Nov. 4, 1930. G. K. CRUTCHFIELD, JR., ET AL 1,780,815

BAG TYING MACHINE

Filed June 1, 1929 11 Sheets-Sheet 1

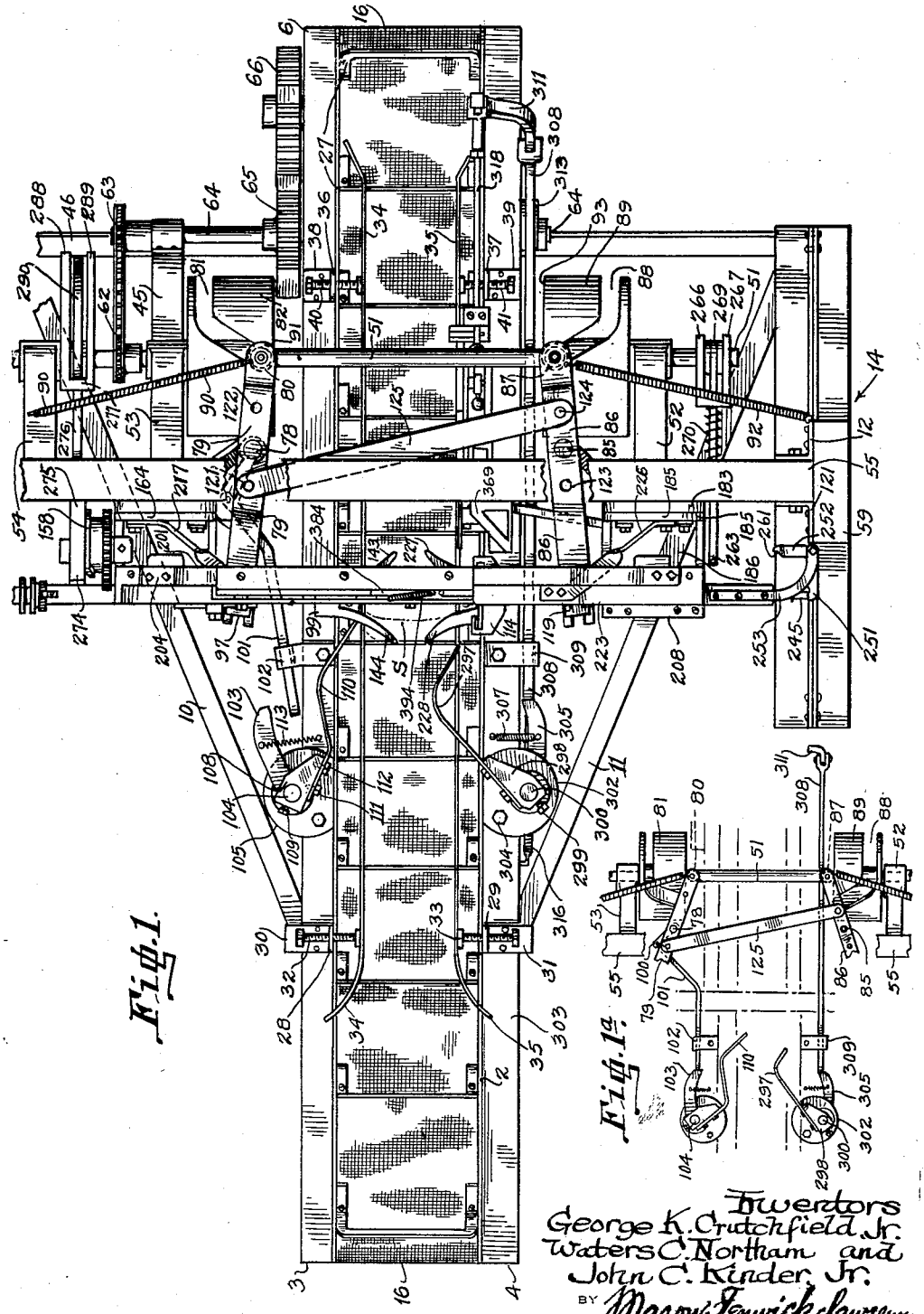


Fig. 1.

Fig. 1a.

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BAG TYING MACHINE

Filed June 1, 1929 11 Sheets-Sheet 2

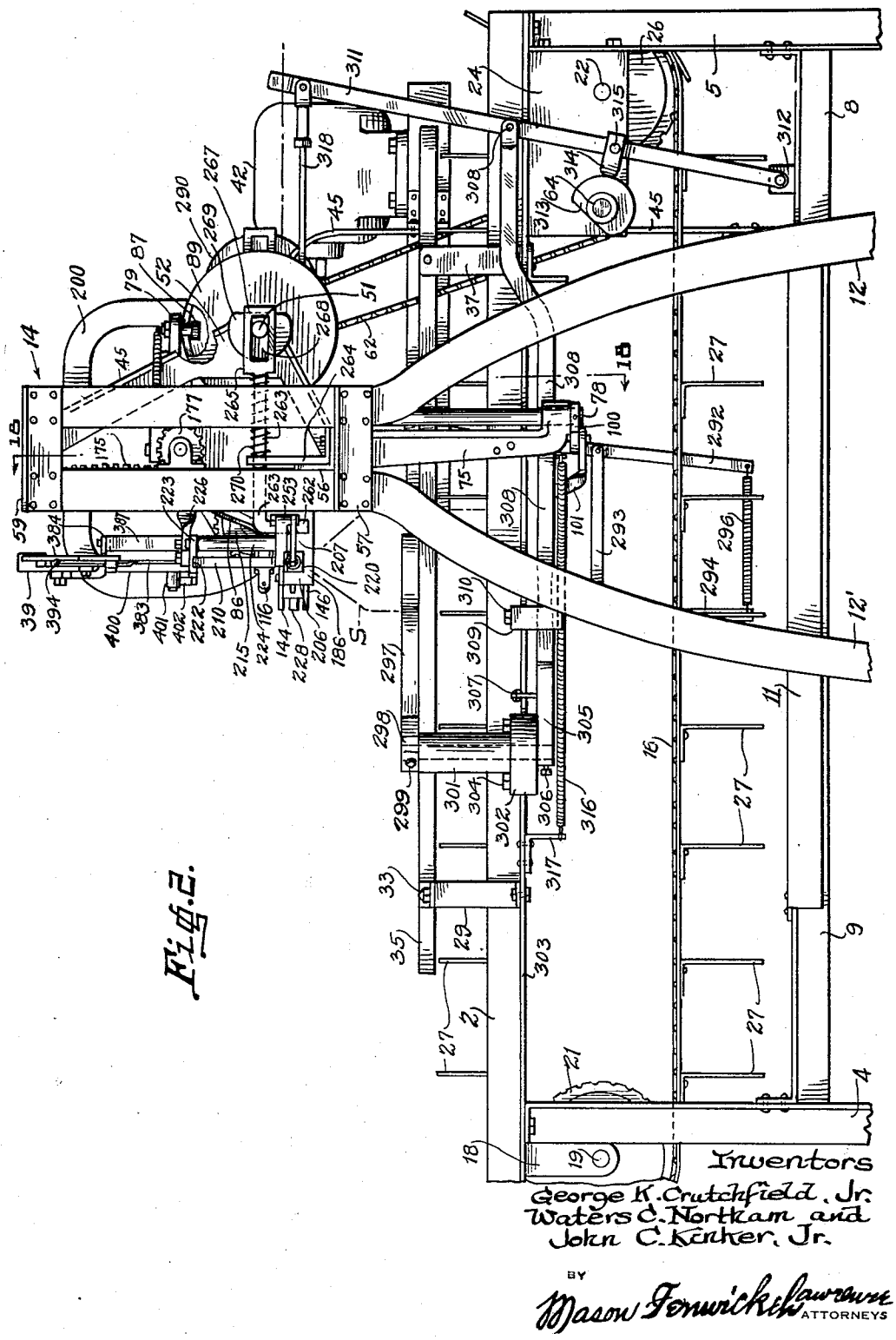


Fig. 2.

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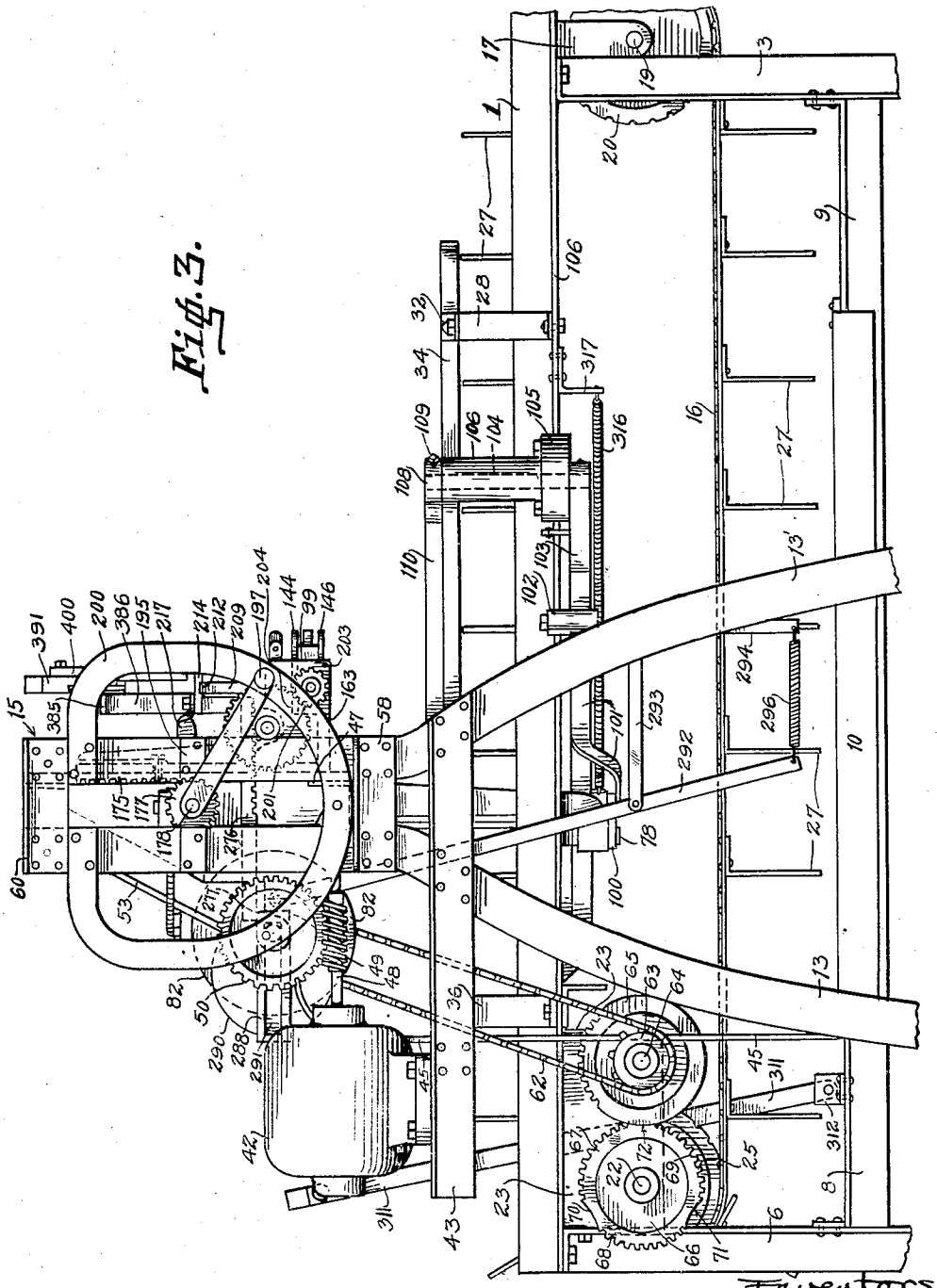
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Fig. 3.



