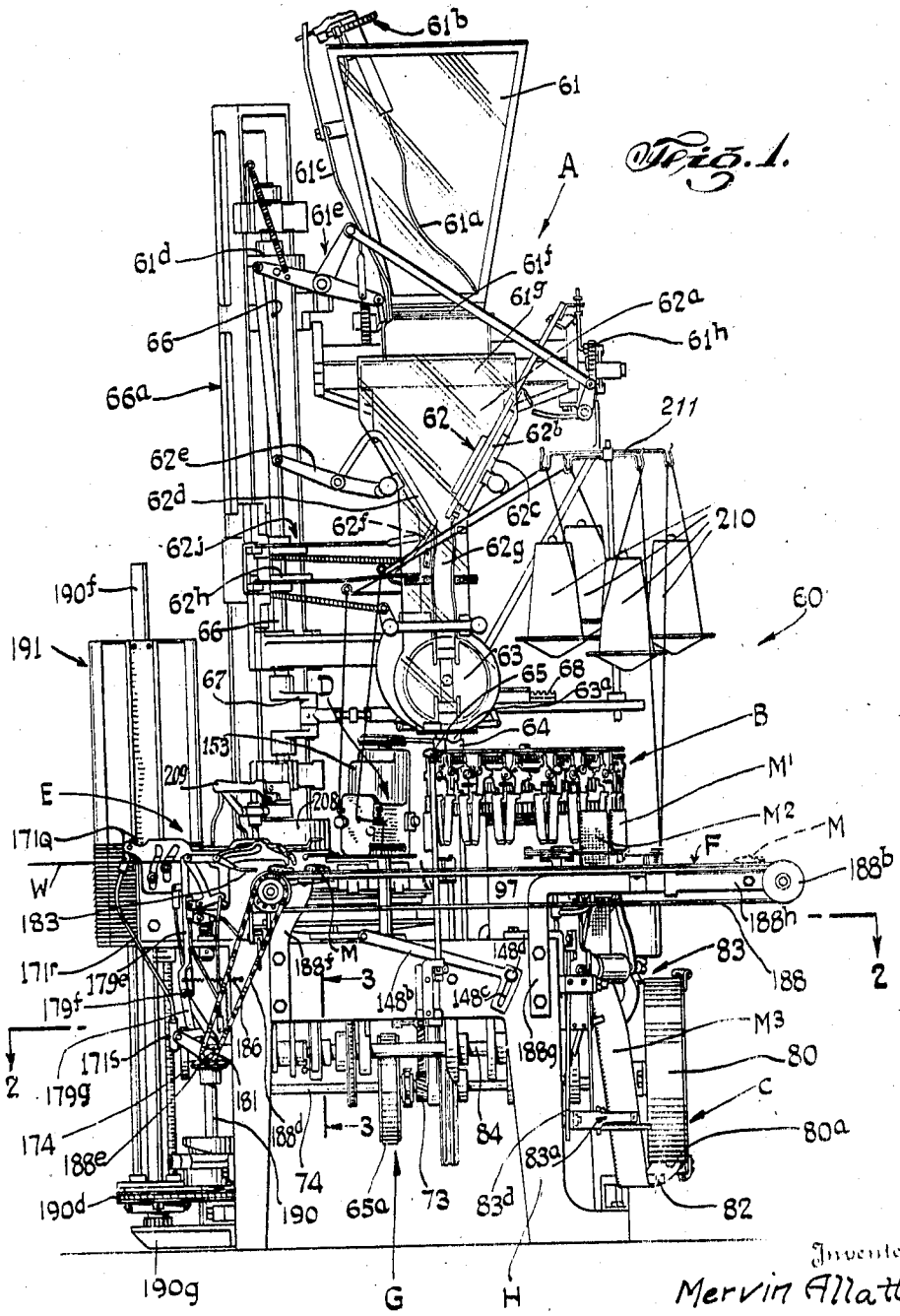
June 6, 1944. M. ALLATT 2,350,333

AUTOMATIC BAG PACKAGE MAKING AND FILLING MACHINE

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Fig. 1.



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AUTOMATIC BAG PACKAGE MAKING AND FILLING MACHINE

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Fig. 2.

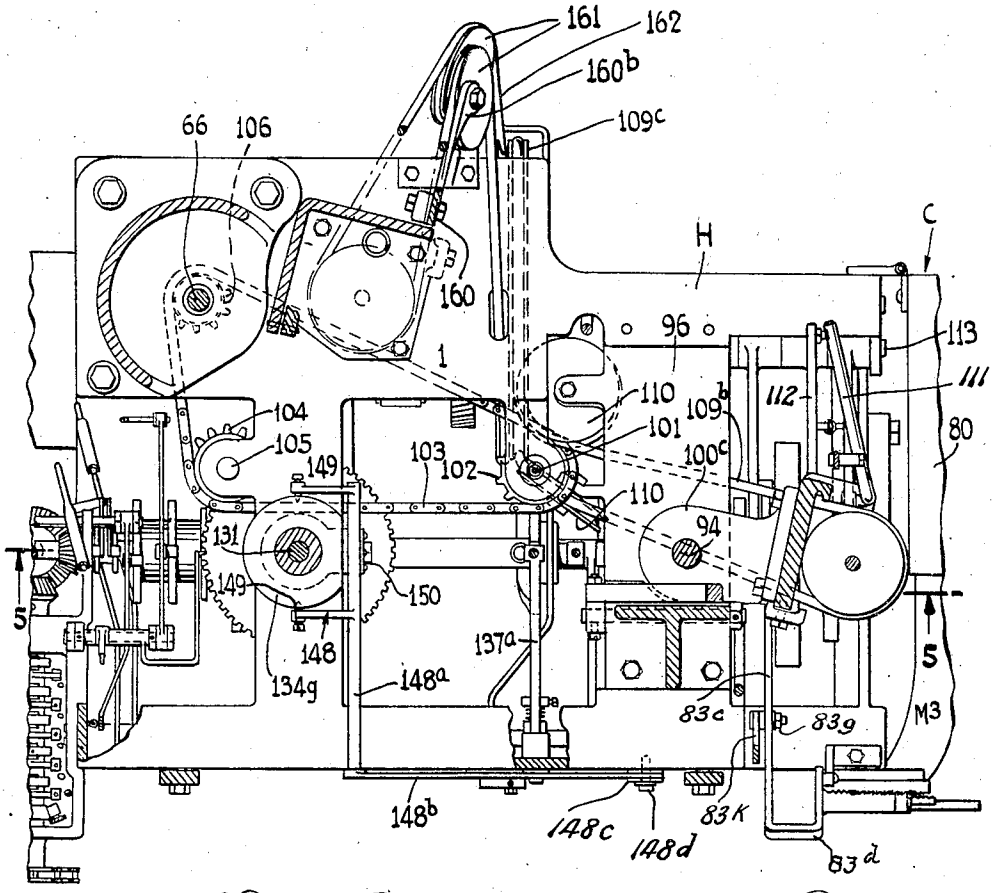


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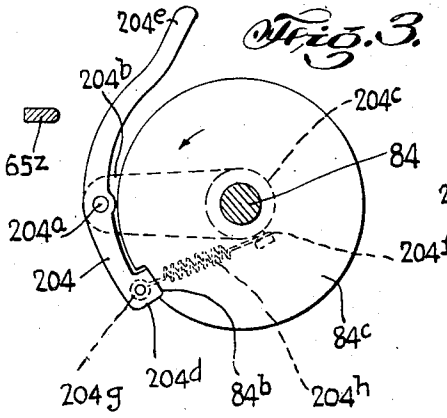
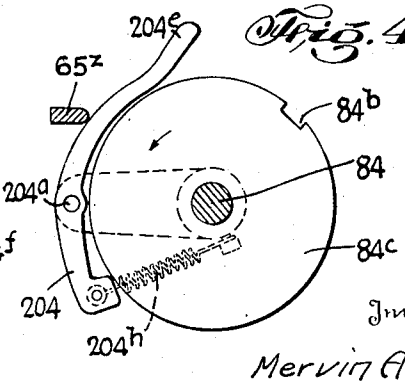


Fig. 4.



