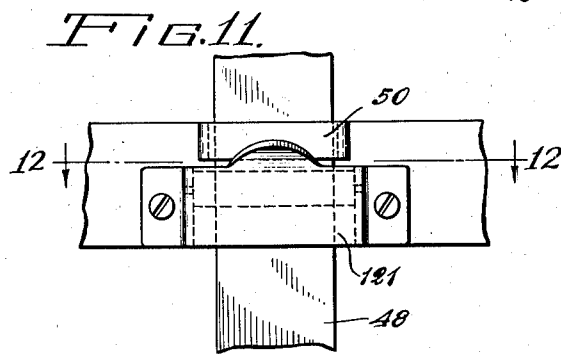
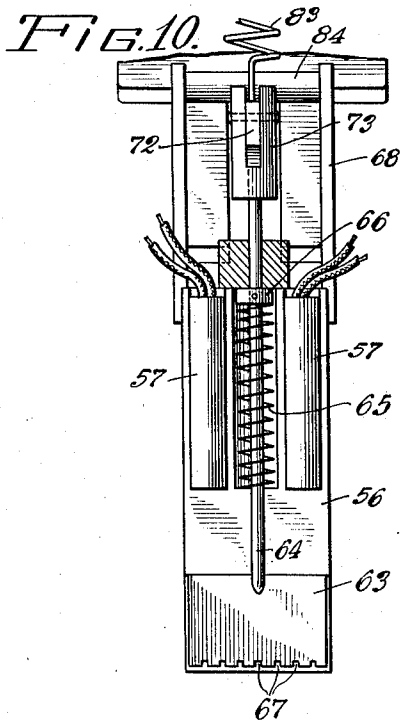
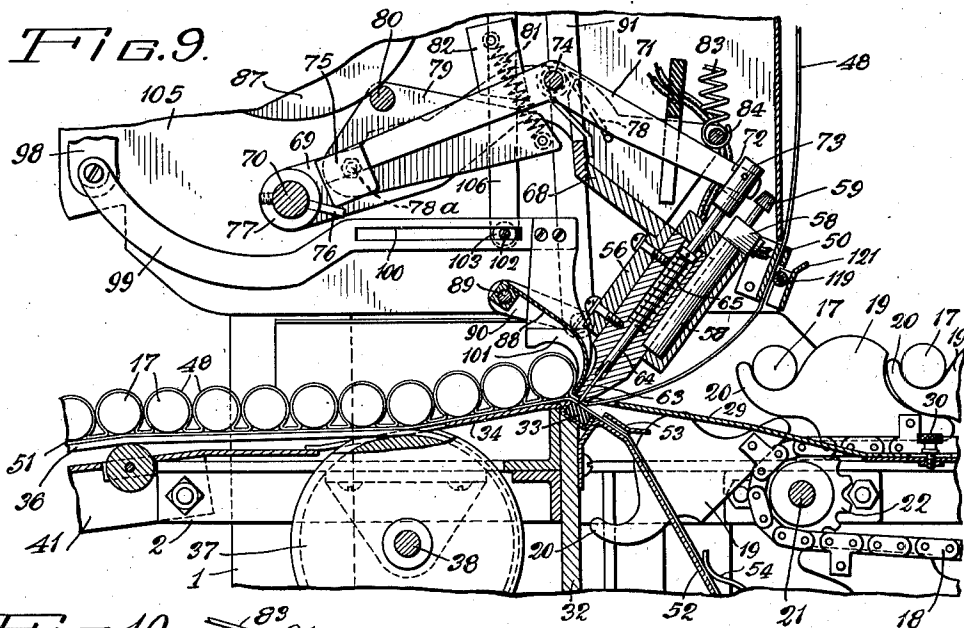
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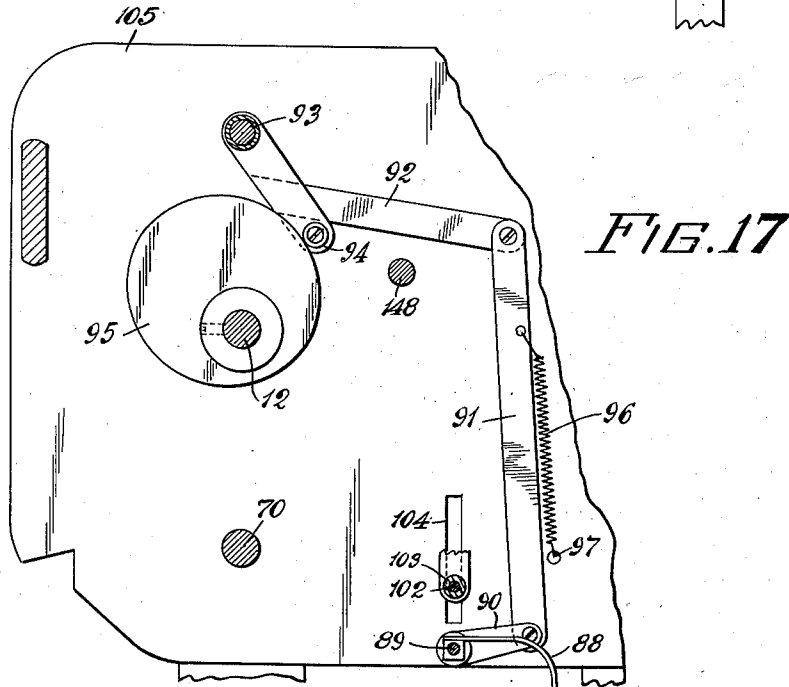
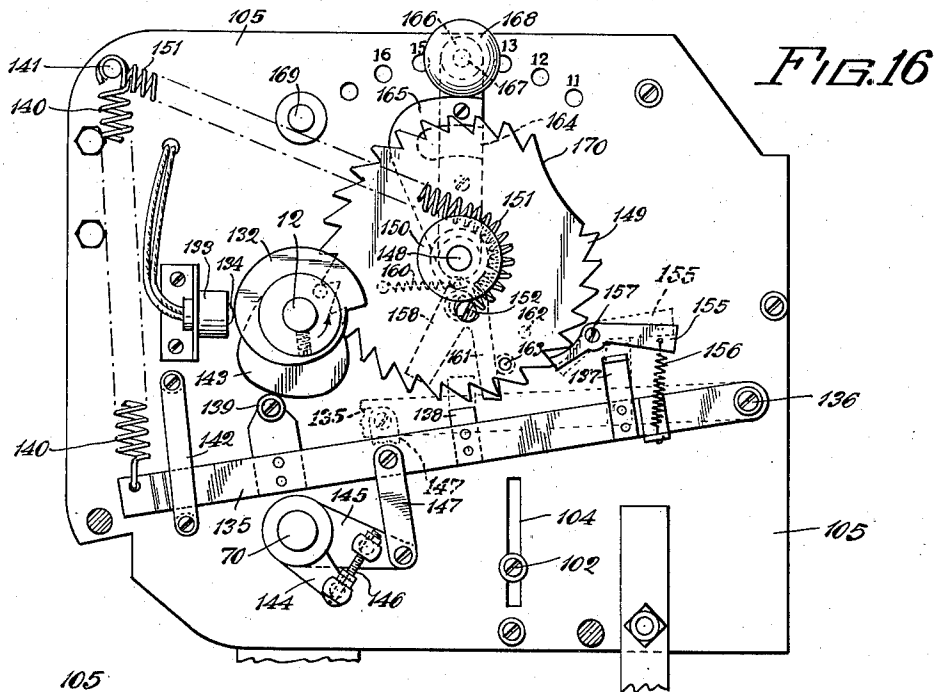
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9 Sheets-Sheet 8