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Filed June 1, 1929 11 Sheets-Sheet 4

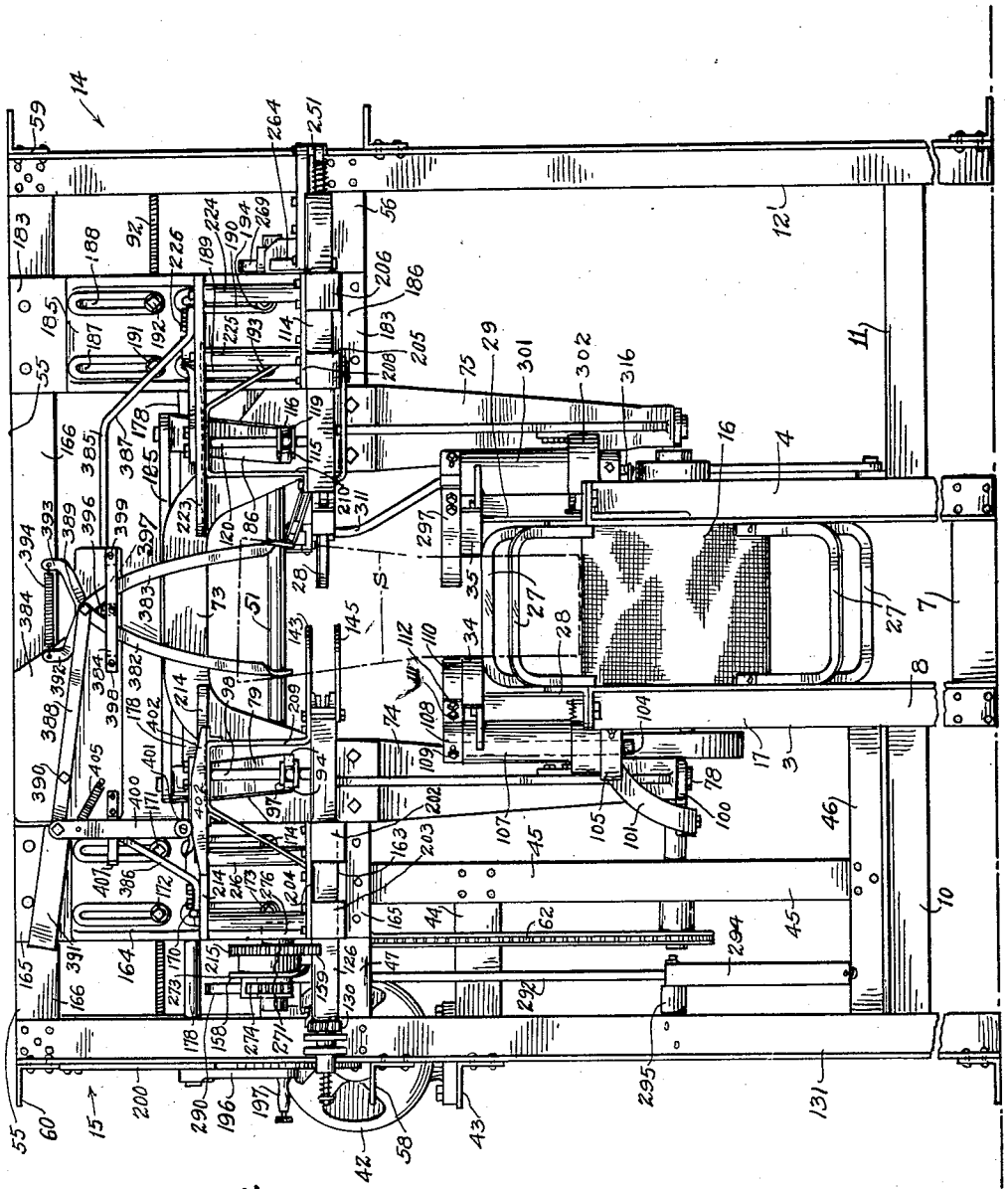


Fig. 4.

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Filed June 1, 1929 11 Sheets-Sheet 5

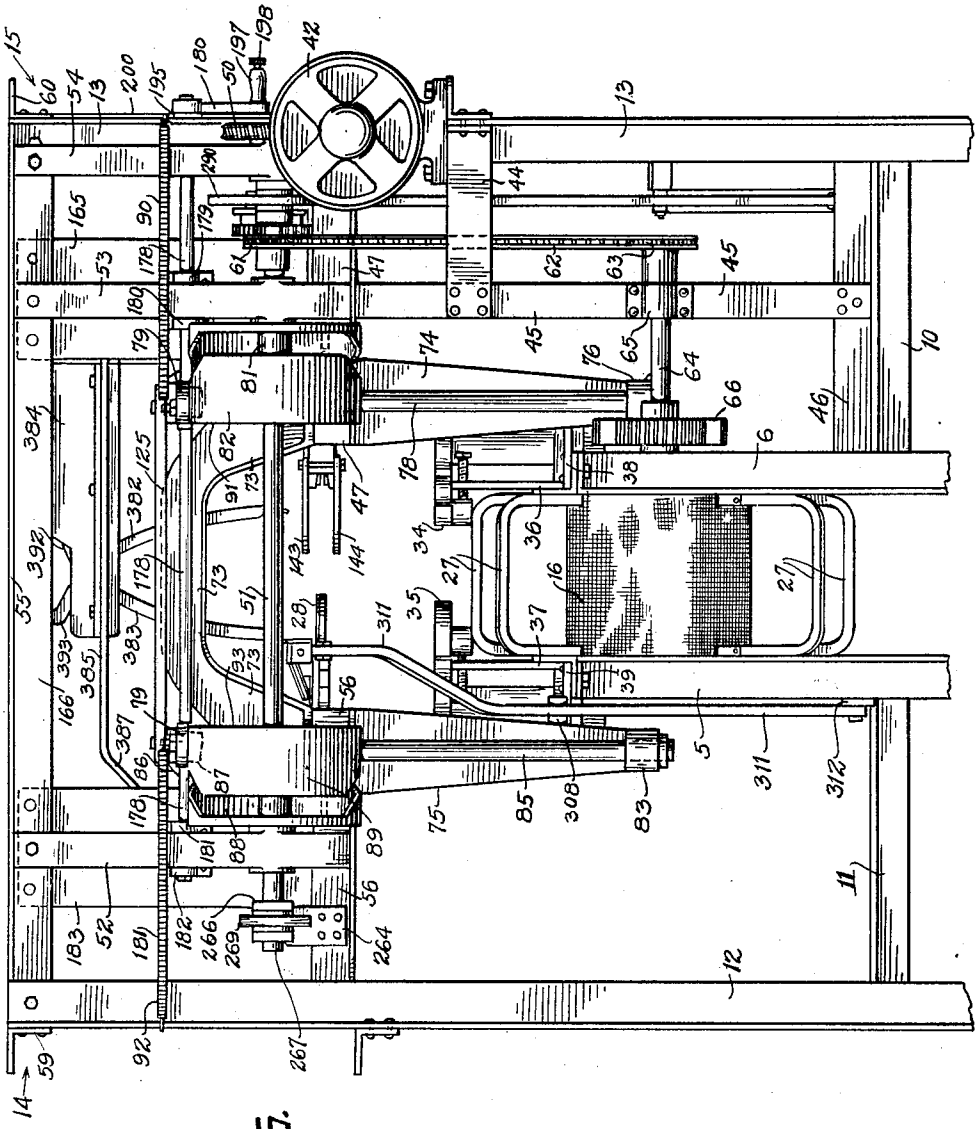


Fig. 5.

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Filed June 1, 1929 11 Sheets-Sheet 6

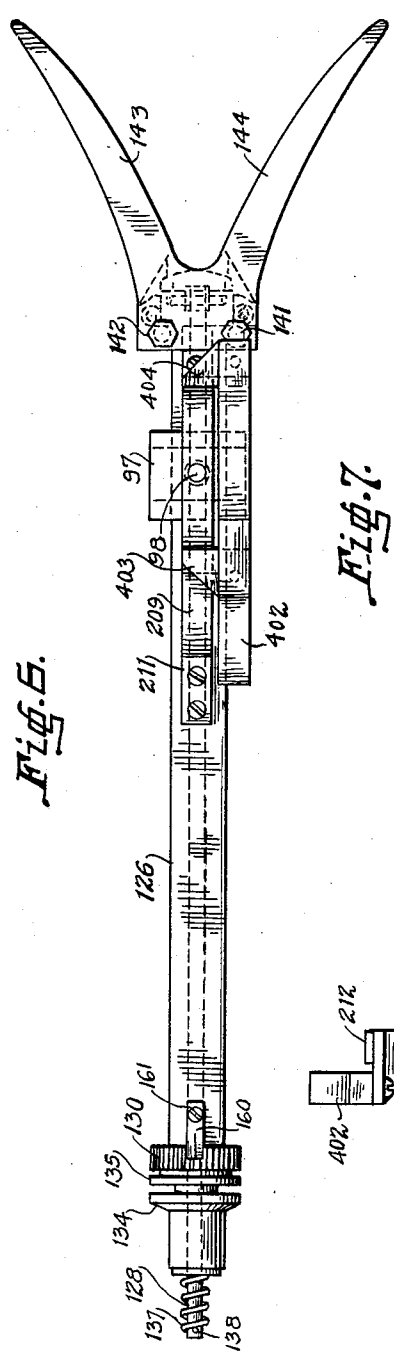


Fig. 5.

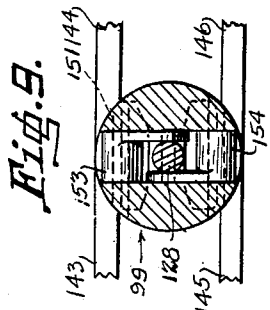


Fig. 9.

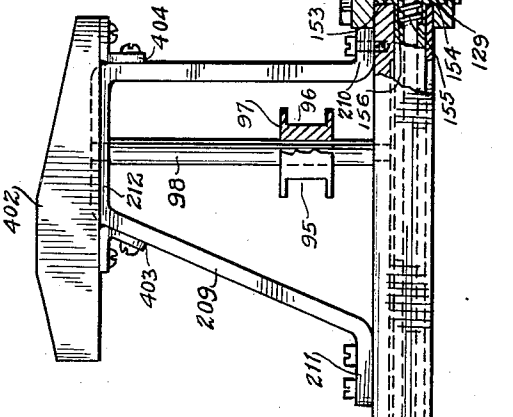


Fig. 7.

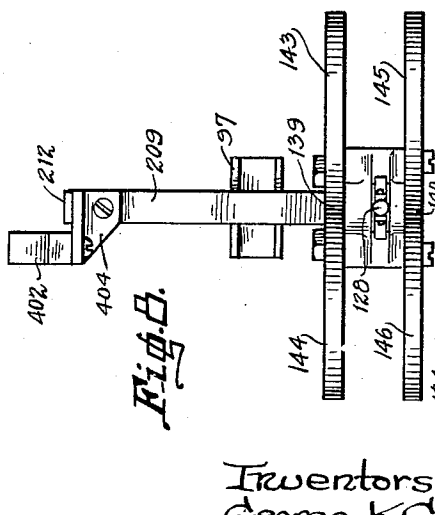


Fig. 8.