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By

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AUTOMATIC BAG PACKAGE MAKING AND FILLING MACHINE

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Fig. 5.

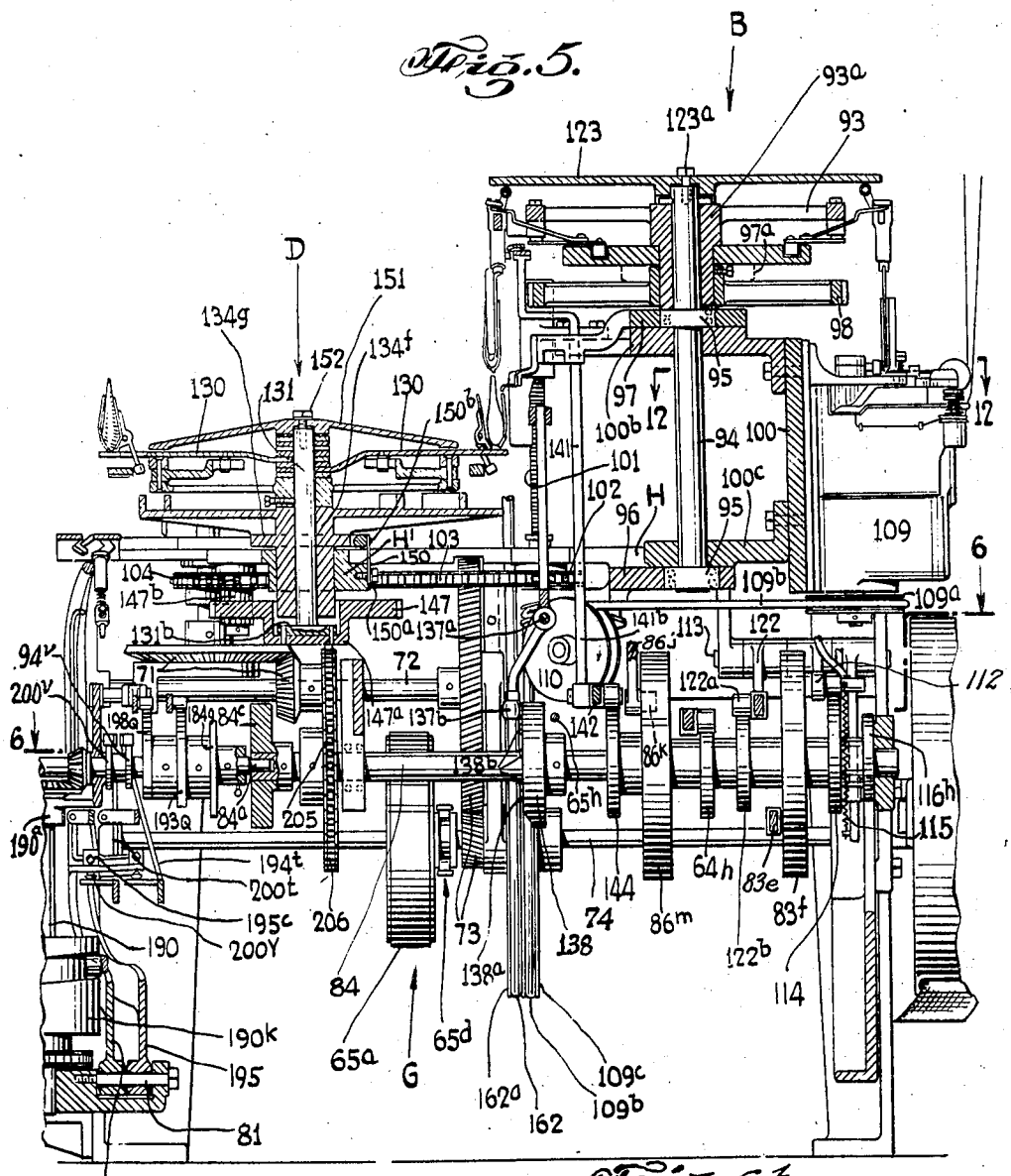
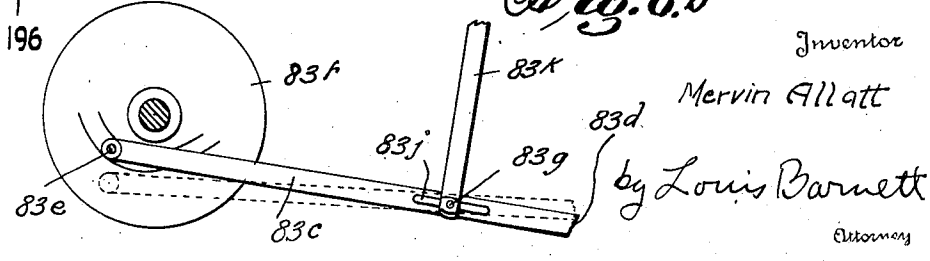


Fig. 6.b



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Fig. 6.

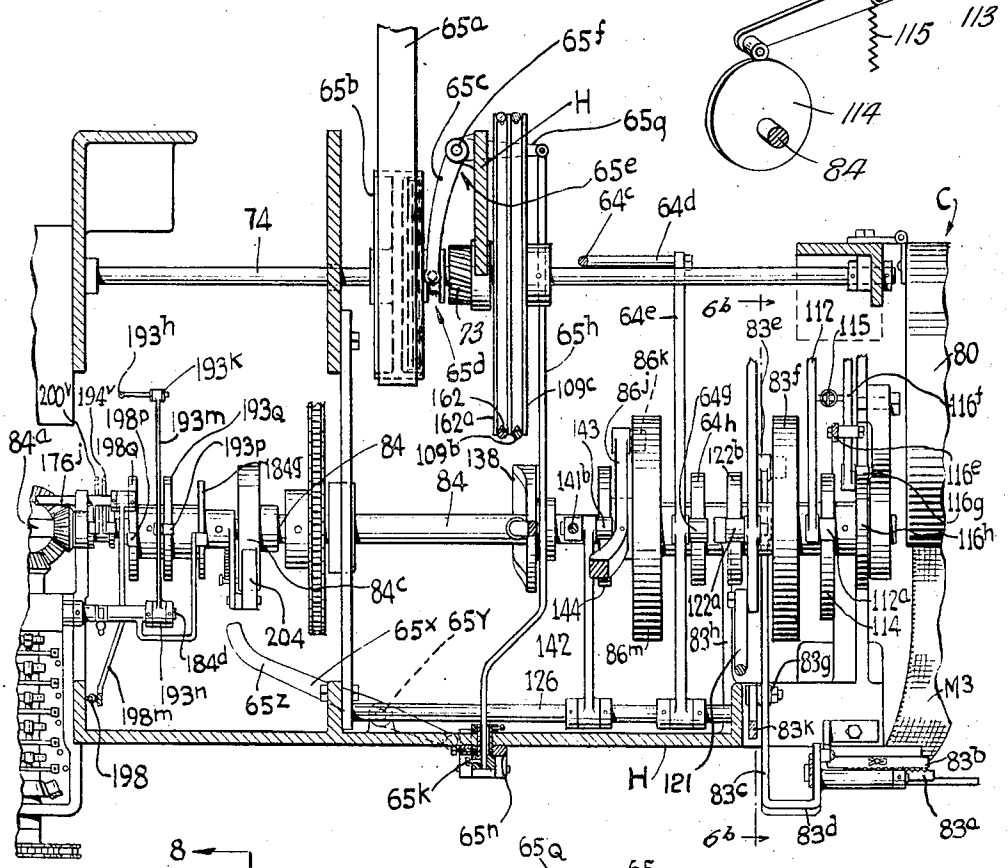


Fig. 6.a

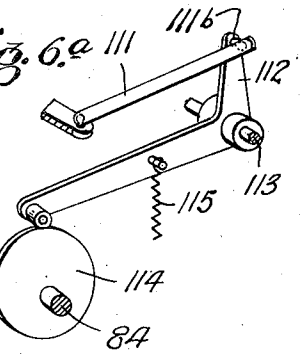


Fig. 7.