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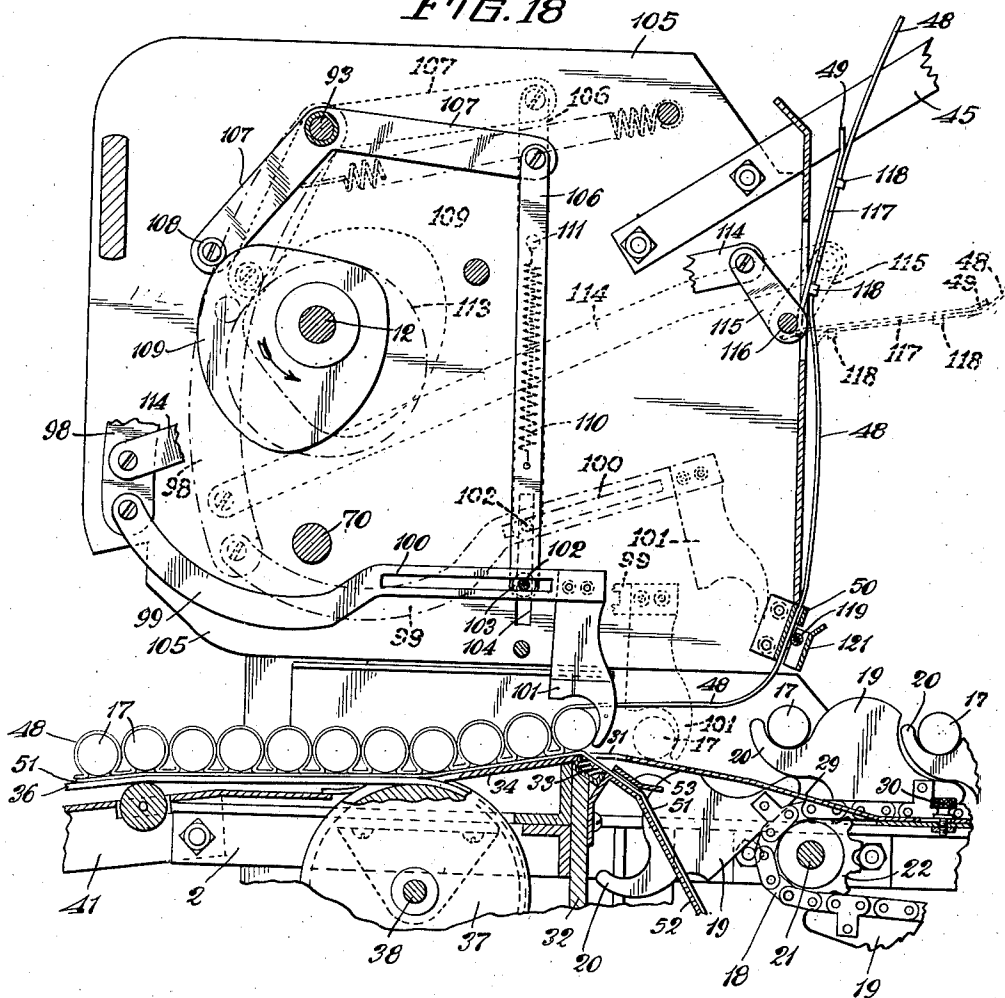
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FIG. 18



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UNITED STATES PATENT OFFICE

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BANDING MACHINE

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Application May 8, 1944, Serial No. 534,666

20 Claims. (Cl. 93—2)

This invention relates to a packaging or banding machine and has for one object to provide a machine capable of placing bands of paper or other material about a series of generally rounded, elongated articles such as sausages. One object of the invention is, therefore, to provide a machine for banding a continuous series of sausages.

Another object is to provide a machine for securing the sausages together in contact with each other, or substantially so.

A further object is to provide such a machine and means for securing the bands about the sausages, with one band relatively flat and the other band looped about the sausages.

Another object is to provide, in connection with such a device, means for banding a series of sausages and for severing the bands at predetermined intervals to form a package comprising a predetermined number of sausages banded together.

Other objects will appear from time to time throughout the specification and claims.

This invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a side elevation of one form of the device, with parts broken away;

Figure 2 is a plan view of the device of Figure 1;

Figure 3 is a view in perspective, showing a series of sausages banded together;

Figure 4 is a vertical, longitudinal section taken on an enlarged scale at line 4—4 of Figure 2;

Figure 5 is a side elevation of the banding mechanism housing, with the parts in position thereon;

Figure 6 is a transverse, vertical section taken at line 6—6 of Figure 4;

Figure 7 is a longitudinal, horizontal section taken at line 7—7 of Figure 4;

Figure 8 is a longitudinal, horizontal section taken at line 8—8 of Figure 4;

Figure 9 is an elevation, with parts in section, showing a portion of the mechanism of Figure 4 in a different position;

Figure 10 is a fragmentary section, with parts in elevation, taken at line 10—10 of Figure 4 on an enlarged scale;

Figure 11 is an elevation taken at line 11—11 of Figure 4 on an enlarged scale;

Figure 12 is a transverse section taken at line 12—12 of Figure 11;

Figure 13 is a side elevation of a portion of the driving mechanism of the banding device, taken

on an enlarged scale on the opposite side of the housing from that shown in Figure 1;

Figure 14 is a schematic wiring diagram of the circuit for driving the apparatus;

Figure 15 is a schematic wiring diagram of a portion of the heating circuit for the heating elements;

Figure 16 is a view generally similar to Figure 5, showing the parts in a modified position;

Figure 17 is a section similar to Figure 4, with parts omitted; and

Figure 18 is a view generally similar to Figure 4, with parts omitted and showing parts additional to those shown in Figure 17.