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BAG TYING MACHINE

Filed June 1, 1929 11 Sheets-Sheet 7

Fig. 10.

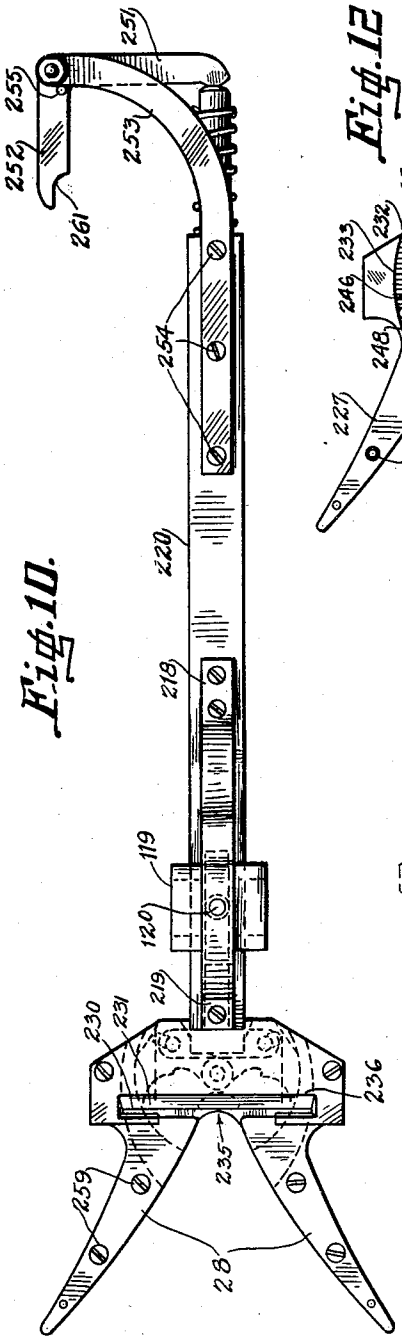


Fig. 12

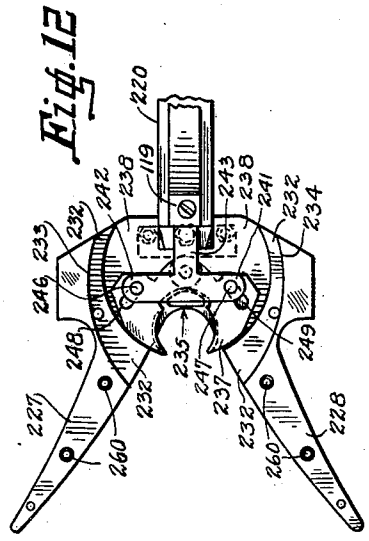


Fig. 11.

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BAG TYING MACHINE

Filed June 1, 1929 11 Sheets-Sheet 8

Fig. 13.

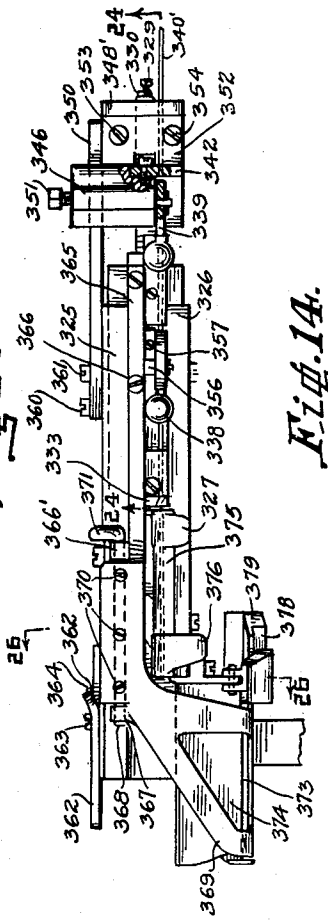


Fig. 14.

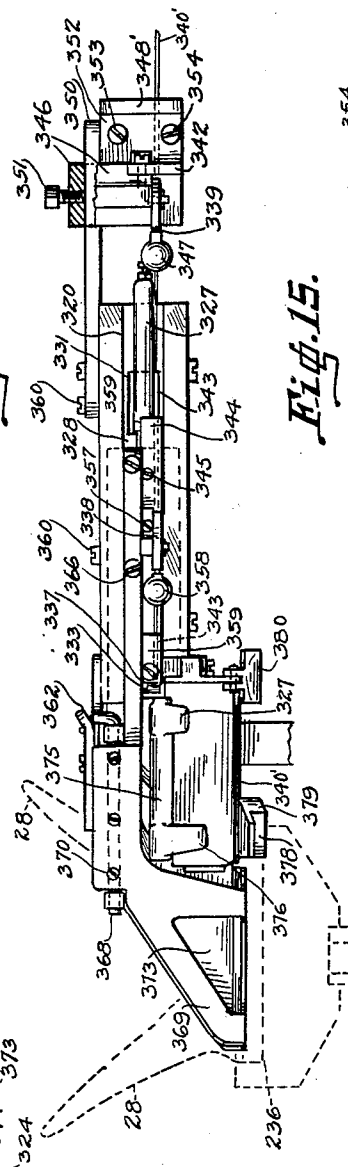


Fig. 15.

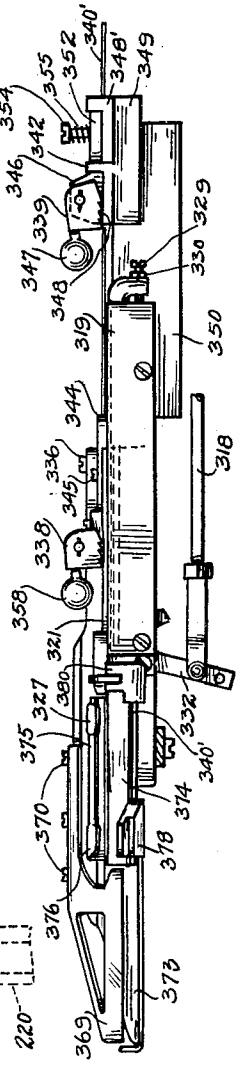
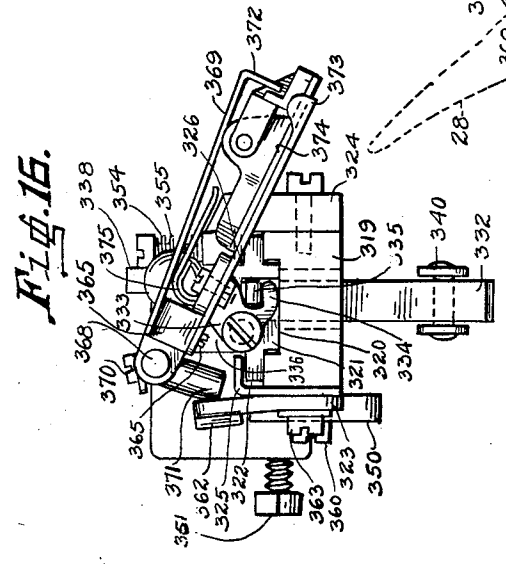


Fig. 16.



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BAG TYING MACHINE

Filed June 1, 1929 11 Sheets-Sheet 9

Fig. 17.

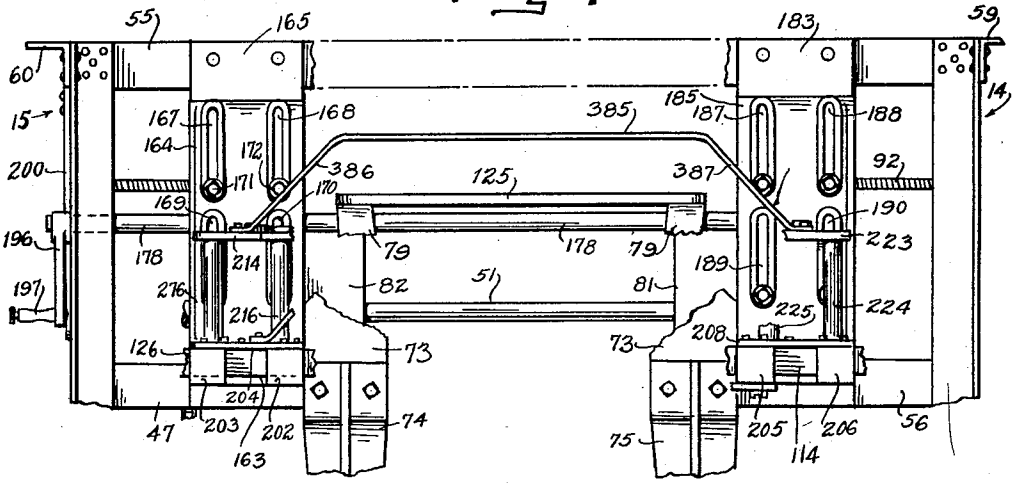


Fig. 18.

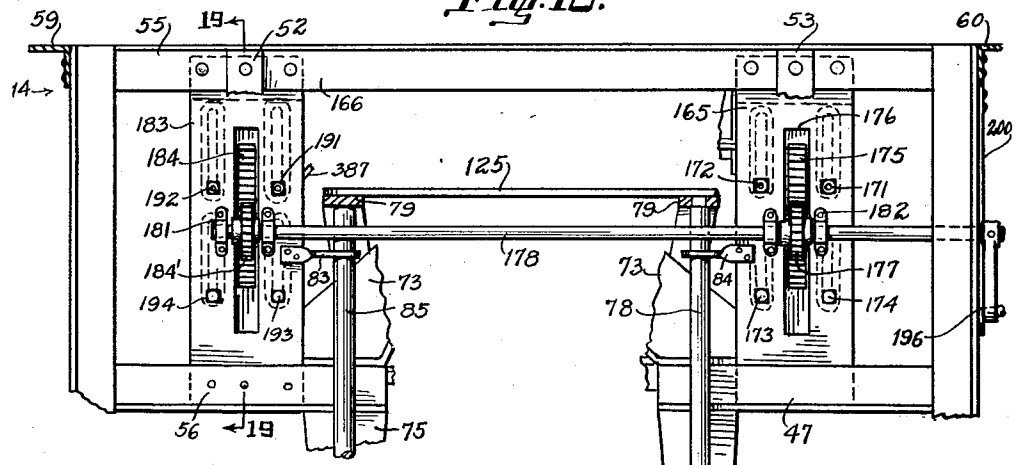


Fig. 19.

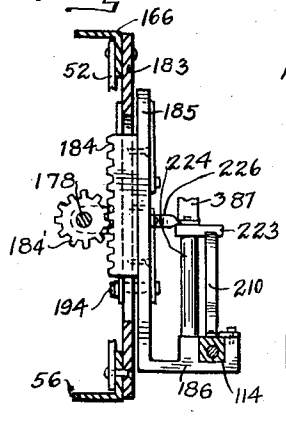
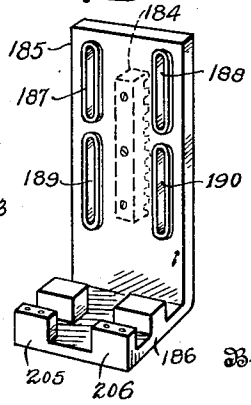


Fig. 20.