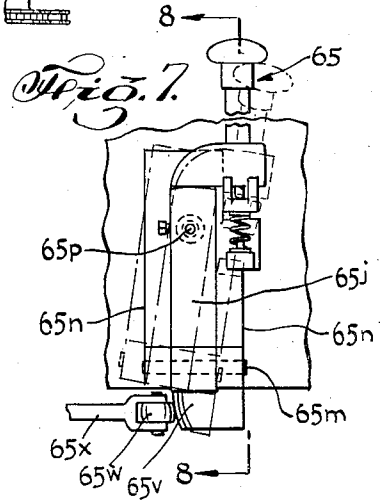
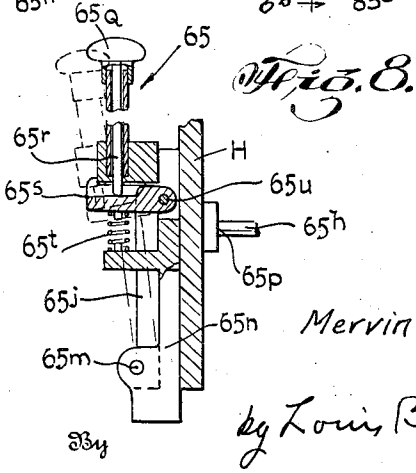


Fig. 8.



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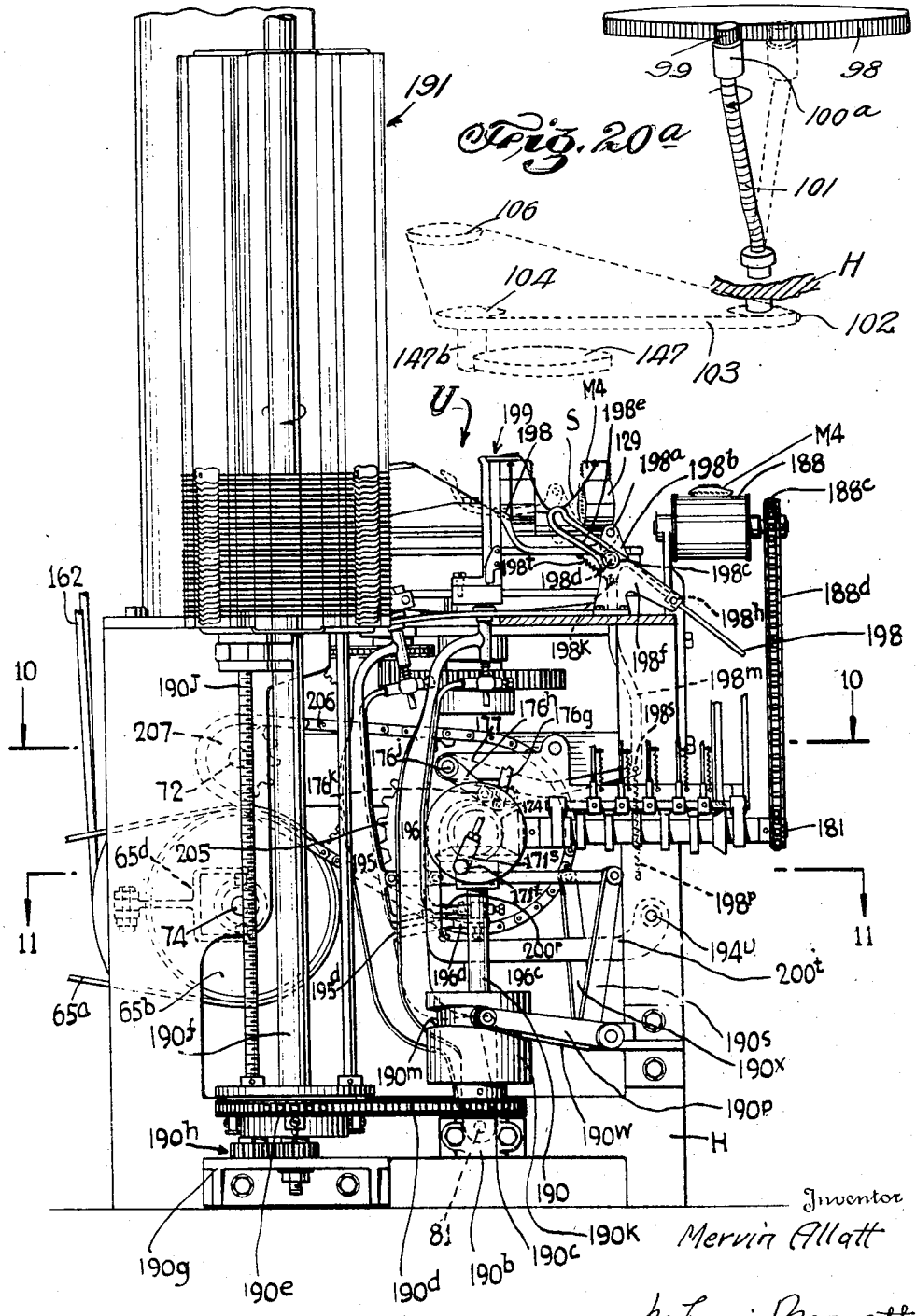


Fig. 20a

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Fig. 10.

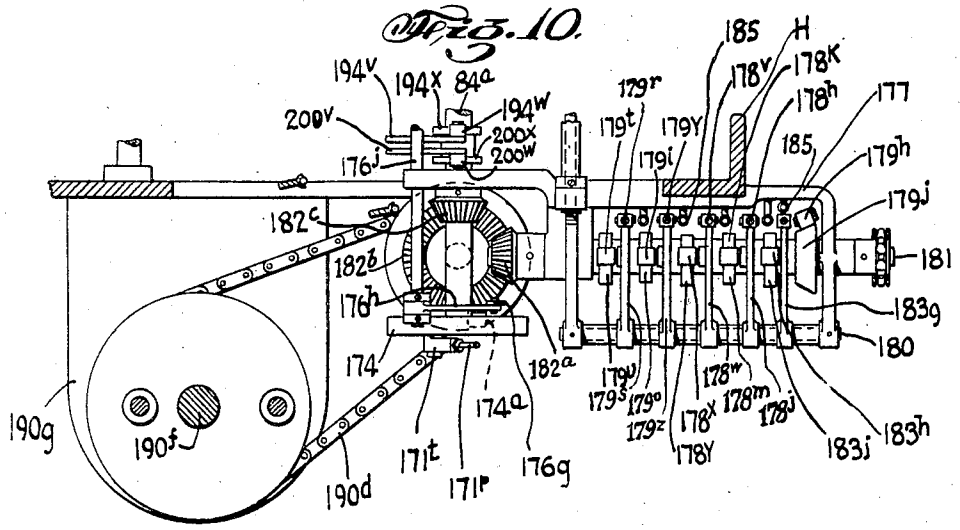
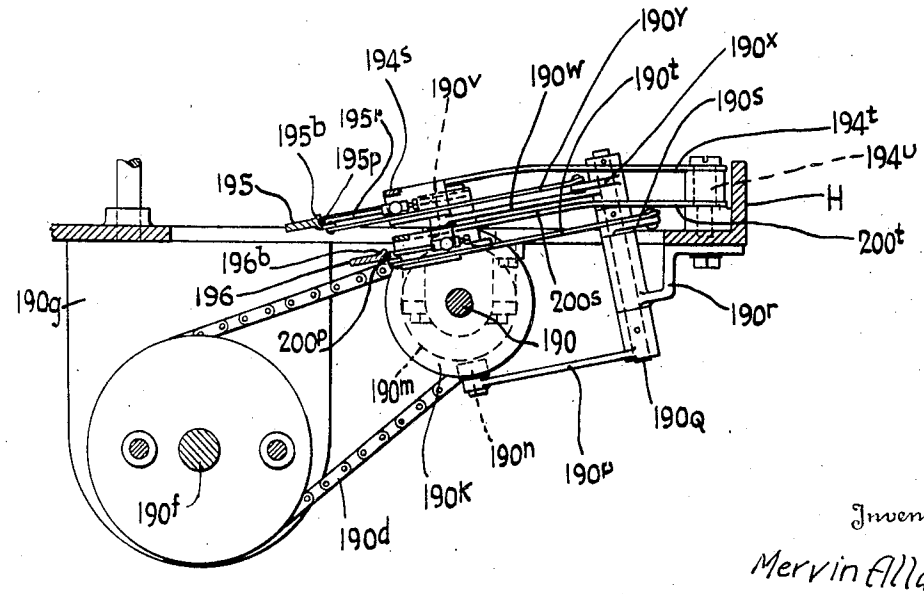


Fig. 11.