Like parts are indicated by like characters throughout the specification and the drawings.

In the particular form here shown, the banding mechanism is designed for banding of sausages, although other articles of somewhat similar shape and proportion could be equally well banded.

The mechanism generally comprises a base or support, means for feeding a series of articles to a point where banding occurs, means for supplying at least two bands from different sources, and means for bringing the bands together, and for securing them together. In this operation at least one of the bands is looped or wrapped substantially about each of said sausages. Means are also provided for severing both bands after a predetermined number of sausages have been banded together.

As shown, the support comprises a table-like member having one or more legs 1 which are joined by side members 2 and one or more transverse members 3. A shelf 4 may be provided beneath the table and, if desired, a driving motor 5 may be mounted on the shelf or on a subframe 6. A speed-reducing gear assembly 7 is driven by a shaft 8 from the motor through a coupling 9. A pulley 10 is driven by the gear assembly and drives a belt 11 which drives a shaft 12 by means of a pulley 12'. The mechanism may be conveniently driven from the shaft 12. A sprocket X fixed on the shaft 12 drives a chain Y, which in turn drives a second sprocket Z, the mounting of which will be described below. A control box 13 includes the necessary fuses. A handle 14 may be used to break the circuit for changing fuses or other purposes. A push button switch 15 is in the motor-driving circuit and may be used to stop and start the motor. The particular details of the driving circuit and controls are not illustrated in full, as these details form no essential part of the invention, which may be carried out by any structure in which means are provided for a motor and for

energizing the motor and for driving the mechanism from the motor.

The sausage-carrying mechanism may include a loading platform or tray 13 upon which sausages 17 are placed and from which they are fed to the carrier. The carrier itself comprises a pair of flexible members, such as chains 18, 18 which have secured to them at appropriate intervals sausage-supporting members 19, each of which is provided with a member 20 in which is formed a notch or depression to carry the sausage 17, as shown generally in the figures and in detail in Figures 2 and 9. At one end the chains 18 are engaged in sprockets 22 which are mounted upon and driven by a shaft 21. At the opposite end the chain is engaged with sprockets 23 which are carried upon a shaft 24. The shaft may have its bearing in a member 25 which is adjusted by a screw 26 to adjust the tension of the chains. The particular drive of the chains is immaterial so long as the chains are driven in the right direction and at a reasonable speed for synchronization with the other parts of the total assembly. A cover 27 may be provided at one end of the assembly to enclose the sprockets 23, and a guiding and limiting member 28 may be placed alongside the chain opposite the platform 16, as shown particularly in Figures 1 and 2.

Positioned so as to lie between the sprockets 22, as shown in plan in Figures 7 and 8, is a guiding member 29 which is adjustably held in position by a screw 30. At its opposite end the member is bifurcated, as at 31, and is inclined upwardly, as shown for example in Figure 4. Adjacent the free ends of the bifurcations 31 is a fixed positioning member 32 which is fastened to the general frame structure in any desired manner. Adjacent its upper edge the member 32 is provided with a cushion 33 which may be of rubber or similar material. The cushion is positioned generally in line with the ends of the bifurcations 31. Extending downwardly and to the left, as shown in Figure 4, from the member 32 is a sausage-guiding and supporting member 34. It terminates in separated members 35 between which a clearance is provided for a conveying belt 36 which is driven by a drum 37 carried on a shaft 38. At its opposite end the belt is positioned about a drum 39 carried on a shaft 40 which is supported upon a table-like extension 41 of the sausage-conveying assembly. Braces 42 may be provided to support the member for one or more of the vertical frame parts 1. Positioned alongside of the belt 36 may be surface members 43, as shown particularly in Figure 2.

The mechanism thus far described comprises means for conveying sausages, for loading them into the conveyor, for moving them to a point of sealing and for conveying them away from the sealing point. The sealing means will now be described.

The sealing means comprises generally means for supplying two strips of web material which may be paper or other more or less analogous material and which will be referred to hereafter as tape or tapes. In addition to the means for supplying the tapes, the mechanism comprises means for forcing the two tapes together and for sealing them together. While many different forms of sealing may be used, the particular form here shown involves the use of heat and for that purpose the tapes may be supplied with wax or other adhesive material which, upon the occurrence of suitable heat, will cause two such tapes to adhere together. Means may also be provided with the sealing means or otherwise for perforat-

ing the tapes so that the tapes may be readily torn between sausages. A still further means is provided, in connection with the sealing member or assembly, whereby the tapes are totally severed after the sealing of a predetermined number of sausages. Thus, for example, six, twelve or more sausages may be sealed together in a unitary string or group, and then the group will be automatically severed from the following sausages and the complete package will comprise a string of a predetermined number of sausages banded together.

The means for supplying the tape comprises an upper reel 44 which is mounted for rotation upon an arm 45 and a lower reel 46 mounted for rotation upon an arm 47. From the reel 44 an upper tape 48 is fed along a guide 49 and through a guide 50 to the point of use. A lower tape 51 is fed along a guide member 52 and under a guide member 53 across the cushion member 33 to a point of use. While many different means may be arranged for controlling the feeding of the tapes, those shown are typical of possible feeding means. The means for controlling and feeding the upper tape will be described below.

The means for feeding the lower tape comprises, in part, the drum pulley 37 and a detent member 54 which is adjustable by a spring 55 against the lower tape 51. This tape is fed to the discharge end of the apparatus by the drum 37. The sealing assembly comprises not merely means for bringing the two tapes together, and for sealing them together, but comprises also means for, in effect, wrapping the upper tape substantially about the sausage while the lower tape remains substantially flat. The sealing assembly also includes means for feeding the sausages toward the discharge end as they are banded and sealed together.