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BAG TYING MACHINE

Filed June 1, 1929 11 Sheets-Sheet 10

Fig. 21.

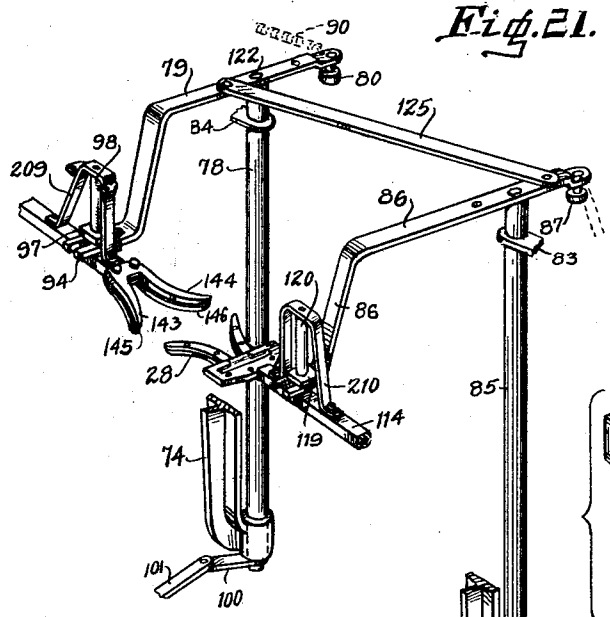


Fig. 23.

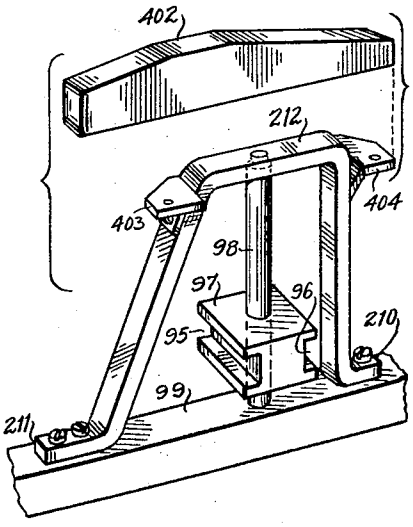
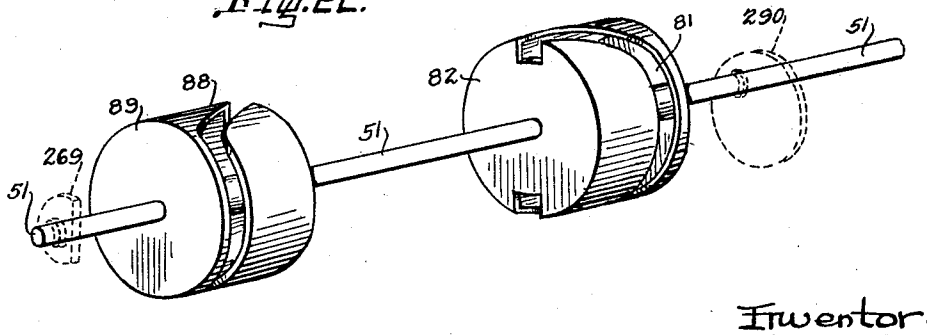


Fig. 22.



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BAG TYING MACHINE

Filed June 1, 1929 11 Sheets-Sheet 11

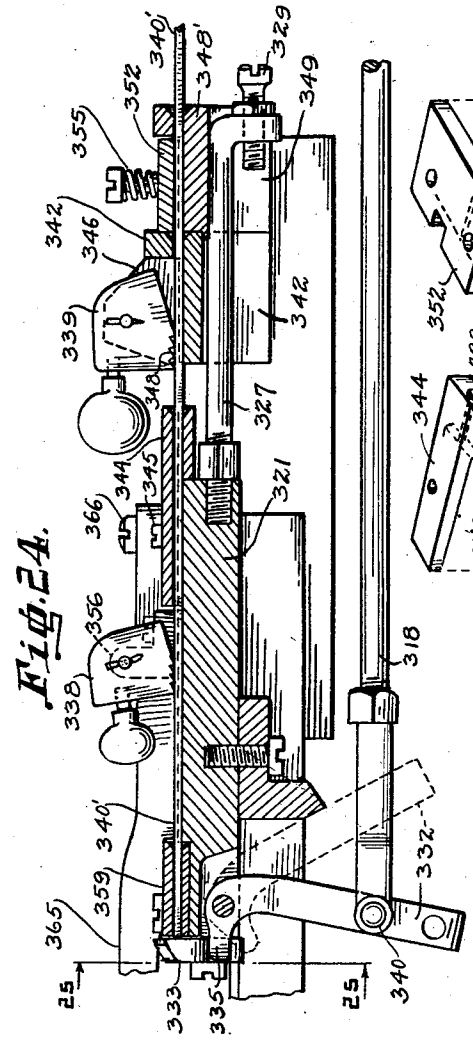


Fig. 24.

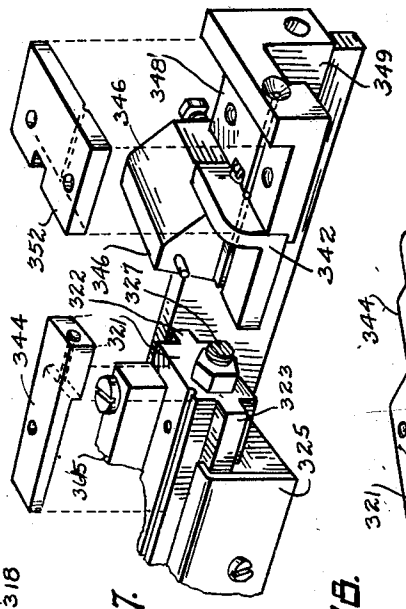


Fig. 27.

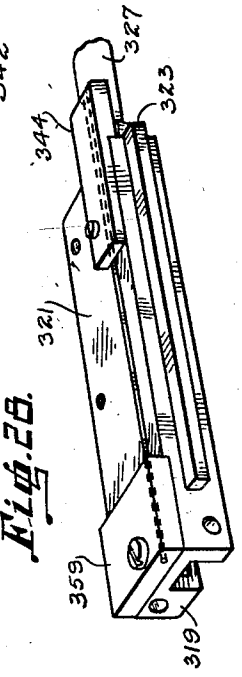


Fig. 28.

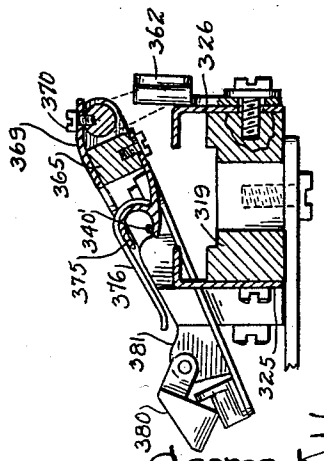


Fig. 26.

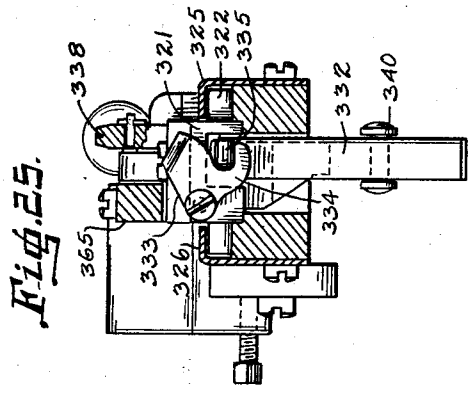


Fig. 25.

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UNITED STATES PATENT OFFICE

GEORGE K. CRUTCHFIELD, JR., WATERS C. NORTHAM, AND JOHN C. KINKER, JR., OF RICHMOND, VIRGINIA, ASSIGNORS TO SAID CRUTCHFIELD

BAG-TYING MACHINE

Application filed June 1, 1929. Serial No. 367,787.

The invention forming the subject matter of this application is a machine for automatically carrying or feeding filled paper or other sacks to a predetermined position under mechanism for tying the sacks and for passing the tied sacks from such position out of the machine.

The main object of the invention is to provide a machine of this type in which the parts operable to tie the sacks are controlled in their operation by the presence of filled sacks in certain predetermined positions on a conveyor forming part of the machine.

A further object of the invention resides in providing machines of this type with means for cutting off ties of predetermined length, and applying these ties only when a bag or sack is properly positioned to receive them.

Other objects of the invention will become apparent as the detailed description thereof proceeds.

In the drawings:

Fig. 1 is a plan view of the machine with parts broken away to illustrate the invention clearly;

Fig. 1A is a fragmentary diagrammatic plan view illustrating the normal positions of controlling elements of the machine;

Fig. 2 is a side elevation of the machine;

Fig. 3 is an elevation of the machine taken on the side opposite to that shown in Fig. 2;

Fig. 4 is a front end elevation of the machine;

Fig. 5 is a rear end elevation of the machine;

Fig. 6 is a plan view of one of a pair of bag closing members;

Fig. 7 is a side elevation of the member shown in Fig. 6, parts being broken away and sectioned to show details of construction;

Fig. 8 is an end elevation of the member shown in Fig. 6;

Fig. 9 is a vertical section taken on the line 9—9 of Fig. 7;

Fig. 10 is a plan view of the other bag closing member;

Fig. 11 is a side elevation of the member shown in Fig. 10, parts thereof being broken away and sectioned to show details of construction;

Fig. 12 is a fragmentary plan view of part of the member shown in Fig. 10, with several of the movable parts of said member shown in a different position to that illustrated in Fig. 10;

Fig. 13 is a plan view of a tie cutting mechanism forming part of the present invention;

Fig. 14 is a similar plan view of said tie cutting mechanism, but with the part thereof shown in a different operative position to that shown in Fig. 13;

Fig. 15 is a side elevation of the tie cutting mechanism with the several parts thereof arranged as shown in Fig. 14;

Fig. 16 is an end elevation, on an enlarged scale, of the said cutting mechanism with the parts arranged as shown in Figs. 14 and 15;

Fig. 17 is a fragmentary front elevation of the vertically adjustable structure for slidably supporting the bag closing members;

Fig. 18 is a fragmentary vertical section taken on the line 18—18 of Fig. 2;

Fig. 19 is a section on line 19—19 of Fig. 18;

Fig. 20 is a perspective view of one of the L-shaped members for slidably supporting one of the bag closing members;

Fig. 21 is a fragmentary perspective view of part of the mechanism for operating the bag closing members;

Fig. 22 is a perspective view of a pair of cam rolls which cooperate with the mechanism shown in Fig. 21 for operating the bag closing fingers;

Fig. 23 is an exploded perspective of a detail of construction supported by one of said bag closing members;

Fig. 24 is a vertical section taken on line 24—24 of Fig. 13;

Fig. 25 is a vertical section taken on the line 25—25 of Fig. 24;

Fig. 26 is a transverse section taken on the line 26—26 of Fig. 13;

Fig. 27 is an exploded fragmentary perspective view of the right-hand end of the mechanism shown in Fig. 24; and

Fig. 28 is a perspective view of a cutter slide-support forming part of the mechanism shown in Figs. 24 and 27.