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AUTOMATIC BAG PACKAGE MAKING AND FILLING MACHINE

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Fig. 12.

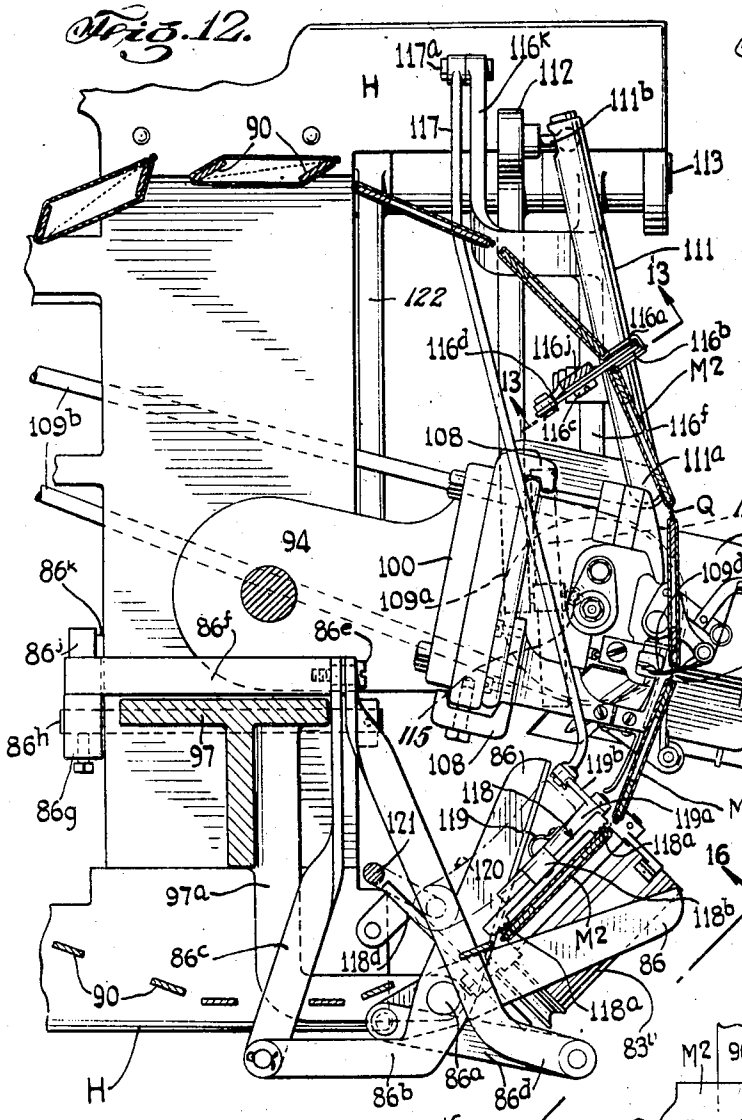


Fig. 13.

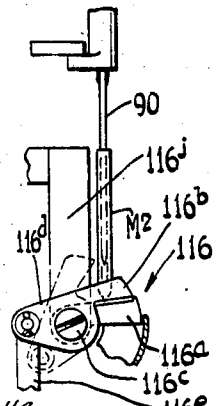


Fig. 14

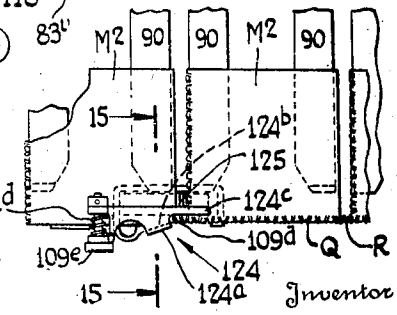


Fig. 15.

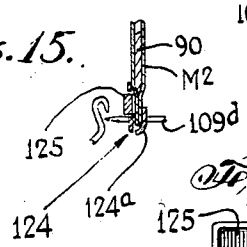
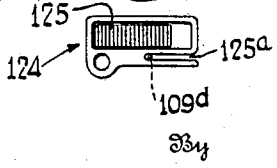


Fig. 14a



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Fig. 16.

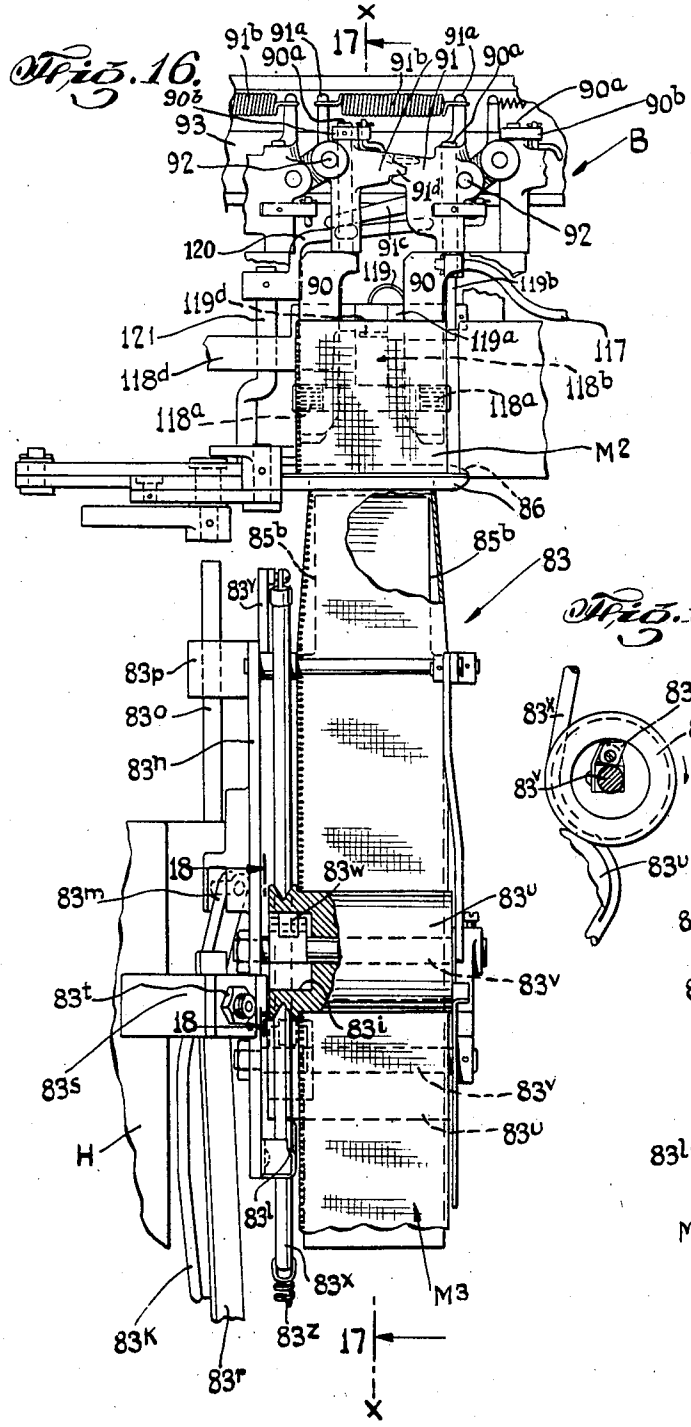


Fig. 17.

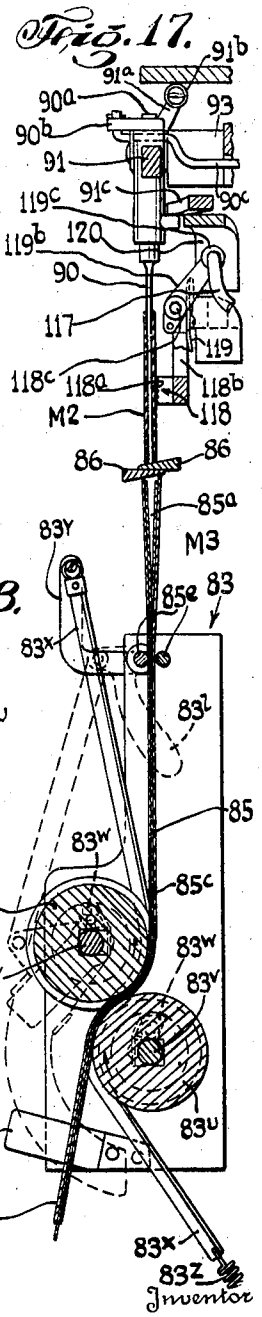


Fig. 18.