The sealing assembly proper comprises a housing 56 within which or adjacent which a pair of heating coils 57, 57 is mounted. A rheostat is enclosed in the housing 58, preferably associated with the coils 57, and a switch or lever 59 is associated with the rheostat. By means of this construction the heating coils may, if desired, be arranged to be turned off and on, and the degree of heat of the coils may be varied. A telltale light 60 is associated in the heating coil circuit and a separate switch 61 may, if desired, also be inserted in the circuit. As shown in Figure 1, the telltale light 60 is enclosed in the housing 62 and the switch 61 is associated or mounted adjacent these parts for convenience of operation. The details of the circuit and the conductors by means of which electricity is conducted to the heating coils and the rheostat need not be described. It is sufficient for the purpose of this invention that conductors are provided for conducting electricity to the heating coils and to the rheostat if one is present. Obviously the coils might be designed so that no rheostat is necessary.

Associated with the heating assembly member 56 is a blade 63 carried on a rod 64. A spring 65 tends to hold the blade in a raised or relatively inactive position. It bears at one end against the housing 56 and at the other end against a collar or stop 66 fixed upon the rod 64. The blade 63 is notched, as at 67, so that its lower edge, if given one degree of travel, will merely perforate the tapes, and if given another degree of travel will totally sever the tapes. The housing 56 is secured to a relatively hollow member 68 which is itself fixed to or formed integrally with the arms 69 which are loose on a shaft 70. While

the rod 64 is mounted within the housing 56 and may move with it, it also has relative movement under the influence of the arm 71. As shown, one end of this arm is pivoted, as at 72, to an enlargement 73 fixed to or formed as a part of the rod 64. The arm 71 is pivoted at 74 on a pin which is fixed in the arms 69. The opposite end of the lever arm 71 is enlarged, as at 75, and as shown in Figure 9, may contact a pin 76 seated in a collar 77 secured to the shaft 70. A torsional spring 78 which is positioned about the pin 74 tends, when free to do so, to raise the right-hand end of the lever arm 71. Pivoted preferably between the arms 69, as at 78a, is a member comprising two lever-like portions 79. These members are joined by a pin 80. Obviously a roller might be substituted for the pin. Each of the members 79 is provided with a spring 81, tending normally to raise it against the stop 82, each of which is welded or otherwise secured to one of the arms 69. A spring 83 is mounted at one end on a pin 84 which extends between the two sides of the housing 68. At its opposite end it is secured to a pin 85 and tends, when free to do so, to hold the sealing assembly and its associated parts in the raised position, as shown in Figure 4, but is adapted to yield to permit lowering of the sealing assembly to the position shown in Figure 9.

It has been stated above that the shaft 12 is driven from the belt or chain 11. This may be done by a sprocket or by a pulley 12', as shown in Figure 13. Fixed on the shaft 12 is a cam 87 which, as shown, contacts the pin or roller 88 between the arms 79.

One means for looping or "wrapping" the upper tape about the sausage includes a part 89. This member is secured to a rod 89 to which an arm 90 is fixed. A link 91 is joined at one end of the arm 90 and at its opposite end the link 91 is pivoted to a lever 92 which is itself pivoted at 93. Rotatably mounted in an extension on the lever is a roller 94 arranged to contact a cam 95 which is fixed on the shaft 12. A spring 96 is secured at one end to the link 91 and at its opposite end to an abutment 97 and acts to hold the roller 94 constantly in contact with the cam 95 and correspondingly to move the link 91 downwardly as far as the position of the cam 95 permits.

A feeding and sausage-moving means additional to the chains is illustrated in elevation primarily in Figures 4, 9 and 18. This means includes a pair of levers 98 pivoted on the member 93. At their free ends each of the levers has pivoted to it a link 99 slotted as at 100. Fixed to the free ends of each of the links 99 is one of a pair of hooks 101. Extending across the assembly and through each of the slots 100 in the links 99 is a rod 102. Spacers 103 may or may not be positioned on the rod 102. The rod 102 passes through slots 104 in the side frame members 105 and is also carried in the lower ends of links 106. These links, at their upper ends, are pivoted in one end of a lever arm 107, which is itself pivoted on the rod or pin 93. The opposite end of the lever arm 107 is provided with a roller 108 which is in contact with a cam 109. One or more springs 110 are secured, each at one end to the links 106 and at their opposite ends are secured to abutments 111. These springs hold the rollers 108 in contact with the cam or cams 109. One or more of the levers 98 may be provided with a roller 112 adapted to contact the cam 113 which is fixed upon the shaft 12.

Pivoted to one of the levers 98 is a tape feed

link 114. At its opposite end it is pivoted to a lever arm 115 which is fixed to a rod 116 which itself extends through and is pivoted upon the side frame members 105. The guide 49 is mounted on the rod 116 to rotate with it from the full line position of Figure 4 to the dotted line position of Figure 18. It comprises a relatively flat member 117 which may or may not be curved at its free end and which has one or more loops 118 through which the upper tape 48 passes. The lower guide 50 above referred to may include a roller 119 yieldingly held against the tape by springs 120 which bear upon the frame 121 in which the roller 119 is pivoted.

The means for driving the conveyor belt 36 will now be described. These means are shown generally in Figure 13. As pointed out above, the shaft 21 is driven by means of the chain Y and the sprocket Z. A cam carrier 122 is fixed on the shaft 21 and carries at each end a roller 123. Pivotaly mounted on the shaft 38 is a pair of links 124, and between the links a dog 125 is pivoted. Fixed between the links is a lever 126 which is held in contact with the rollers 123 by a spring 127 which has one end fixed to the lever 126 and its opposite end fixed to an abutment 128. The cam carrier 122 may be provided with an enlarged roller-like hub 129 against which the lever 126 lies during a portion of the rotation of the member 122. A spring 130 has one end fixed to the dog 125 and at the other end is fixed to the lever 126 to hold the dog in contact with the teeth of a gear 131 which is fixed on the shaft 38. Movement of the lever 126 in response to rotation of the cam carrier 122 moves the dog back and forth over the teeth of the gear 131 and thus advances the gear in a step by step movement.

It has been stated above that means are provided for operating the blade 63 at a predetermined time to cause it completely to sever both of the tapes. Means are also provided for controlling the operation of the heating elements in the sealing and cutting assembly to prevent unsatisfactory operation. These two controlling means are shown in Figure 5 in one position and in Figure 16 in another position and will now be described. The schematic wiring diagram of the heating circuit is shown in Figure 15. As there shown, the shaft 12 carries a cam 132. A switch 133 is shown in the circuit and a switch-operating member 134 is also shown. The cam 132 in its rotation contacts the switch-operating member 134 and moves it to open the switch. Thus in one position of the cam and correspondingly in one position of the sealing and cutting assembly, the switch is so operated as to break the circuit of the heating elements. One reason for this is to prevent burning of the cushion 33, the tapes, the sausage or any other part of the sealing assembly should it be stopped or held too long in the position of Figure 9.