Referring to the drawings, the machine comprises a pair of runners 1 and 2, supported at their opposite ends by standards 3, 4, 5 and 6 (see Figs. 4 and 5), which are connected at their lower ends by suitable cross braces of which only the cross brace 7 is shown in the drawings as connecting the standards 3 and 4. Lower rails 8 and 9 connect the standards 3 and 6, and 4 and 5, in pairs, respectively; and braces 10 and 11 extend from the rails 8 and 9, respectively, to the rear legs 12 and 13 (see Figs. 2 and 3) of vertical supports 14 and 15 arranged on opposite sides of runners 1 and 2 to carry the bag tying mechanism in proper position over a conveyor 16 movably mounted between the said runners 1 and 2.

Immediately in front of the standards 3 and 4, and depending from the runners 1 and 2, respectively, are the brackets 17 and 18, in the lower end of which is mounted a shaft 19 having the sprocket wheels 20 and 21 fixed thereto to support one end of the conveyor 16 adjacent to the runners 1 and 2. At the rear end of the machine and adjacent the standards 5 and 6, the shaft 22 is journaled in bearing plates 23 and 24 suitably secured to and depending from the runners 1 and 2, respectively. This shaft has secured thereto, the sprocket wheels 25 and 26 forming the other support for the conveyor 16, which as shown, is of the endless type, and has suitably secured thereto the bracket members 27 for moving the material placed on the conveyor into proper position below the tying mechanism.

Standards 28 and 29 are secured by their base plates 30 and 31, respectively, to the runners 1 and 2, and at their upper ends are provided with screwthreaded apertures in which are mounted the adjusting screws 32 and 33 having one end of each secured pivotally to the guide rails 34 and 35 which are adapted to center the filled sacks upon the conveyor 16. At the rear end of the machine the guide rails 34 and 35 are supported upon standards 36 and 37 secured by their base plates 38 and 39 to the runners 1 and 2, respectively. Adjusting screws 40 and 41, screwthreaded into the standards 36 and 37, are also swivelled to the guide rails 34 and 35 to provide for adjustment of the rear end of the said guide rails toward and from the center of the conveyor 16. The guide rails 34 and 35 are supported upon their respective standards at any convenient height above the bracket members 27, and are preferably made of light springy material.

The conveyor 16 is driven by means of a motor 42 (see Figs. 3 and 5) mounted on a rail 43 secured to the legs 13 and 13′ of the standard 15, as shown in Fig. 3. A cross rail extends from the rail 43 inwardly toward the conveyor; and the outer end of this cross rail 44 is riveted to the rail 43, while its inner end is riveted to an upright member 45 secured at its bottom end to a transverse rail 46, extending between the leg 13 and the lower rail 8.

The rail 45 extends vertically from the cross rail 46 to a height about in alinement with the rotor axis of the motor 42 (see Figs. 2 and 3), and is then bent inwardly to be connected to a short cross rail 47 extending laterally inward from the leg 13. The motor 42 has its rotor shaft 48 rotatably supported in the upper part of the leg 13, and has fixed thereto a worm 49 in mesh with a worm wheel 50 secured to the end of a shaft 51 which is journaled in substantially triangular brackets 52, 53 and 54 bolted at their upper ends to a cross rail 55 connecting the tops of the standards 14 and 15.

The bracket 52 is supported at its lower end by a short rail 56 riveted to an angle iron 57 (see Fig. 2) and extending inwardly in alinement with the similar rail 47, above referred to, which is likewise secured to an angle iron 58 connecting the legs 13 and 13′ of the standard 15. The angle iron 57 serves not only as a support for the rail 56, but also connects the legs 12 and 12′ rigidly to each other. Angle irons 59 and 60 are riveted to the tops of the legs 12 and 12′ and 13 and 13′, respectively, to secure these pairs of legs rigidly to each other; and the top rail 55 is bolted or otherwise suitably secured to these angle irons 59 and 60. In order to drive the conveyor, the shaft 51 has secured thereto between the brackets 53 and 54 a sprocket wheel 61 in mesh with a chain 62, which at its lower end, meshes with the sprocket wheel 63 secured to a countershaft 64 which is journalled in a bearing 65 on the rail 45, and in bearings formed in the bearing plates 23 and 24.

A gear 65, having gear teeth extending over only one fourth of the periphery thereof, is fixed to the shaft 64 and engages a gear 66 fixed to the shaft 22 of the conveyor 16. The gear 66 has three sets of gear teeth 67, 68 and 69, each set of which extends over one fourth of the periphery of the gear 66 and is separated from the adjacent sets of teeth by concave portions 70, 71 and 72, adapted to fit the smooth part of the periphery of the gear 65. Each of the parts 70, 71 and 72 occupies one twelfth of the periphery of the gear 66; and serves to lock the gear 66 and shaft 22 in fixed position in the framework of the machine while the gear 65 is rotating with its smooth part in contact with one of the concave parts 70, 71 or 72.

The object of the gear construction just described is to cause intermittent movement of the conveyor 16, and to predetermine such intermittent movement that a filled sack will always occupy a predetermined position in

the machine when moved by the conveyor under the sack tying elements. The movements of the sack tying elements of the machine are timed with the movement of the conveyor and are controlled by the presence of a sack or sacks on the conveyor, so that they will only operate when a sack is presented in proper position to be operated upon by them. It will be obvious, of course, that the spacing of the sets of gear teeth on the gears 65 and 66 must have a predetermined relation to the spacing between the brackets 27 on the conveyor 16 in order that the several parts may operate in properly timed relation.

The ends of the short rails 47 and 56 (see Fig. 5) are connected to each other by a bridge 73; and brackets 74 and 75 are bolted to and depend from the rails 47 and 56, respectively.

The bracket 74 is provided with rearwardly turned bearings 76 and 77 (see Fig. 17) in which the vertical shaft 78 is journaled; and the top of this shaft 78 has fixed thereto a lever 79 having a roller 80 rotatably mounted on one end thereof to slide in the groove 81 formed in the cam roll 82, which is fixed to shaft 51 to be rotated thereby.

The bracket 75 is structurally identical with the bracket 74 and has similar bearings 83 and 84 in which the vertical shaft 85 is journaled. A lever 86, similar to lever 79, is fixed intermediate its ends to the top of shaft 85, and also has a roller 87 rotatably mounted on one end thereof to slide in the groove 88 formed in the periphery of the cam roll 89, which is also fixed to shaft 51 to rotate therewith.

A tension spring 90 has one end fixed to the standard 15 and has its other end fixed to the lever 79 adjacent to the end of the arm carrying the roller 80. This spring 90 normally holds the roller 81 in rolling contact with the edge 91 of the cam roll 82, and draws the roller into the cam groove 81, unless the lever 79 be held against rotation by means to be described hereafter.

A tension spring 92 has one of its ends fixed to the standard 14 and has its other end fixed to the lever 86 adjacent to the end of the arm carrying the roller 87. This spring 92 normally holds the roller 87 in rolling contact with the edge 93 of the cam roll 89, unless the lever 86 be held against rotation by means about to be described.

The lever 79 extends from its supporting shaft 78 toward the front of the machine and is bent downwardly toward the conveyor 16. The forward end of lever 79 is bent to form a bifurcated part 94 having the furcations thereof slidably seated in grooves 95 and 96, formed in the opposite edges of a sleeve 97, which is slidably mounted on a cylindrical rod 98 fixed perpendicularly to a sack closing member 99, to be described later.

The lower end of the shaft 78 (see Figs. 2, 3 and 4) has a crank 100 fixed thereto; and an arm 101 has one of its ends pivoted to the end of said crank. This arm 101 is mounted to slide in a guide bracket 102 fixed to the runner 1 (see Figs. 1 and 3); and the end of arm 101 is adapted to contact with the end of the stop 103 secured to the lower end of a shaft 104 which is journaled in a bearing block 105, suitably fixed to the horizontal flange 106 of the runner 1.

A spacing sleeve 107 encloses shaft 104, and serves to space and support a straight edged block 108, secured to the upper end of shaft 104 by a set screw 109. An arm 110 of springy material is secured to the inner side of said block by means of set screws 111 and 112, (see Fig. 1); and a tension spring 113 has one end fixed to the stop 103 and its other end to runner 1 to hold the stop normally in position to make its end come to rest in the path of sliding movement of the arm 101 in its guide bracket 102.

As shown in Fig. 1, the stop 103 has been moved out of the path of arm 101 by the engagement of the arm 110 with the side of a filled sack S (shown in dotted lines in Figs. 1, 2 and 4); and this movement has permitted the shaft 78 to rotate under the pull of spring 90 (see Fig. 1) by the roller 80 being moved into the cam groove 81. The several parts of the machine controlling rotation of lever 79 are so designed that when the end of stop 103 is in contact with the end of arm 101, the lever 79 is positioned so that its roller 80 just rides in contact with the edge 91 of cam roll 82; and the cam groove 81 is located on roll 82 so as to permit the lever 79 to rotate only when a filled sack has moved stop 103 away from end or arm 101 and is located as shown in Fig. 1 in position to have its neck closed by the bifurcated sack closing members 99 and 114.

The lever 86 is structurally identical with the lever 79, and has its forward end bent and slotted to form furcations 115 and 116 slidably mounted in the grooves 117 and 118, respectively, of the rectangular sleeve 119, which is slidably mounted on the cylindrical rod 120 secured perpendicularly to the finger closing member 114 (see Figs. 10 and 11).

The oscillations of the levers 79 and 86 about their pivot axes occur simultaneously to move the sack closing members 99 and 114 toward and from each other; and, this simultaneous oscillation of the two members is controlled by the movements of the member 110 as affected by the presence of a filled sack moved thereagainst by the conveyor 16.

The lever 79 has studs 121 and 122 secured to its upper face and equidistant from the axis of shaft 78. The lever 86, likewise, has studs 123 and 124 spaced on opposite sides of the axis of shaft 85, at distances equal to the distances between studs 121 and 122 from shaft 78. A link 125 is provided with aper-

tures at its opposite ends to seat in either of the diagonally opposite pairs of studs 122, 123, or 121, 124. The cams rolls 82 and 89 and their respective cam grooves are paired so that the rollers 80 and 87 enter their respective grooves simultaneously. It will be obvious from Fig. 1 that as lever 79 oscillates about the axis of shaft 78, the link 125 will impart an oscillation in the opposite direction to the lever 86; and thereby cause the bag closing members 99 and 114 to move toward and from bag closing position.

The sack closing member 99 comprises a rod 126 rectangular in cross section and bored lengthwise to form a bearing for a cylindrical shaft 127, which is also axially bored to receive slidably a cylindrical rod 128. The shaft 127 is provided with a flange 129 which extends over one end of the rod 126; and the other end of the shaft 127 projects through the rod 126 and has keyed thereto a pinion 130 which abuts against the other end of the rod 126.

A cap member 131 is provided with a countersink 132 to receive the end of the shaft 127, and is provided with a flange abutting against the pinion 130.

A sleeve 133 is slidably mounted on the cap member 131 with slide friction fit, and has a flange 134 formed on the end thereof adjacent to a flange 135 formed on the end of the member 131 which abuts against the pinion 130. A washer 136 extends across the end of cap 131 and the sleeve 133; and a compression spring 137 is coiled around the end of the rod 128 which projects through the cap member 131 and washer 136. The spring 137 abuts, at one end, against the washer 136; and a pin 138, secured to the rod 128, serves as an abutment for the other end of the spring 137.

The other end of the rod 126 has the sack closing plates 139 and 140, secured to opposite sides of the rod 126 by the bolts 141 and 142. The plates 139 and 140 are shaped to form furcations 143 and 144, and furcations 145 and 146, respectively, (see Figs. 7 and 8). These furcations are spread apart at their outer ends to insure proper positioning of the neck of the filled sack presented in the machine for a tying operation.