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By

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AUTOMATIC BAG PACKAGE MAKING AND FILLING MACHINE

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Fig. 19.

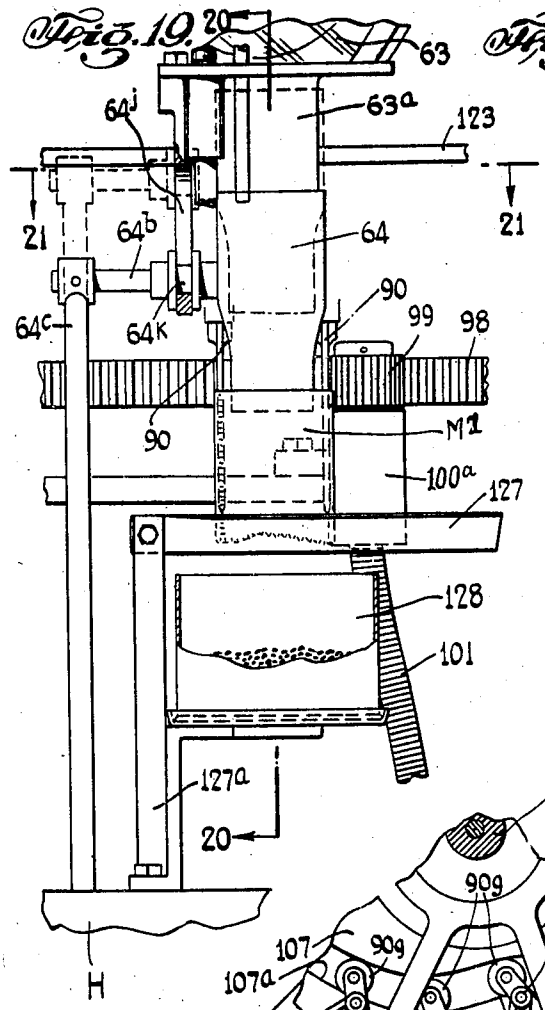
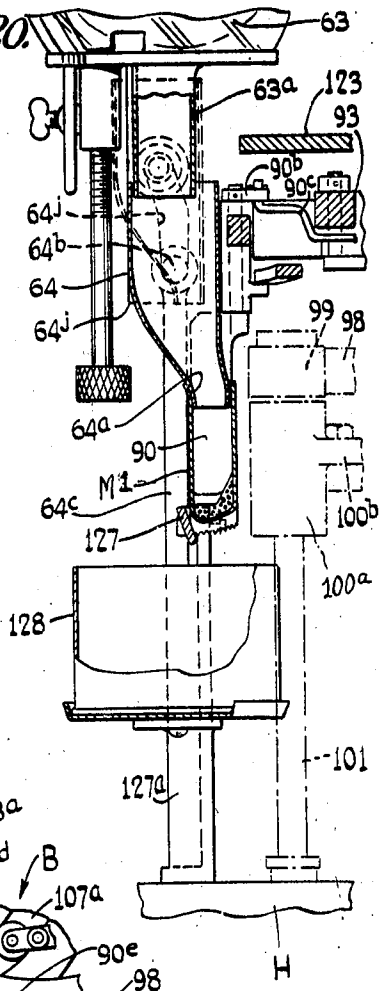


Fig. 20.



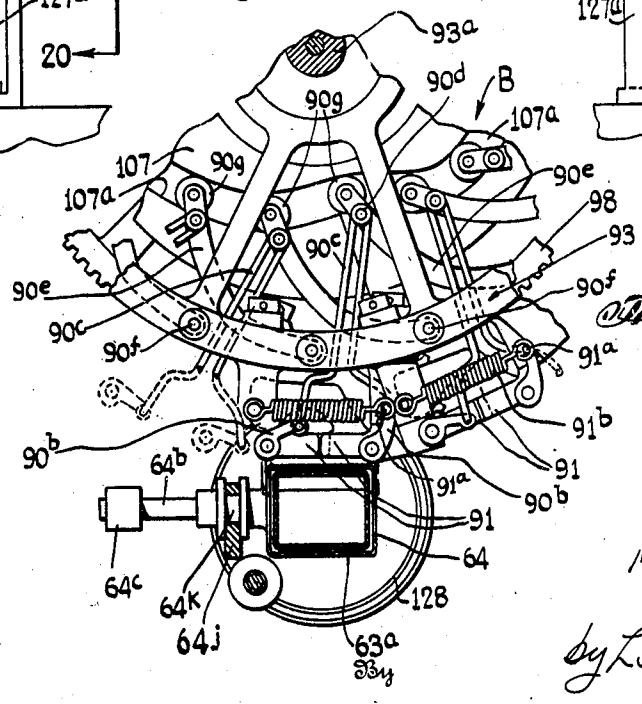


Fig. 21.

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Fig. 22.

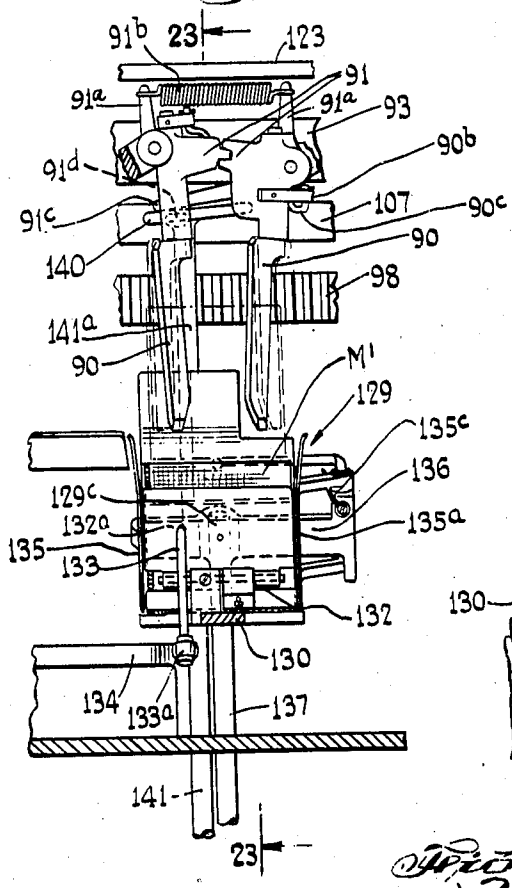


Fig. 23.

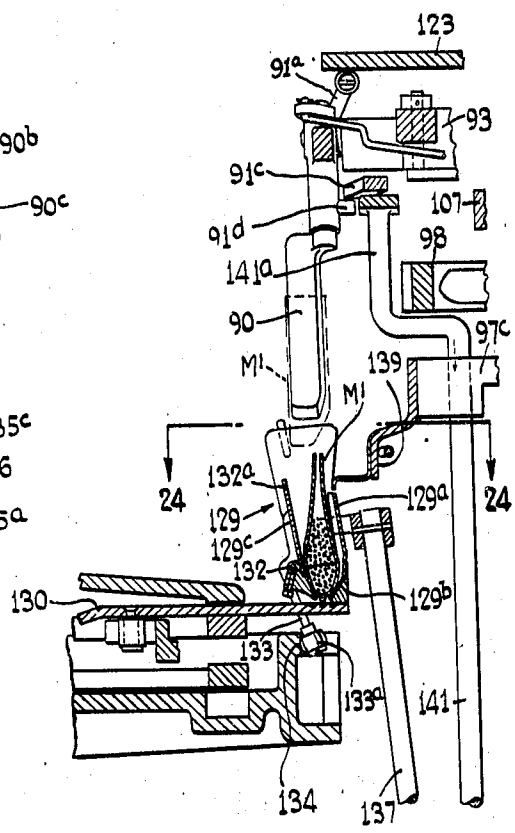
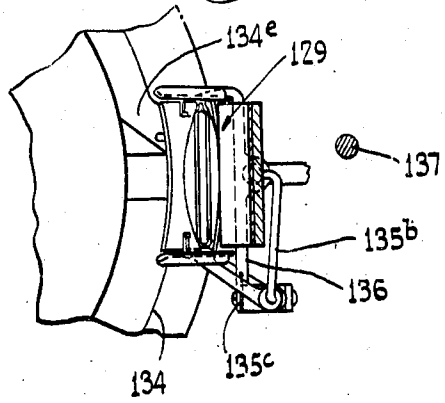


Fig. 24.