The cutting control means includes a lever 135 pivoted at 136 upon one of the side frame members 105. It carries a dog-operating member 137, an abutment member 138 and a roller 139. A spring 140 is attached at one end to the lever 135 and at the other end to an abutment 141. A keeper 142 may be provided to keep the lever 135 in proper alignment at all times.

A cam 143 is fixed on the shaft 12 and is in contact with the roller 139, since the spring 140 holds the lever 135 and its associated parts in the raised position. The cam 143 thus, as it rotates, depresses the lever 135 with each rotation.

Fixed on the shaft 70 is a lever arm 144. Loose on the shaft 70 is a cooperating left arm 145. The two left arms 144 and 145 are joined together by an adjustable means 146 so that their position may be relatively adjusted. The arm 145 is connected to the lever 135 by a link 147. Loosely mounted on a supporting shaft 148 is a ratchet wheel 149. A hub 150 is fixed to the ratchet 149. A spring 151 has one end mounted upon the abutment 141, is wrapped or positioned partially about the hub 150 and has its other end fixed at 152 upon the ratchet wheel 149. The spring thus tends to rotate the ratchet wheel 149 in a counter-clockwise direction as seen in Figures 5 and 16. The ratchet is rotated in a clockwise direction by the pin 153 which is fixed in the hub 154 of the cam 143. Thus as the hub rotates in the clockwise direction the pin, with each rotation of the hub, strikes a tooth of the ratchet 149 and rotates it in the clockwise direction against the resistance of the spring 151. The dog 155 rides over the tooth during the clockwise direction and under the influence of the spring 156 returns to the latching position and holds the ratchet wheel against reverse movement under the influence of the spring 151. The dog 155 is pivoted at 157 upon one of the side frame members 105.

A stop member 158 is pivoted at 159 on one of the side frame members 105. A spring 160 normally urges one of its legs 161 against a stop 162 which is fixed in the same side frame member 105. The abutment 138 strikes the stop 158 in the upward movement of the lever 135 and limits that movement. A pin 163 which is fixed in the ratchet wheel 149 contacts the leg 161 of the stop 158, as shown in Figure 16, and moves the stop out of line with the abutment 138. When that occurs, a greater upward movement of the lever 135 may occur. When that movement occurs, the member 137 raises the dog 155 out of latching engagement with the teeth of the ratchet 149 and permits the ratchet to move in the counter-clockwise direction under the influence of the spring 151. The raised position of the dog is shown in dotted lines in Figure 16. The amount of counter-clockwise movement which is given to the ratchet 149 is determined by the setting of the adjustment arm 164. This arm as shown is pivoted on the shaft 148 and includes a notched member 165 into which the pin 163 fits upon the counter-clockwise movement of the ratchet. This notched member acts as a stop for the pin 163. The adjustment arm 164 may be provided with a socket 166 within which a spring or some other means not shown is mounted. A pin 167 is mounted in the socket 166 and is normally held in the inward position by the spring. A knob 168 is provided for pulling out the member 167. By this means the member 164 may be moved into adjusted position and the pin 167 may be seated in any of the perforations or other seating positions shown in Figure 5 and numbered from 11 to 16, inclusive. There might obviously be any number of such seating positions.

A final or extreme stop member 169 is provided on the side frame member 105 and the handle portion 164 may be seated against that stop. It will be noted that the teeth of the ratchet 149 are cut away, as at 170.

Since the lever 144 is fixed to the shaft 70, movement of that lever oscillates the shaft. So long as the abutment 138 contacts the stop 158 the movement is slight, and it is only sufficient to carry the blade 63 a short distance outside of

the housing 56, sufficiently to accomplish perforation of the tapes, but not severing. When the stop 158 has been moved out of line with the abutment 138 the lever 135 makes a greater stroke and gives a greater movement to the shaft 70, thus raising the pin 76 which is fixed with relation to the shaft 70 and through the member 75. This movement acts on the lever 71 which is pivoted to the blade carrier 64 and gives the blade 63 a greater downward movement and thus completely severs both bands.

When only perforation of the tape is to occur the handle 164 is moved into contact with the stop 169. With the parts in that position, when the ratchet 149 is moved counter-clockwise by the spring 151, the stop pin 163 is received in the notched member 165 and in this position the cut away portion 170 lies in the path of the pin 153 and the pin can contact any of the teeth of the ratchet and hence further rotation of the pin is without effect on the ratchet until the latter is reset into one of the adjusted positions. When this is done, the ratchet wheel is rotated in a clockwise direction and the cut away portion 170 is moved so that thereafter the pin 153, in its further rotation, will strike one of the teeth of the ratchet, and hence the cycle of operations above described can be repeated.

Although I have shown an operative form of my invention, it will be recognized that many changes in the form, shape and arrangement of parts can be made without departing from the spirit of the invention, and my showing is therefore to be taken as, in a sense, diagrammatic. The use and operation of this invention are as follows:

In general, the operation comprises the steps of putting the sausages onto the conveying chains, particularly onto the notches formed in the members 12, conveying the sausages to the point of sealing by means of the chain, then transferring the sausages from the chain and the sausage carriers to the point of sealing, moving the sealing assembly and associated parts downwardly, and thus moving the sausage slightly beyond the point of sealing, and at the same time wrapping the upper tape about a larger part of the diameter of the sausage. After this has occurred, the sealing assembly moves downwardly sufficiently to perforate the tape by means of the blade 63. Since the sealing assembly is heated and since the tapes are provided with heat-sealing adhesive, they are sealed together at this time. Obviously the perforating step might be omitted if desired. Other sealing means can be used.

The sausages are then moved away from the point of sealing in a continuous package of varying length. The package comprises, of course, the lower tape, the sausages positioned on it, and the upper tape wrapper about the sausages positioned at intervals against the lower tape and sealed to it. The auxiliary carrying belt 36 assists in the further movement of the completed sausage package. For some purposes the conveying effect on the sausage about to be sealed is sufficient to move the sausages already sealed because, as pointed out below, the sealing assembly and parts associated with it force the sausage slightly beyond the sealing point, and this successive forcing of each sausage is transmitted to the previously sealed sausages, because they are all secured to the same tapes and are in actual or substantial contact with each other. In the particular form here shown, adjustable

means are provided for severing the bands or tapes at predetermined intervals so that a package consisting of any desired number of sausages, after having been sealed together, are severed and thus the complete package is automatically formed.