The end of the shaft 127, between the plates 139 and 140, is bifurcated to form the curved parts 147 and 148 for guiding the ends of a wire tie into the space between the toothed elements 149 and 150, which are pivotally mounted on pins 151 and 152, the parts 147 and 148 being recessed to receive the toothed elements 149 and 150.

Rigidly connected to the elements 149 and 150 are the links 153 and 154 which are pivotally connected at their free ends to each other and to the end of the rod 128, a coil spring 155 being inserted in a counter sink 156 formed in the end of shaft 127 and abutting against the toggle links 153 and 154 to hold the elements 149 and 150 normally separated from each other.

It will be obvious from inspection of Fig. 7 that when the rod 128 is moved against the pressure of the spring 137, the wire gripping edges of the elements of 149 and 150 are made to move toward each other to grip the ends of a piece of wire inserted between said edges. It will also be obvious that rotation of the pinion 130 will cause rotation of the shaft 127 and the elements 149 and 150. The spring 137 is made just long enough to contact with the washer 136 and pin 138 without tending to cause the rod 128 to move in the shaft 127 against the pressure of the spring 155; and, the outward movement of the rod 128 is caused by engagement of the side 157 of the sleeve 133 by a disk cam 158 (see Fig. 4).

The pinion 130 is also adapted to mesh with a gear 159 (see Fig. 4) whenever the sack closing member is in its innermost sack tying position. Since the pinion 130 has to move repeatedly into and out of mesh with the teeth on the gear 159, the adjacent edges of the intermeshing teeth are slightly pointed so as to cause proper alinement and meshing of the said teeth when the member 99 is slid to bring the pinion 130 into engagement with the gear 159.

A leaf spring 160 is secured by a screw 161 to the top of the rod 126, and is provided with an indentation 162, adapted to seat in the spaces between the teeth of the pinion 130 to hold the shaft in the position it occupied at the moment of separation of the pinion 130 from the gear 159. This construction is necessary in order to ensure the elements 149 and 150 always occupying their proper position between the fingers 139 and 140.

The member 99 is supported to slide transversely of the machine on a horizontal arm 163 of a slotted angle bracket 164 mounted to slide vertically on a plate 165 having its upper end suitably secured to the depending flange 166 of the cross rail 55; and having its lower end secured to the upwardly extending flange of the short cross rail 47.

The plate 164 is provided with vertical slots 167, 168, 169 and 170, through which clamping set bolts 171, 172, 173 and 174, respectively, extend and are screwthreaded into the supporting plate 165. A rack 175 fixed to the back of the bracket 164 extends slidably into a slot 176 formed vertically in the plate 165 and meshes with a pinion 177, (see Fig. 3), which is fixed to a shaft 178 journaled in bearings 179, 180, 181 and 182, (see Fig. 5), fixed to the back of the supporting plate 165 and to the back of a second supporting plate 183 on the other side of the machine and also depending from the flange 166 of the cross rail 55.

The plate 183 has its upper end suitably

fixed to the flange 166 and has its lower end fixed to the short cross rail 56, (see Fig. 4). The plate 183 is also vertically slotted to receive slidably a rack 184, (see Fig. 2), secured to the back of the slotted angle bracket 185 having the horizontally extending arm 186 for slidably supporting the other sack closing member 114. The rack 184 meshes with a pinion 184′ fixed to shaft 178 between the bearings 181 and 182.

The angle bracket 185 is provided with the vertical slots 187, 188, 189 and 190 slidably receiving the clamping set bolts 191, 192, 193 and 194, respectively, which are screwthreaded into the plate 183 to clamp the bracket 185 in adjusted position.

The shaft 178 extends through a strap bearing plate 195, (see Figs. 3 and 5), fixed to the legs 13 and 13′ of the standard 15; and a crank 196 is secured to the end of this shaft 195 to impart rotation thereto manually when desired.

The free end of the crank 196 has a hollow handle 197 fixed thereto and a spring controlled stop bolt 198 extends axially through this handle to engage any one of a series of cooperating indicating stop depressions 199 formed in an arcuate plate 200 which is fixed to the legs 13 and 13′ of the standard 15, (see Fig. 3). This stop construction is well known in all the mechanic arts and need not be further described herein. Suffice to say that the spring (not shown) in the handle forces the bolt 198 yieldingly against the plate 100 and into the various depressions 199 when the crank 196 is rotated over the plate 200.

As will be obvious from the foregoing disclosure, rotation of the shaft 178 by crank 196 rotates the pinions 177 and 184′, and thereby simultaneously raises or lowers the angle brackets 164 and 185, with everything carried thereby, on the relatively fixed supporting plates 165 and 183. It is to be understood, of course, that the clamping bolts extending through the slots in the two angle brackets will be loosened when the brackets are being raised or lowered in the machine, and will be turned into clamping positions when the brackets are in the desired position to which they shall have been adjusted by operation of the crank 196.

The horizontal arm 163 near its outer end has an upwardly projecting tongue 201, (see Fig. 1), spaced inwardly from the end of arm 163 a distance equal to the width of the rod 126; and lugs 202 and 203, (see Fig. 4). extend up from the front edge of arm 163 to hold the rod 126 slidably against the tongue 201. A plate 204, extending slightly over the top of rod 126, is suitably secured to the top of tongue 201 to hold the said rod 126 slidably in the groove formed between tongue 201 and lugs 202 and 203.

Similarly, lugs 205 and 206 project up from the end of the horizontal arm 186 to cooperate with a tongue 207 to hold the sack closing member 114 slidably on the arm 186, a plate 208 being suitably secured to the top of said tongue 207 and slightly overlapping the top of the member 114 to hold the latter slidably in the groove formed by the tongue 207 and the lugs 205 and 206 on the arm 186.

The plates 204 and 208 are set back from the lugs 202, 203, 205 and 206, respectively, in order to give sliding room for the standards 209 and 210 of the sack closing members 99 and 114, respectively.

The standard 209 is formed as a substantially inverted U-shaped member having the lower ends 210 and 211 of its legs suitably secured to the rod 126, (see Fig. 7), and having the intermediate part 212 parallel to the rod 126 to form a support for the upper end of the rod 98 on which the sleeve 97 is mounted to slide.

The part 212 slides in a groove 213, (see Fig. 3), formed in the lower face of a plate 214 suitably secured to and supported by pillars 215 and 216 fixed to the horizontal arm 163 at the rear of the tongue 201; and a strap 217 secured to the vertical face of the bracket 164, (see Fig. 1), and to the plate 214, (see Fig. 3), braces this plate 214 and the pillars 215 and 216 relative to the bracket 164.

Similarly, the standard 210 of the sack closing member 114 is formed as a substantially inverted U-shaped member having the lower ends 218 and 219 suitably secured to the top of rod 220, and having the intermediate part 221 parallel to rod 220 to form a support for the upper end of rod 120 on which sleeve 119 is mounted to slide.

The part 221 slides in a groove 222, (see Fig. 2), formed in the lower face of a plate 223 suitably secured to and supported by pillars 224 and 225, (see Fig. 4), fixed to the horizontal arm 186 of the angle bracket 185 at the rear of the tongue 207; and a strap 226 secured to the vertical face of bracket 185, (see Fig. 1), and to the plate 223, (see Fig. 2), braces plate 223 and pillars 224 and 225 relative to the bracket 185.

The other sack closing member 114 comprises the rod 220 slidably mounted on the horizontal arm 186 between the lugs 205 and 206 and the tongue 207. The rod 220 is bifurcated at one end to form the sack engaging fingers 227 and 228, (see Fig. 12), which cooperate with the fingers 143, 144, 145 and 146 in closing the sack S.

The member 114 includes means for bending a wire tie 229 around the sack S and for forcing the ends of the tie between the toothed wire gripping elements 149 and 150 of the sack closing member 99. The ties 229 are of a predetermined length, and are fed swiftly and automatically from a wire cutter, hereinafter described, through a straight

guide slot 230 having an inclined wall 231 to feed the tie onto the horizontal face 232 of an arcuate recess formed in the bifurcated end of the rod 220, the vertical walls of the said recess being indicated in Fig. 12 by the reference characters 233 and 234.

The curvature of the walls 233 and 234 is, of course, determined by the length of the tie 229, and obviously must be such as to allow each half of the tie to swing about its center without binding against the walls 233 and 234; since this center will be held stationary by contact with the neck of the sack being closed, and the two halves of the tie must be bent around said neck. The walls 233 and 234, therefore, must be struck from the center 235 so far as their curvature from the slot 230 is concerned, while the parts thereof behind slot 230 may be formed as found convenient.

In order to bend the tie 229 a pair of curved jaws 236 and 237 are mounted in a circular recess 238 to pivot about the pin 239 fixed to the bifurcated end of rod 220. The vertical walls of the recess 238 and the outer edges of the jaws 236 and 237 are struck from the axis of pin 239 as center; while the inner arcuate edges of the jaws are formed on an arc corresponding to the diameter of the closed sack at the tied part thereof, each of the said inner edges being provided with a groove 240 to prevent kinking of the wire tie 229 and hold it while the ends are being twisted by the rotation of the shaft 127 while the sack closing members 99 and 114 are performing their sack closing operation.

The jaws 236 and 237 are swung about the pin 239 by means of a T-shaped member having branches 241 and 242 extending from opposite sides of the end of a central leg 243 which is securely fastened by screws 244, (see Fig. 11), to the end of a rod 245 slidably mounted in the bore 245′ formed in one end of the rod 220.

The branches 241 and 242 have dowels 246 and 247 fixed thereto to slide in slots 248 and 249, respectively. The rod 220 between its ends is grooved to form a recess 250 receiving the rod 245 and giving access to the screws 244.

The end of the rod 245 impinges against the end of one arm 251 of a bellcrank lever which is pivoted at the intersection of bellcrank arm 251 with bellcrank arm 252 to bracket 253 secured by screws 254 to the rod 220. A stop 255 is fixed to arm 252 to limit the rotation of the bellcrank anti-clockwise as seen in Fig. 10 and to limit the movement of the rod 245 by the compression spring 256 which is coiled around the part of rod 245 projecting from rod 220, between the end of rod 220 and an abutment pin 257 fixed to said part.

The screws 259, tapped into the holes 260 are adapted to secure a plate, not shown, the purpose of which is to cover the recesses 232 and 238, and to enclose the jaws 236 and 237 with their operating mechanism. The end of the bell-crank lever arm 252 is provided with a recess, (see Figs. 1 and 10), adapted to be engaged by lug 262, (see Fig. 2), depending from a rod 263 slidably mounted in a standard 264, (see Figs. 2, 4 and 5). The rod 263 terminates in a head 265 from which project the plates 266 and 267, (see Fig. 1), provided with slots of the same width as the diameter of shaft 51. The slot 268 in the plate 267 is shown in Fig. 2 and is identical with a similar slot, (not shown), formed in plate 266.

The shaft 51 acts as a further support for the rod 263; and a cam disk 269, fixed to shaft 51, rotates between said plates 266 and 267, (see Fig. 1), to reciprocate the said rod 263, in order to cause the lug 262 to seat at predetermined intervals in the recess 261 of bellcrank lever 252 and pull said lever to force rod 245, against the pressure of spring 256, inwardly of the rod 220 and thereby cause the jaws 236 and 237 to bend a tie around a sack S when properly positioned in the machine.