Inventor
Mervin Allatt

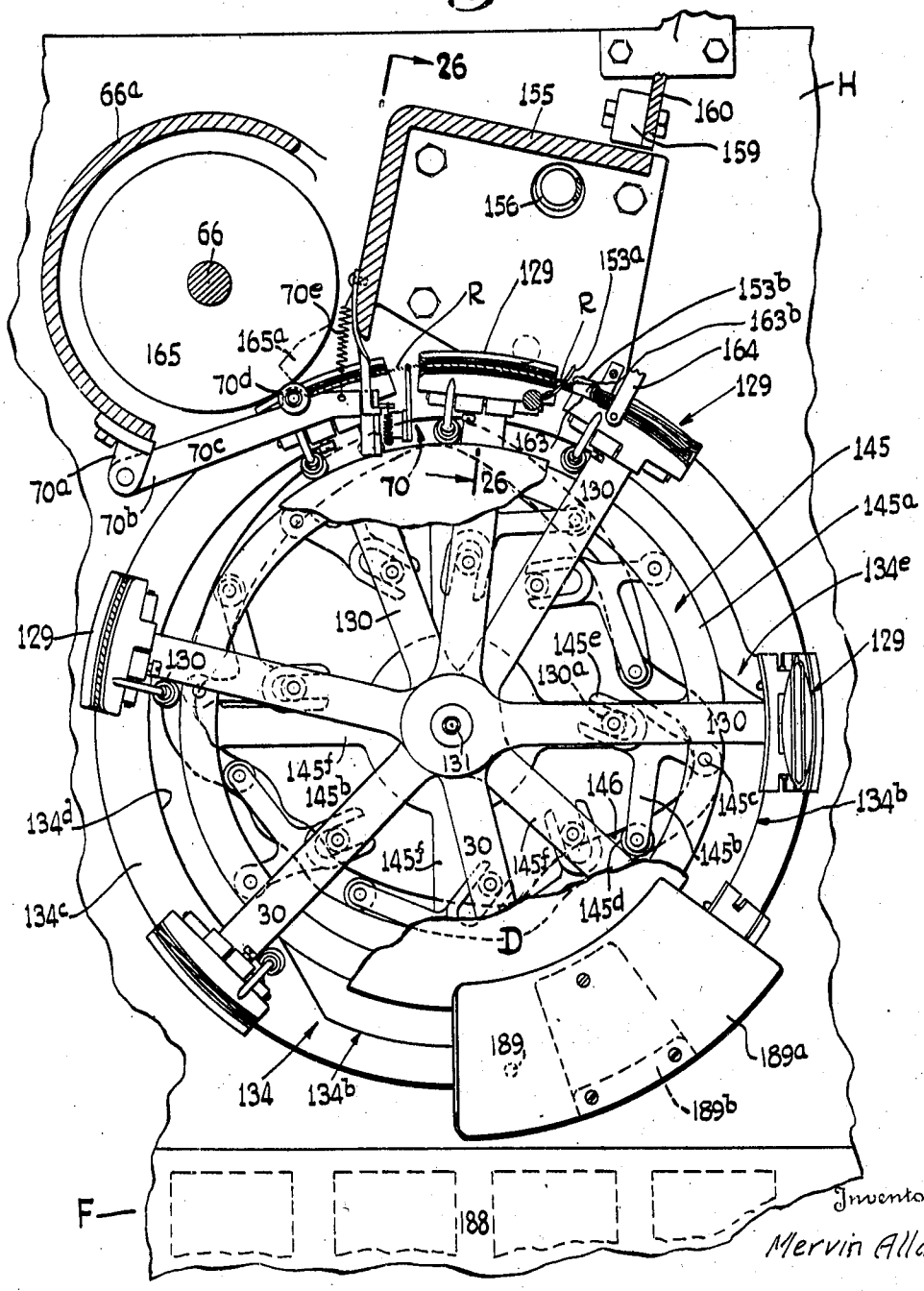
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AUTOMATIC BAG PACKAGE MAKING AND FILLING MACHINE

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Fig. 25.



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Fig. 26.

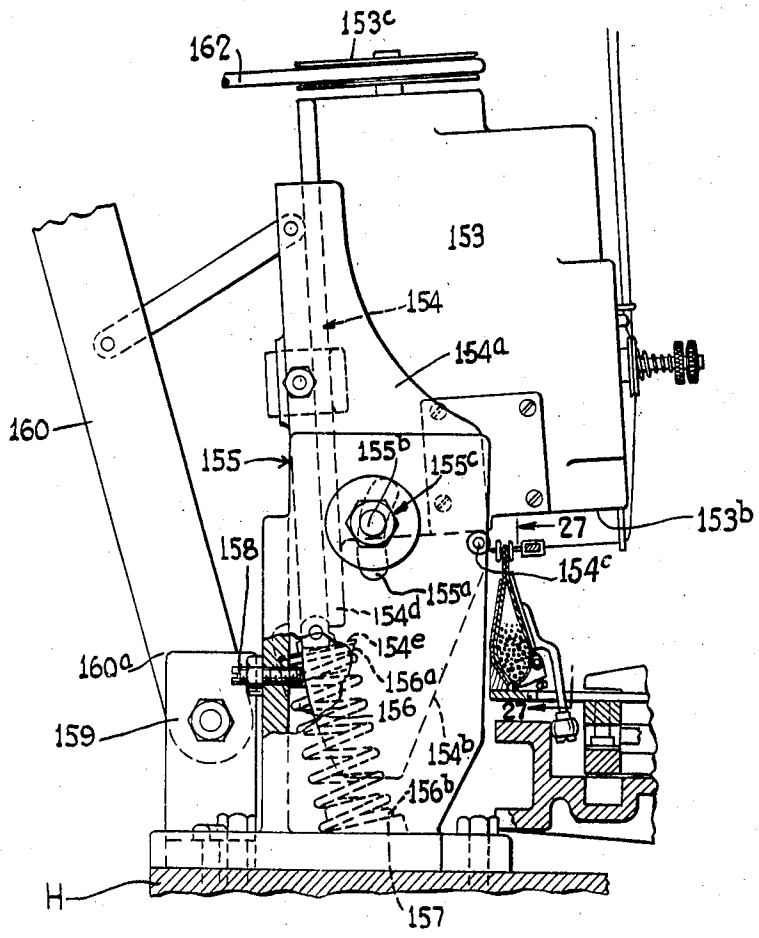
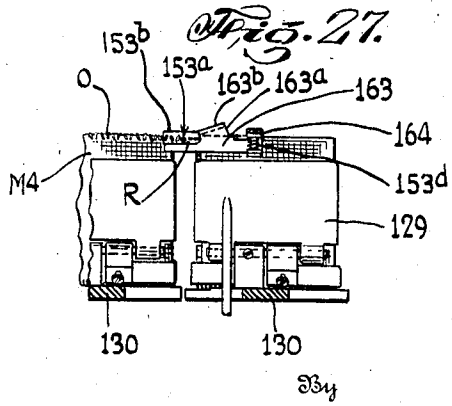


Fig. 27.



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by Louis Barnett

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AUTOMATIC BAG PACKAGE MAKING AND FILLING MACHINE

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Fig. 28.