The chains 18 are ordinarily given a continuous movement so that the sausages are continuous. Since a slight time interval is required to accomplish sealing, the sausages, after they have been removed from the notches in the members 19, remain stationary for a brief period. To accommodate for this brief stopping, the conveyor 36, if positively driven, is driven in a step by step or interrupted movement. This is accomplished by the mechanism shown in Figure 13. As there shown, the cam carrier 122 rotates with the shaft 21 and with each half revolution one of the rollers 123 strikes the lever 126 and thus oscillates the link 124 and moves it in a clockwise direction, as shown in Figure 13, and by means of the dog 125 advances the ratchet 131 and the shaft 36 a limited distance.

The reverse movement of the lever 126 carries the dog over the teeth of the ratchet 131 into position for the next forward movement of the ratchet and, correspondingly, for the next forward movement of the conveyor belt 36.

As above mentioned, means are provided for positively moving the sausage after it has left the notch in the member 19. These means include primarily the member 101, which is carried on the link 99 from the lever 98. These parts are shown in their downward position in Figures 4 and 18 and in their raised position in dotted lines in Figure 18. This movement occurs with rotation of the shaft 12 and is caused by the contact of the roller 112 with the cam 113. The movement is also controlled by the action of the lever 107 which raises and controls the link 99 through the means of the link 106 in the lever 107 which is oscillated through the contact of the roller 109 with the cam 109 which is also on the shaft 12. The members 98, shown generally in Figures 4 and 9 and in detail in Figure 17, act as keepers to prevent misplacement of the sausage after it has been moved into position for sealing by the part 101.

The means for actuating the keepers 98 are shown in Figure 17 and include the lever 92, the link 91 and the arm 90, all of which act to rotate the shaft 89 upon which the keepers 98 are positioned. The lever 92 is oscillated through contact of the roller 94 with the cam 95.

The sealing assembly itself, including the housing 56, the heating coils 57, the heating coil switch 58 and the blade 63, is raised and lowered by the movement of the cam 37 which contacts the roller 50. The roller 50 is carried on the member 79 which is pivoted on the arm 69 to the extension 68 to which the housing 56 is secured. Movement of the cam 37 causes these parts to rise and fall from the position of Figure 4 to that of Figure 9. After the housing 56 has reached the sealing position, further movement of the arm 71 is permitted by its mounting on the member 69 and by the spring which is positioned about the rod 64.

Ordinarily the movement downward of the rod 64, and with it the blade 63, is only sufficient to move the points 67 outwardly beyond the housing 56 and thus to cause perforating. The greater movement of the blade accomplishes complete cutting of the tapes by means of the mechanism illustrated in detail in Figures 5 and 16, and this will next be described.

As shown in Figures 5 and 16, the mechanism for causing complete severance of the tapes or bands comprises in general a ratchet, a means for rotating it, a means for holding it in effective 5 rotated or advanced position and a means for releasing it upon the completion of a predetermined number of advanced steps. Further means are provided for causing the complete severance to occur when the ratchet is released after the predetermined number of steps have been completed.

The lever 135 is given slight oscillations with each rotation of the cam 149 which is fixed on the shaft 12. These oscillations through the 15 link 147 and the adjustable lever 145 cause an oscillation of the shaft 70. The stop 158, so long as it remains in the position of Figure 5, will limit the upward oscillation of the lever 135, and the lever cannot move to the full upper limit, as indicated in dotted lines in Figure 16, until the stop 158 has been moved to the position of Figure 16. Then the spring 140 is free to raise the lever to the full upward position and to give a substantially increased oscillation to the shaft 70.

As the shaft 12 rotates, carrying with it the several cams which are fixed upon it, the pin 153 rotates in counter-clockwise direction and with each rotation strikes a tooth of the ratchet 149 and moves it in clockwise direction. The dog 155 retains the ratchet in each successive advanced position. As the ratchet is advanced, the spring 151 is additionally wrapped about the hub 150 and its tension is increased. The successive 25 step by step clockwise movement of the ratchet 149 will continue until the pin 163 on it strikes the arm 161 and moves the stop 158 to the dotted line position of Figure 16 and thus permits the lever 135 to rise, since the abutment 136 and the stop 158 are no longer in alignment.

When the lever 135 rises to the dotted line position of Figure 16, the dog 155 is knocked out of engaging position by the member 137. The ratchet is therefore no longer held in its advanced position and it is returned in a counterclockwise 35 direction by the action of the spring 151. The limit of its return movement is established by the adjustment of the notched member 165. Positions of adjustment as shown in Figures 5 and 16 are provided and the location of the notch member determines the degree of return movement of the ratchet. Since the ratchet is advanced one tooth each time the sealing assembly is reciprocated, the setting of the return control means for the ratchet may readily be coordinated 45 with the number of sausages banded. Thus if it is desired to sever the bands after twelve sausages have been banded, the pin 167 of the handle 168 is seated in the perforation marked "12" and the machine is started. Twelve sausages will be banded, by twelve reciprocations of the sealing assembly, and then the stop 158 will be moved out of position, the lever 135 will rise to its upper limit and will give the shaft 70 an additional rotation or oscillation which accomplishes the 55 further movement of the blade 63 and thus the complete cutting of the tapes.

If the pin 167 is seated against the stop 169, the cut-away portion 170 of the ratchet will be brought into position, where the rotation of the pin 153 will merely pass through the cut-away portion without contacting or advancing the ratchet. When the parts are thus adjusted, no total cutting of the tapes will occur and the mechanism will merely operate to make a long 75 continuous package of sausages banded together.

I claim:

1. In combination in a banding machine for securing together a plurality of elongated articles, means for supplying, along separate and converging paths, two elongated bands of flexible web material, means for feeding progressively a plurality of said articles to a point between said bands, means for placing said articles and retaining them for a predetermined time interval at a point of band attachment, said means including parts adapted to take said articles from the feeding means and to move them to the point of attachment, band attaching means including an assembly, and means for raising and lowering the assembly and for causing it to attach one of said bands to the other band, said assembly including means for attaching said bands, means for perforating said bands, and means for cutting said bands, and driving means adapted to move said assembly toward and from the point of attachment.