A coil spring 270 surrounds the rod 263 and has one end abutting against the standard 264 while the other end abuts against the shoulder formed by the junction of rod 263 and the head 265. It will be apparent from Figs. 1 and 2 that this spring 270 keeps the head in constant contact with the head 265 between the plates 266 and 267, and thereby causes the rod 263 and its lug 262 to reciprocate at right angles to the path of movement of the sack closing member 114 and cause operation of the wire tie bending jaws 236 and 237.

The gear 159 is oscillatably mounted on its stub shaft 271 supported by the horizontal arm 163 of the bracket 164. The oscillation of gear 159 and the cam disk 158 integral therewith is effected by a rack 274 meshing with a pinion 275 fixed to the disk 158 and gear 159. This rack 274 is integral with a rod 276 suitably connected or formed integral with a head 277 from which the plates 288 and 289 extend rearwardly on opposite sides of an eccentric disk 290 fixed to the shaft 51, (see Figs. 1 and 3).

The plates 288 and 289 are longitudinally slotted to slide on and be supported by the shaft 51, one of the slots 291 being shown in plate 288, (see Fig. 3). The slot, (not shown), in plate 289 is identical with slot 291 and serves to support the said plate 289 slidably on the shaft 51.

The inner face of the head 277 between the plates 288 and 289 is held in constant contact against the periphery of the disk 290 by means of a lever 292 pivoted between its ends to the end of an arm 293 of a bellcrank lever which is pivoted at the intersection of said arm 293 with the other bellcrank arm 294

to a stud 295 projecting inwardly from the leg 13', (see Fig. 4). A tension spring 296, (see Fig. 3), connects the lower end of the lever 292 to the lower end of the arm 294 and serves to keep the head 277 in contact with the disk 290.

The swinging pivotal support of the lever 292 and its fulcrum 293 is necessary to provide for the vertical adjustment of the sack closing members 99 and 114, and at the same time provide for oscillation of the gear 159 at all adjustments of such members.

As previously described, the reciprocation of the sack closing members, toward and from the center of the machine, is controlled by the engagement of the arm 110 by a filled sack on the conveyor 16. The arm 297 on the opposite side of the machine from the arm 110 controls, also by contact with a filled sack, the operation of a wire cutting device, shown in Figures 13 to 16, for cutting wire ties of predetermined length and for feeding the cut ties snugly into the slot 230 on the sack closing member 114.

The arm 297, (see Figs. 1 and 2) is suitably secured to a block 298, which is, in turn, fixed by a set bolt 299 to the upper end of a shaft 300 passing rotatably through a spacing sleeve 301 seated endwise on a bearing block 302, and suitably slotted to seat on the horizontal flange 303. Bolts 304 fix the block 302 in proper adjusted position on the flange 303.

The lower end of shaft 300 projects below the block 302 and has a stop arm 305 fixed thereto by a set bolt 306. A tension spring 307 has one of its ends fixed to the flange 303 of the runner 2 and has its other end fixed to the stop arm 305.

As shown in Fig. 1, the spring 307 is not under tension and holds the arm 305 so that its end is in the path of movement of one end of the rod 308, (see Figs. 1 and 2), mounted to slide lengthwise in a slot, (not shown), in the guide block 309 fixed by set bolt 310 to flange 303. The rod 308 has its other end pivotally connected to a lever 311 having one end thereof pivoted to a block 312 suitably secured to the lever rail 9.

A cam disk suitably keyed or otherwise secured to the conveyor shaft 64 rotates in constant contact with a lug 314 adjustable lengthwise of lever 311 and secured in adjusted position thereon by a set bolt 315. A spring 316 has one of its ends connected to the flange 317 of a piece of angle iron fixed to the lower face of flange 303, and has its other end connected to the rod 308 between the ends thereof, in order to hold the lever 311 with its lug 314 in constant yielding contact with the periphery of the cam disk 313.

As shown in Fig. 2, the stop arm 305 is of such length as to prevent movement of the lever 311 when the end of said arm is in contact with the end of rod 308; and thereby prevents reciprocation of a rod 318, (see Fig. 2), having one end pivotally connected to lever 311 to control the operation of the wire feeder and cutter about to be described.

The specific details of the wire feeder and cutter are shown in Figs. 13 to 16 of the drawing. These details include a base 319, (see Fig. 16), provided with a guide groove 320 in which a tongue 321 of a slide 322 is slidably seated. Angle plates 323 and 324 suitably secured to the sides of the base 319 have their upper parts 325 and 326 turned over on opposite sides of the slide 322 to retain the latter slidably on the base 319.

The slide 322 has a stop rod 327 screw-threaded into one end thereof and locked thereto by a lock nut 328. The free end of rod 327 is turned down to receive a screw 329 provided with a lock nut 330, the end of the screw being adapted to contact with the end of the base 319 to limit the sliding movement of the slide 320 in one direction on the base 319.

Centrally between the sides of groove 320, the base 319 is provided with a longitudinal slot 331 to permit the passage therealong of the upper end of a link 332 pivoted to a lug, (not shown), projecting downwardly from the bottom of slide 320, near the end thereof, into said slot 331.

A wire cutter 333, (see Figs. 14 and 16), is pivoted to the end of the slide 320 opposite the stop screw 329, and has an arm 334 projecting from its lower end to be engaged by a lug 335 projecting from the upper end of the link 332, for holding the cutting edge of the cutter 333 depressed below the top face of slide 320, when the latter is being pulled to the right, as viewed in Fig. 15. The lug 335 slides on the periphery of a cam recess 336 shaped so that when the link 332 is pushed to the left, as shown in full lines in Fig. 15, the upper left hand edge of lug 335 impinges against the upper part of recess 336 and raises the cutting edge 337, (see Fig. 14), of the cutter above the upper face of slide 320 to cut a predetermined length of wire from a stretch of wire fed along the slide 320 by the wire grip pawls 338 and 339.

The link 332 is pivotally connected to one end of the rod 318, which has its other end pivoted to the upper end of the lever 311 to be reciprocated thereby.

The wire 340 is conducted from a reel, (not shown), through an aperture 341 in a guide plate 342 and under the teeth of the grip pawl 339 over onto a guide groove 343 beneath a correspondingly grooved plate 344 fixed to slide 321 by a screw 345.

The pawl 339 is pivoted eccentrically to a standard 346, and a weight 347 keeps the teeth 348 normally pressing against the wire 340 to prevent movement of the wire in a direction opposite to the direction of inclination of the teeth.

The standard 346 is integral with a hori-

zontal extension or a vertical plate 349 seated against the inner face of a supporting plate 350; and the rear end of the standard is projected down along the outer face of plate 350 to receive a set bolt 351 for clamping the extension 348′ in any desired position of adjustment on plate 350.

A tension plate 352 is held yieldingly pressed on the wire 340 on the extension 348′ by means of the set screws 353 and 354 tapped into extension 348′ and having compression springs 355 coiled around their shanks between the heads of the screws and the top of plate 352.

The other grip pawl 338 is eccentrically pivoted on the standard 356 secured by screw 357 to the slide 321, and has a weight 358 designed to keep the grip teeth of pawl 338 in contact with wire 340 to draw the wire 340 to the left, as seen in Fig. 14, when the slide 321 is moved to the left. A hardened steel plate 359 fixed to slide 321 cooperates with the cutter edge 337 to sever the wire 341 when the cutter 333 is swung upwardly by a push to the left, (as seen in Fig. 15), of the link 332.

The base 319 and the angle plate 323 are clamped to the supporting plate 350 by screws 360 and 361; and the plate 350 is secured to the supporting structure for the sack closing members 99 and 114 and moves bodily therewith as hereinafter described.

A cam plate 362 is clamped to the base 319 through the angle plate 323 by means of the screws 363 and 364. A strip 365 is secured to the slide 321 by screws 366 and has bearings 366′ and 367 extending laterally therefrom, and in which a shaft 368 is journaled. A wire tie retaining plate 369 is fixed to said shaft by screws 370. The shaft 368 has one end thereof bent to act as contact member 371 for sliding along the cam plate 362 in order to raise the free downturned end 372 of the tie retaining plate 369 away from its inclined base plate 373.

The tie carrying base plate 373 is fixed to the slide 321 and is inclined downwardly from the member 114 when the said member and the cutter are properly positioned for this purpose, as will be described hereafter. This plate 373 moves with the slide under an inclined plane 374 suitably fixed or formed integral with the base 319 or flange member 324.

The trough-like upturned member 375 having lugs 376 and 327 projecting therefrom is also fixed to slide 321 and serves to form an abutment to prevent bending of the wire 340 while it is being cut by upward movement of the cutter 333.

A stop 378 projects up from the edge of the tie carrying base plate 373 and slides with said plate along the lower edge of the inclined plane 374. The stop 378 is provided with an inclined end 379 adapted to ride under and raise a gravity actuated retainer plate 380 secured to the end of a small rod 381 pivoted to standard fixed to the base 319 or the flange member 324.

In the operation of the tie cutter, it is to be understood that the cutter mechanism is fixed as a whole by the supporting plate 350 to an arm extending inwardly from the bracket 185, (see Fig. 4), in such position that when the sack closing member 114 is in its retracted position, as shown in Fig. 4, the tie retainer members 369 and 374 are positioned immediately above the tie receiving slot 230 in the member 114 with the plate 369, raised as shown in Fig. 16, to permit a tie to roll by gravity of the tie carrying plate 373 into the slot 230.

When the member 114 moves toward the center of the machine to close a sack, the tie carrying plate 373 and the retainer plate 369 must be moved away from the member 114, and this movement is utilized to cut a tie from a length of wire, as will be described later.

In order to insure a compact closing of the filled sack S, a pair of scissor-like arms 382 and 383, (see Fig. 4), are pivoted to swing bodily at the center of the machine, in front of a plate 384 welded or otherwise suitably secured to the front edge of the upper part of a strap bridge 385 having downturned legs 386 and 387 secured to the plates 214 and 223, respectively.

The arms 382 and 383 are pivoted to each other and to the end of their supporting lever arm 388 by means of the pivot bolt 389; and this arm 388 is pivoted intermediate its ends to the plate 384 by the pivot bolt 390, and a weight 391 is fixed to the arm 388, on the side of pivot 390 opposite to the pivot 389, to hold the scissor-like arms 382 and 383 raised away from the sack spreading position shown in Fig. 4.

The legs 382 and 383 extend on opposite sides of pivot 389, and the ends of the extension 392 and 393, thereof, are connected to each other by a tension spring 394, which maintains the inner edges of the legs 382 and 383 in contact with the opposite cam-like edges of a spreader block 396 fixed to plate 384 to spread the legs 382 and 383 apart during the lowering thereof into the mouth of the sack S.

A strap 397 which in Figure 4 is directly behind the plate 384, is secured centrally to the block 396 and has its ends bent toward the plate 384 to be secured thereto by the screws 398 and 399. The strap 397 provides guide slots for the legs 382 and 383 and its bent ends contact with the outer edges of the legs 382 and 383 to force them together, against the tension of spring 394 during the raising of the legs 382 and 383 by the weight 391.

The raising and lowering of the legs 382

and 383 is effected by a link 400 pivoted at its upper end to the lever 388 adjacent the weight 391 and having a roller 401 at its lower end adapted to ride over a cam block 402, (see Figs. 4, 7 and 8), fixed by angle brackets 403 and 404, (see Fig. 7), to one side of the standard 209.