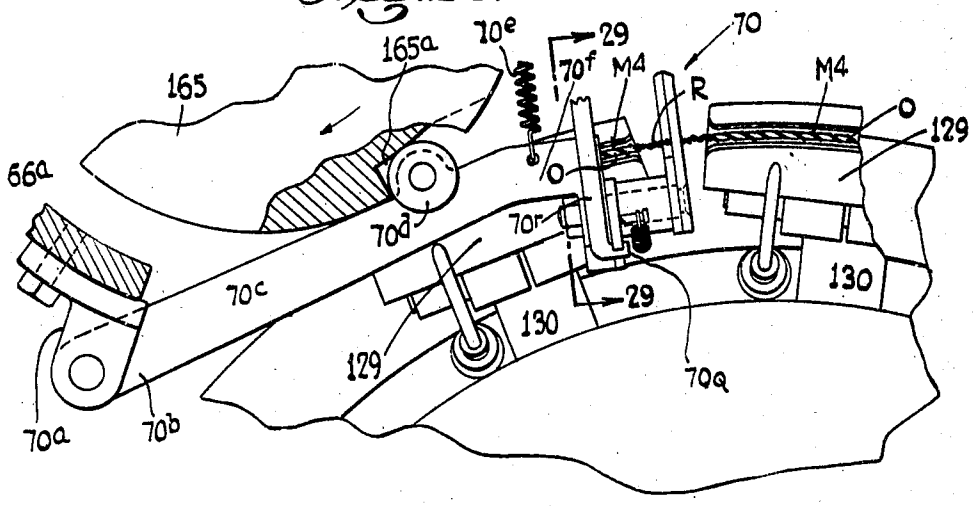


Fig. 29.

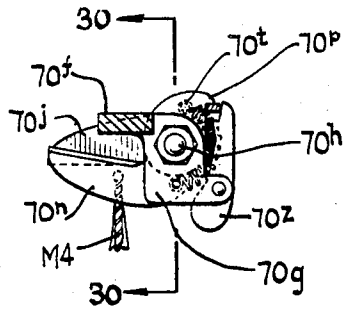


Fig. 30.

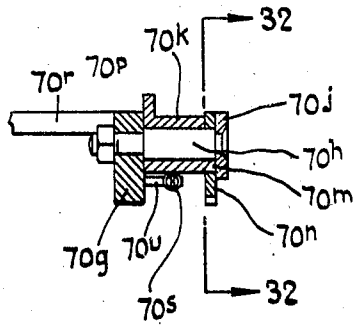


Fig. 31.

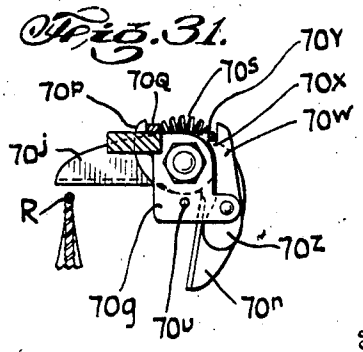
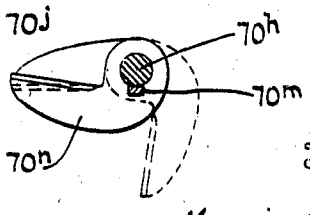


Fig. 32.



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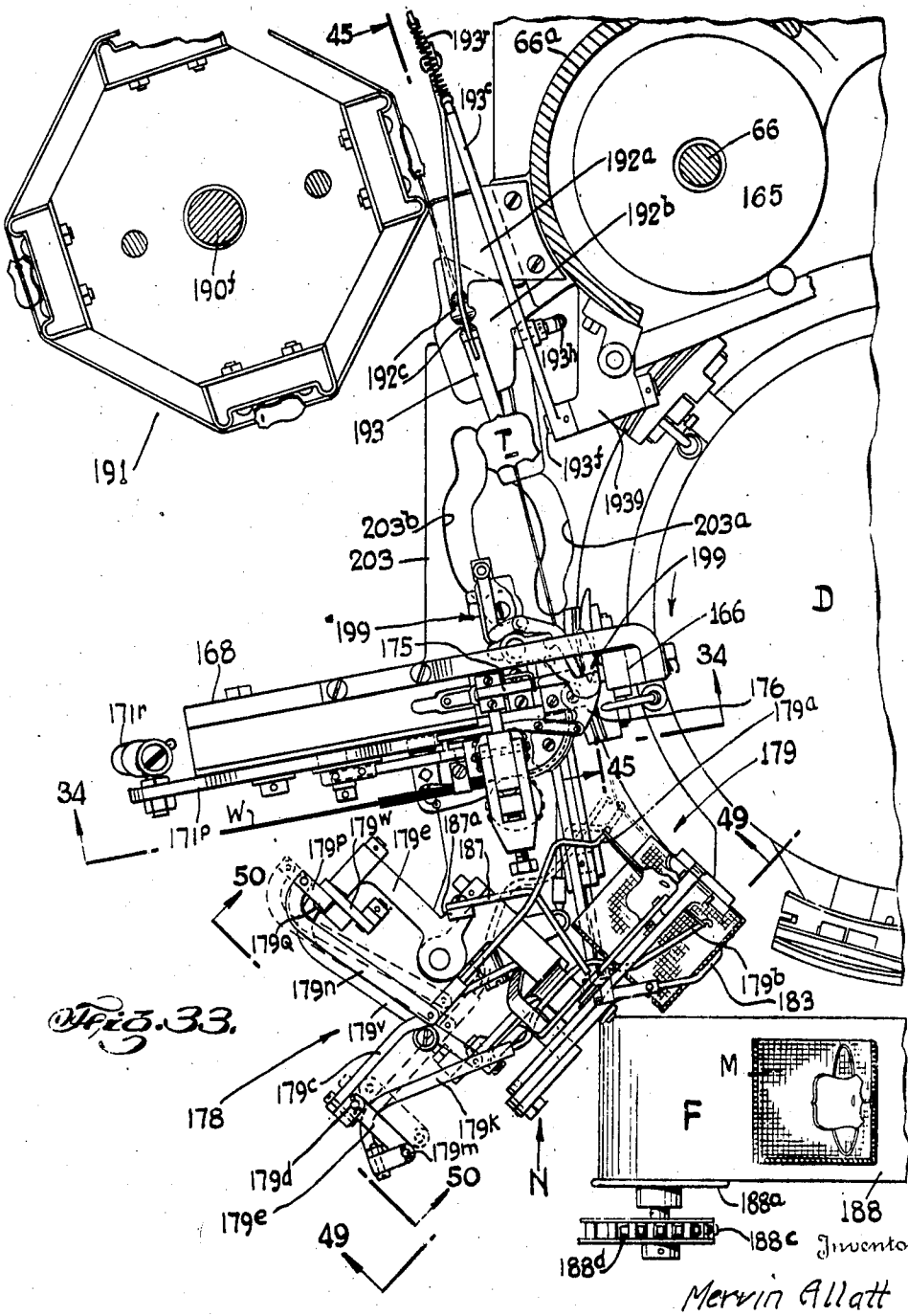


Fig. 33.

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Fig. 34.

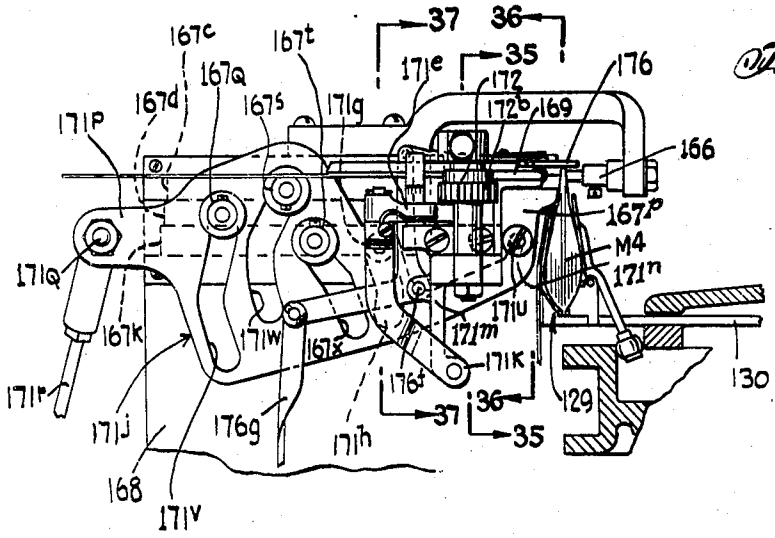


Fig. 35.