2. In combination in a banding machine for securing together a plurality of elongated articles, means for supplying, along separate and converging paths, two elongated bands of flexible web material, means for conveying progressively a plurality of said articles to a point between said bands, means for placing said articles and retaining them for a predetermined time interval at a point of band attachment, said means including parts adapted to take said articles from their conveyor and to move them to the point of attachment, band attaching means including an assembly, and means for raising and lowering the assembly and for causing it to attach one of said bands to the other band, said assembly including heating means, means for perforating said bands, and means for cutting said bands, and driving means adapted to move said assembly toward and from the point of attachment, said perforating and cutting means being movable within said assembly, and members for controlling the movement of said perforating and cutting means.

3. In combination in a banding machine for securing together a plurality of elongated articles, means for supplying, along separate and converging paths, two elongated bands of flexible web material, means for conveying progressively a plurality of said articles to a point between said bands, means for placing said articles and retaining them for a predetermined time interval at a point of band attachment, said means including parts adapted to take said articles from their conveyor and to move them to the point of attachment, band attaching means including an assembly, and means for raising and lowering the assembly and for causing it to attach one of said bands to the other band, said assembly including heating means, means for perforating said bands, and means for cutting said bands, and driving means adapted to move said assembly toward and from the point of attachment, said perforating and cutting means being movable within said assembly, and members for controlling the movement of said perforating and cutting means, said controlling means including parts adapted to cause said perforating and cutting means, at a predetermined time, to make an increased movement whereby the bands are cut.

4. In combination in a banding machine for securing together a plurality of elongated articles, means for supplying, along separate and converging paths, two elongated bands of flexible web

material, means for conveying progressively a plurality of said articles to a point between said bands, means for placing said articles and retaining them for a predetermined time interval at a point of band attachment, said means including parts adapted to take said articles from their conveyor and to move them to the point of attachment, band attaching means including an assembly, and means for raising and lowering the assembly and for causing it to attach one of said bands to the other band, said assembly including heating means, means for perforating said bands, and means for cutting said bands, and driving means adapted to move said assembly toward and from the point of attachment, and conveying means for moving the banded articles progressively in a step by step movement away from the point of attachment.

5. In combination in a banding machine for securing together a plurality of elongated articles, means for supplying, along separate and converging paths, two elongated bands of flexible web material, means for conveying progressively a plurality of said articles to a point between said bands, means for placing said articles and retaining them for a predetermined time interval at a point of band attachment, said means including parts adapted to take said articles from their conveyor and to move them to and hold them at the point of attachment, band attaching means including an assembly, and means for raising and lowering the assembly and for causing it to attach one of said bands to the other band, said assembly including heating means, means for perforating said bands, and means for cutting said bands, and driving means adapted to move said assembly toward and from the point of attachment.

6. In combination in a banding machine for securing together a plurality of elongated articles, means for supplying, along separate and converging paths, two elongated bands of flexible web material, means for conveying progressively a plurality of said articles to a point between said bands, means for placing said articles and retaining them for a predetermined time interval at a point of band attachment, said means including parts adapted to take said articles from their conveyor and to move them to the point of attachment, band attaching means including an assembly, and means for raising and lowering the assembly and for causing it to move one of said bands substantially about one of said articles and to attach one of said bands to the other band, said assembly including heating means, means for perforating said bands, and means for cutting said bands, and driving means adapted to move said assembly toward and from the point of attachment.

7. In combination in a banding machine for securing together a plurality of elongated articles, means for supplying, along separate and converging paths, two elongated bands of flexible web material, means for conveying progressively a plurality of said articles to a point between said bands, means for placing said articles and retaining them for a predetermined time interval at a point of band attachment, said means including parts adapted to take said articles from their conveyor and to move them to and hold them at the point of attachment, band attaching means including an assembly, and means for raising and lowering the assembly and for causing it to move one of said bands substantially about one of said articles and to attach one of said bands to the

other band, said assembly including heating means, means for perforating said bands, and means for cutting said bands, and driving means adapted to move said assembly toward and from the point of attachment.

8. In combination in a banding machine for securing together a plurality of elongated articles of generally rounded cross section, means for supplying, along separate and converging paths, two elongated bands of flexible web material, means for conveying progressively a plurality of said articles to a point between said bands, means for placing said articles and retaining them for a predetermined time interval at a point of band attachment, said means including parts adapted to take said articles from their conveyor and to move them to and hold them at the point of attachment, band attaching means including an assembly, and means for raising and lowering the assembly and for causing it to move one of said bands substantially about one of said articles and to attach one of said bands to the other band, said assembly including heating means, means for perforating said bands, and means for cutting said bands, and driving means adapted to move said assembly toward and from the point of attachment, said perforating and cutting means being movable within said assembly, and members for controlling the movement of said perforating and cutting means, said controlling means including parts adapted to cause said perforating and cutting means, at a predetermined time, to make an increased movement whereby the bands are cut.

9. In combination in a banding machine for securing together a plurality of elongated articles of generally rounded cross section, means for supplying, along separate and converging paths, two elongated bands of flexible web material, means for conveying progressively a plurality of said articles to a point between said bands, means for placing said articles and retaining them for a predetermined time interval at a point of band attachment, said means including parts adapted to take said articles from their conveyor and to move them to and hold them at the point of attachment, band attaching means including an assembly, and means for raising and lowering the assembly and for causing it to move one of said bands substantially about one of said articles and to attach one of said bands to the other band, said assembly including heating means, means for perforating said bands, and means for cutting said bands, and driving means adapted to move said assembly toward and from the point of attachment, said perforating and cutting means being movable within said assembly, and members for controlling the movement of said perforating and cutting means, said controlling means including parts adapted to cause said perforating and cutting means, at a predetermined time, to make an increased movement whereby the bands are cut, and conveying means for moving the banded articles progressively in a step by step movement away from the point of attachment.

10. In combination in a banding machine, means for supplying a pair of bands along converging paths, a conveyor for moving a plurality of articles toward a point of sealing between said bands, means adapted to move said articles from said conveyor to said point of sealing, a sealing assembly, and means for moving the assembly to cause it to carry one of said bands substantially about one of said articles, said sealing as-

sembly including a housing, a blade therein and means for moving said blade out of said housing to a greater or less degree, said blade mounted to move with said housing, there being additional means for moving said blade with respect to said housing.

11. In combination in a banding machine, means for supplying a pair of bands along converging paths, a conveyor for moving a plurality of articles toward a point of sealing between said bands, means adapted to move said articles from said conveyor to said point of sealing, a sealing assembly, and means for moving the assembly to cause it to carry one of said bands substantially about one of said articles, said sealing assembly including a housing, a blade therein and means for moving said blade out of said housing to a greater or less degree, said blade shaped, when moved a limited distance out of said housing, to perforate said bands and when moved a greater distance out of said housing to sever said bands, said blade mounted to move with said housing, there being additional means for moving said blade with respect to said housing, and means for controlling the movement of said blade with respect to said housing.