A tension spring 405, (see Fig. 4), has one of its ends fixed to the plate 384 and has its other end fixed to the link 400 to maintain the link normally in contact with the stop edge 406 of a stop plate fixed to the supporting plate 384. An upturned end 407 of the stop plate serves as a stop to limit the swing of the link 400 against the tension of the spring 405.

In the operation of this invention, it is to be understood that all the movable parts are driven by the motor 42, and are timed so that their functions are performed in proper relation to each other to effect the automatic feed of filled sacks to proper position between the sack closing members 99 and 114, and to move these members against the mouth of the filled sacks spread apart by the scissor-like members 382 and 383. The wire tie 229 is bent around the mouth of sack by the jaws 236 and 237, and the ends of the tie are gripped between and twisted by rotation of the members 149 and 150 of the sack closing member 99.

The wire cutting and feeding operation is performed when the sack closing members are retracted from each other, and the reciprocation of the tie supporting and retaining plates 373 and 369 takes place while the members 99 and 114 are performing their sack closing and tying operation.

When the motor 42 is set in operation, it rotates the shaft 51 and the cam rolls 82 and 89 carried thereby; and also, through the chain 62, rotates the shaft 64 to set the conveyor 16 traveling lengthwise of the runners 1 and 2. Filled sacks to be tied by the machine are positioned either manually or automatically upon the conveyor 16 against the bracket 27 carried by said conveyor.

The filled sacks are positioned on the conveyor at the lefthand end of the machine, as shown in Fig. 1, which end is to be considered as the front end. The conveyor moving toward the sack closing members 99 and 114 causes the filled sacks to contact with the guide members 34 and 35 and to be centered on the conveyor by such contact. During the travel of the conveyor, the filled sack contacts with the control arm 110 to move the stop 103 out of the path of sliding rod 101, and thereby permit the spring 90 to pull the roller 80 into the cam groove 81 when the roller reaches the entrance of said groove during the continuous rotation of the roller 82.

When the roller 80 moves in the cam groove 81, it oscillates the lever 79 about the pivot axis 78; and the connecting link 125 causes the lever 86 to oscillate in the opposite direction in order to move the sack closing member 114 toward and from the said closing member 99, the movements of which are controlled by the oscillation of lever 79.

While the sack closing members 99 and 114 are being moved from their extereme separated positions toward each other, the sliding of the cam plate 402 under the roller 401 causes depression of the lever 388, and this depression causes the inner edges of the legs 382 and 383 to spread as they lower into the sack S in order to hold the mouth of sack spread for proper closing operation by the sack closing members 99 and 114.

Assuming that a wire tie has been previously dropped into the slot 230 of the member 114, it will be apparent that when the members 99 and 114 have reached their limit of approach toward each other, the ends of the tie will be gripped by the gripping members of the member 99 and will be twisted by rotation of the shaft 127, (see Fig. 7). This rotation of the shaft 127 is effected by engagement of the gear 215 with the pinion 130; and the gripping action of the members 149 and 150 is effected by the separation of the cap member 134 from the flange 132 by the insertion of the cam 158 between said cap member and flange.

While the tying operation is being performed on the sack S, the wire cutter shall have drawn in and cut off a tie of predetermined length from the wire 340. As soon as the tying operation is completed, the members 99 and 114 are separated and during this separation the legs 382 and 383 are moved away from the top of the sack S.

The operation of the tie cutting member is controlled by the arm 297. When a filled sack on the conveyor 16 contacts with the arm 297, it moves the stop 305 away from the end of the slide rod 308, and thereby permits the long spring 316 to draw the lever arm 311 against the flat edge of the cam 313, and, through the rod 318, causes operation of the tie cutter shown in Figs. 13 to 16. This operation cuts off a predetermined length of wire and feeds it from the supporting plate 374, (by means of the tie supporting plate 373 and the tie retaining plate 369), into position over the slot 230 of the member 114, when the latter is in extreme retracted position, in order to deposit a tie in front of the wire bending jaws 236 and 237 to be bent around a filled sack when the member 114 is moved into proper sack closing position relative to the member 99.

As will be clear from the drawings, all the parts are timed in operation so that the conveyor comes to rest during the tying operation, and the several parts of the tying mechanism are operated only when a filled sack is presented to the machine to have the mouth thereof tied. It will be apparent too that

the sack closing members along with the tie cutting mechanism may be raised and lowered relative to the conveyor in order to accommodate different sizes of bags.

What we claim is:

1. A machine for closing filled sacks, comprising an intermittently moving conveyor, and means controlled by contact with filled sacks in predetermined positions on said conveyor for closing and tying the mouths of said sacks.

2. In a machine for closing filled sacks, an intermittently movable conveyor, means for centering filled sacks on said conveyor, means for engaging the mouths of the filled sacks to close and tie said mouths, and means controlled by contact with a filled sack for preventing the operation of the second named means.

3. A machine for closing the mouths of filled sacks comprising a conveyor, means for automatically stopping said conveyor with a sack, in a predetermined position in the machine, a pair of cooperating legs, means for moving said legs into the mouth of the said sack, to spread the latter in a direction transverse to the movement of the conveyor, and means for compacting the neck of said sack under the ends of said legs and for tying the compacted neck.

4. A machine for closing filled sacks, comprising an intermittently movable conveyor, means for feeding a strip of wire to said machine, means for cutting off ties of predetermined length from said strip of wire, and means controlled by contact with a filled sack on said conveyor for bending one of said ties around the mouth of the sack.

5. A machine for closing filled sacks, comprising an intermittently movable conveyor, a pair of fingers slidable toward and from each other and the center of said conveyor and adapted to compact the neck of the sack presented between said fingers, and an arm rotatable above said conveyor and operable by contact with a filled sack to control the sliding movement of said fingers.

6. A machine for closing filled sacks, comprising an intermittently movable conveyor, means positioned above said conveyor for centering sacks thereon, a stop member projecting normally above said centering means into the path of movement of the sacks on said conveyor, a pair of sack closing fingers mounted to slide toward and from each other and the center of the conveyor, and means controlled by said stop member for sliding said fingers toward and from each other.

7. A machine for closing filled sacks, comprising a conveyor, a pair of fingers slidable transversely toward and from each other over said conveyor, means extending normally over said conveyor and operable by contact with a filled sack to control the movements of said fingers toward and from each other, and means for feeding wire ties of predetermined length to one of said fingers when retracted from the other.

8. A machine for closing filled sacks, comprising a conveyor, a pair of fingers slidable transversely toward and from each other over said conveyor, means extending normally over said conveyor and operable by contact with a filled sack to control the movements of said fingers toward and from each other, means for cutting off a tie of predetermined length from a stretch of wire and for feeding said tie to one of said fingers, and means extending normally over said conveyor and operable by contact with a filled sack to control the operation of said cutting and feeding means.

9. A machine for closing filled sacks, comprising a conveyor, means for feeding a continuous wire to said machine, means for cutting off a predetermined length of wire to form individual wire ties, means for compacting the neck of a filled sack when presented in a predetermined position in said machine, and means for feeding wire ties singly to said compacting means.

10. A machine for closing filled sacks, comprising a conveyor, means for feeding a continuous wire to said machine and for cutting off ties of predetermined length from said wire, means operable by filled sacks during the movement of said conveyor to control the feeding and cutting operation of the first named means, means engageable with the mouth of a filled sack when presented in a predetermined position in said machine to compact the neck of said sack and to bend one of said ties around said compacted neck and secure the ends thereof to each other.

11. A machine for closing filled sacks, comprising a conveyor, means for automatically stopping said conveyor with sacks in predetermined position thereon, a pair of cooperating pivoted legs above the path of movement of said conveyor, means for lowering said legs into the mouth of the sack in said predetermined position, and for spreading said legs at said mouth, and means for compacting the neck of said sack under said legs and for tying the compacted neck.

12. A machine for closing filled sacks, comprising a conveyor, means for automatically stopping said conveyor with sacks in predetermined position in said machine, a pair of legs pivoted to each other, a lever pivoted intermediate its ends on said machine and having the pivotal point of said pair of legs at one end thereof, means controlled by filled sacks on said conveyor for compacting and tying the mouths of said sacks, and means operable by said compacting means to control the raising and lowering movements of said lever.

13. A machine for closing filled sacks, comprising an intermittently movable conveyor,

a pair of legs pivoted to each other above the path of movement of said conveyor, means controlled by contact with filled sacks on said conveyor and operable only when the conveyor is stopped with a sack in a predetermined position to close and tie the mouth of said sack when in said position, and means operable by movement of the last named means to raise and lower the lower ends of said pair of legs out of and into the open mouth of the sack when in said predetermined position.

14. A machine for closing filled sacks, comprising a conveyor, means for intermittently moving said conveyor, means controlled by contact with a filled sack on said conveyor for closing the mouth of a sack in predetermined position on said conveyor during a rest period thereof, and means for pulling the mouth of the sack on opposite sides when the sack is in said predetermined position to cause the said sack mouth to be flattened in a direction transverse to the direction of movement of the conveyor.

15. In a machine for closing filled sacks, an endless conveyor having brackets spaced apart at predetermined intervals thereon, means above said brackets for centering filled sacks in contact with said brackets on said conveyor, a pair of fingers slidable toward and from each other and the center of said conveyor for compacting and tying the necks of filled sacks when presented in a predetermined position between said fingers, and an arm normally positioned above said centering means and operable by contact with a filled sack to control the compacting and tying operation of said fingers.

16. In a machine for closing filled sacks, an intermittently movable conveyor having brackets spaced apart at predetermined intervals thereon, means for centering filled sacks in contact with said brackets on said conveyor, a pair of fingers slidable toward and from each other and the center of said conveyor for compacting and tying the necks of filled sacks when presented in a predetermined position between said fingers, an arm extending normally over said conveyor into the path of movement of said filled sacks and operable to control the compacting and tying operation of said fingers, means for cutting off wire ties of predetermined length from a continuous wire and for feeding said ties individually to one of said fingers, and a second arm extending normally over said conveyor and operable by contact with a filled sack to control the operation of said wire cutting and feeding means.

17. A machine for closing filled sacks, comprising a conveyor, a pair of fingers slidable toward and from each other and the center of said conveyor for compacting and tying the necks of filled sacks when in predetermined position between said fingers, means for cutting wire ties of predetermined length from a continuous wire and for feeding said ties singly to one of said fingers, a pair of legs pivoted to each other, means for moving the ends of said legs into the mouth of the filled sack in said predetermined position to spread the mouth in a direction transverse to the movement of said conveyor, and means for raising and lowering said fingers and wire cutting and tying means and said legs relative to said conveyor.

18. A machine for closing filled sacks, comprising an intermittently movable conveyor, means for compacting the necks of said sacks and for tying them during rest periods of said conveyor, and means for adjustably varying the position of said compacting and tying means toward and from said conveyor.

19. A machine for closing filled sacks, comprising an intermittently movable conveyor, means for compacting the necks of said sacks and for tying them during rest periods of said conveyor, means for cutting off wire ties of predetermined length from a continuous wire and feeding the ties individually to the first named means, means for adjusting the said compacting and cutting means toward and from said conveyor, and means for clamping said compacting and cutting means in adjusted position relative to said conveyor.

In testimony whereof we affix our signatures.

GEORGE K. CRUTCHFIELD, JR.
WATERS C. NORTHAM.
JOHN C. KINKER, JR.