12. In combination in a banding machine, means for supplying a pair of bands along converging paths, a conveyor for moving a plurality of articles toward a point of sealing between said bands, means adapted to move said articles from said conveyor to said point of sealing, a sealing assembly, and means for moving the assembly to cause it to carry one of said bands substantially about one of said articles, said sealing assembly including a housing, a blade therein and means for moving said blade out of said housing to a greater or less degree, said blade shaped, when moved a limited distance out of said housing, to perforate said bands and when moved a greater distance out of said housing to sever said bands, said blade mounted to move with said housing, there being additional means for moving said blade with respect to said housing, and means for controlling the movement of said blade with respect to said housing, said means including control parts and means for adjusting them to a predetermined position whereby the blade is caused to move out of the housing its maximum distance at predetermined variable intervals and whereby the blade is caused to move a minimum distance out of said housing with each movement of the housing.

13. In combination in a banding machine, means for supplying a pair of bands along converging paths, a conveyor for moving a plurality of articles toward a point of sealing between said bands, means adapted to move said articles from said conveyor to said point of sealing and to position and hold them between the bands at said point of sealing for a predetermined interval, a sealing assembly, and means for moving the assembly to cause it to carry one of said bands substantially about one of said articles, said sealing assembly including a housing, a blade therein and means for moving said blade out of said housing to a greater or less degree, said blade mounted to move with said housing, there being additional means for moving said blade with respect to said housing.

14. In combination in a banding machine, means for supplying a pair of bands along converging paths, a conveyor for moving a plurality of articles toward a point of sealing between said bands, means adapted to move said articles from

said conveyor to said point of sealing and to position and hold them between the bands at said point of sealing for a predetermined interval, a sealing assembly, and means for moving the assembly to engage one of said bands and to carry one of said bands substantially about one of said articles, said sealing assembly including a housing, a blade therein and means for moving said blade out of said housing to a greater or less degree, said blade mounted to move with said housing, there being additional means for moving said blade with respect to said housing.

15. In combination in a banding machine, means for supplying a pair of bands along converging paths, a conveyor for moving a plurality of articles toward a point of sealing between said bands, means adapted to move said articles from said conveyor to said point of sealing and to position and hold them between the bands at said point of sealing for a predetermined interval, a sealing assembly, and means for moving the assembly to cause it to engage one of said bands and to carry one of said bands substantially about one of said articles, and guiding means for retaining one of said bands in generally flat position with respect to the other of said bands, said sealing assembly including a housing, a blade therein and means for moving said blade out of said housing to a greater or less degree, said blade mounted to move with said housing, there being additional means for moving said blade with respect to said housing.

16. In combination in a banding machine, means for supplying a pair of bands along converging paths, a conveyor for moving a plurality of articles toward a point of sealing between said bands, means adapted to move said articles from said conveyor to said point of sealing and to position and hold them between the bands at said point of sealing for a predetermined interval, a sealing assembly, and means for moving the assembly to cause it to engage one of said bands and to carry one of said bands substantially about one of said articles, and guiding means for retaining one of said bands in generally flat position with respect to the other of said bands, said sealing assembly including a housing, a blade therein and means for moving said blade out of said housing to a greater or less degree, said blade shaped, when moved a limited distance out of said housing, to perforate said bands and when moved a greater distance out of said housing to sever said bands, said blade mounted to move with said housing, there being additional means for moving said blade with respect to said housing, and means for controlling the movement of said blade with respect to said housing, said means including control parts and means for adjusting them to a predetermined position whereby the blade is caused to move out of the housing its maximum distance at predetermined variable intervals and whereby the blade is caused to move a minimum distance out of said housing with each movement of the housing.

17. In combination in a banding machine, means for supplying a pair of bands along converging paths, a conveyor for moving a plurality of articles toward a point of sealing between said bands, means adapted to move said articles from said conveyor to said point of sealing and to position and hold them between the bands at said point of sealing for a predetermined interval, a sealing assembly, and means for moving the as-

sembly to cause it to engage one of said bands and to carry one of said bands substantially about one of said articles, said articles being arranged transversely of said bands, and guiding means for retaining one of said bands in generally flat position with respect to the other of said bands, said sealing assembly including a housing, a blade therein and means for moving said blade out of said housing to a greater or less degree, said blade shaped, when moved a limited distance out of said housing, to perforate said bands and when moved a greater distance out of said housing to sever said bands, said blade mounted to move with said housing, there being additional means for moving said blade with respect to said housing, and means for controlling the movement of said blade with respect to said housing, said means including control parts and means for adjusting them to a predetermined position whereby the blade is caused to move out of the housing its maximum distance at predetermined variable intervals and whereby the blade is caused to move a minimum distance out of said housing with each movement of the housing.

18. In a machine for banding articles, means for supplying a pair of bands along converging paths, means for feeding a plurality of articles toward a point of connection between said bands, a pair of laterally spaced hooks adapted to engage with each article at opposite sides of the portion to be banded and move the article from said feeding means to said point of connection, a band fastening head operable between the hooks on interposed portions of both bands for securing them together, and means for moving the hooks and band fastening head in timed sequence to each other.

19. In a machine for banding articles, means for supplying a pair of bands along converging paths, means for feeding a plurality of articles toward a point of connection between said bands, a pair of laterally spaced hooks adapted to engage with each article at opposite sides of the portion to be banded and move the article from said feeding means to said point of connection, a band wrapping blade operable between the hooks against one of the bands to wrap that band about a portion of the article, a band fastening head operable between the hooks on interposed portions of both bands for securing them together; and means for moving the hooks, band wrapping blade and band fastening head in timed sequence to each other.

20. In a machine for banding articles, means for supplying banding material, a chain conveyor for moving articles toward a point at which portions of the banding material are connected together about each article, a pair of laterally spaced transfer plates on which each article is deposited by the conveyor with the end portions of the article resting on the plates, a pair of laterally spaced hooks adapted to engage with each article at opposite sides of the portion to be banded and slide the article along said plates to said point of connection, a platen between the transfer plates, a fastening head operable between the hooks against the platen on interposed portions of the banding material for connecting said portions together, and means for moving the conveyor, hooks and fastening head in timed sequence to each other.

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