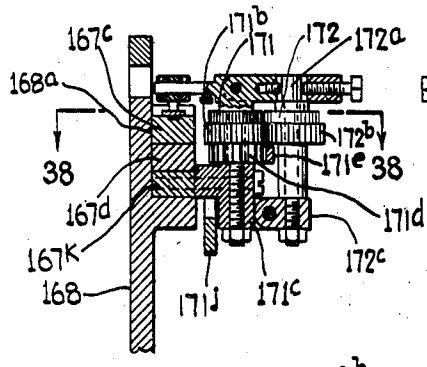


Fig. 36.

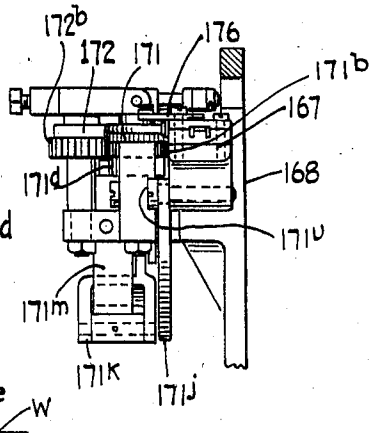
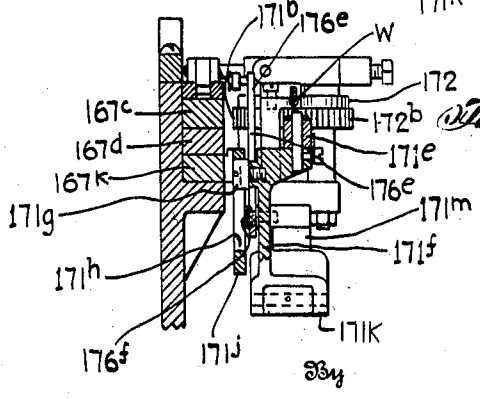


Fig. 37.



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Fig. 38.

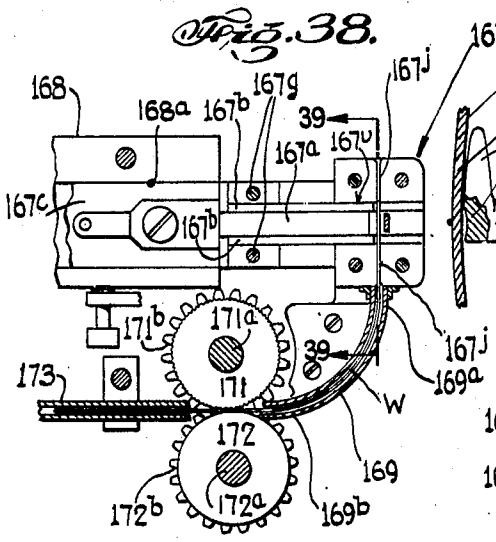


Fig. 39.

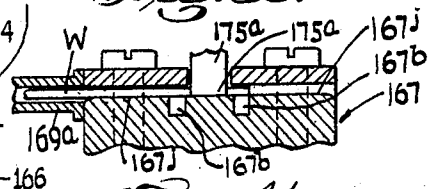


Fig. 41.

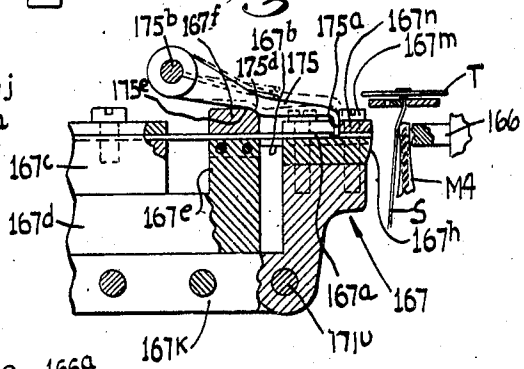


Fig. 40.

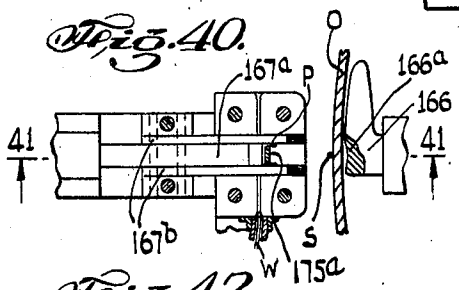


Fig. 44.

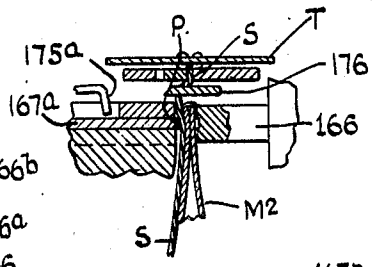


Fig. 42.

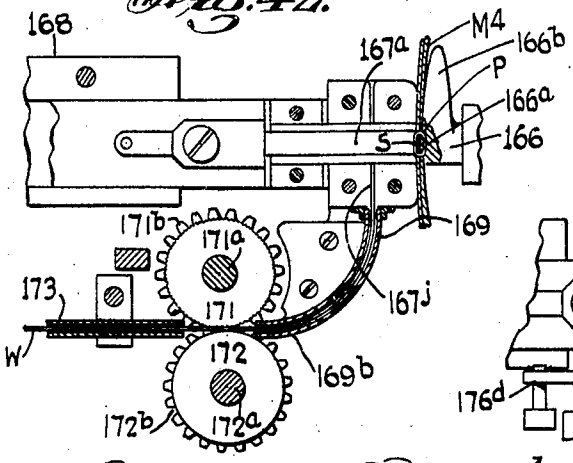


Fig. 43.

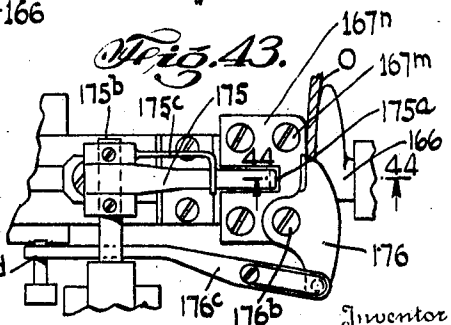


Fig. 38a



Fig. 38b



Inventor

Mervin Allatt

By Louis Barnett

Attorney

Patented June 6, 1944

2,350,333

UNITED STATES PATENT OFFICE

2,350,333

AUTOMATIC BAG PACKAGE MAKING AND FILLING MACHINE

Mervin Allatt, Plainfield, N. J., assignor to Millie Patent Holding Co., Inc., a corporation of New York

Original application August 21, 1935, Serial No. 37,257. Divided and this application June 16, 1937, Serial No. 148,438

9 Claims. (Cl. 226—53)

This invention relates to packaging machinery of the bag making and filling type. More particularly the invention is directed to portions of a full automatic machine for making complete articles, such as tea-balls or other essence containing products, in quantity production.

Among the objects of the invention is to provide an improved machine for making articles of the character described comprising relatively few and simple parts which form a combination of compactly arranged cooperating apparatus, devices and mechanisms for automatically performing certain operations necessary in the complete manufacture of said articles which shall require minimum attention in operation, which shall be relatively inexpensive to construct, and which shall be practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out. This case is a division of my application Serial No. 37,257, filed August 21, 1935, granted July 22, 1942, as Patent Number 2,290,158, for automatic bag package making and filling machine.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the constructions hereinafter described and of which the scope of application will be indicated in the following claims.

In the accompanying drawings, in which is shown various possible illustrative embodiments of this invention,

Figure 1 is a front elevational view of a tea-ball making machine embodying the invention.

Figure 2 is a plan view taken on line 2—2 in Figure 1.

Figure 3 is a detailed view corresponding to a section taken on line 3—3 in Figure 1 showing the clutch mechanism in effective position.

Figure 4 is a view similar to Figure 3 showing the clutch mechanism in the ineffective position.

Figure 5 is a sectional view taken through the machine at line 5—5 in Figure 2.

Figure 6 is a cross-sectional view taken above the main crank shaft at line 6—6 in Figure 5.

Fig. 6*a* is a fragmentary perspective view of a cam and linkage connection for controlling the oscillation of the sewing machine when applying bottom closures on bags.

Fig. 6*b* is a fragmentary section taken on line 6*b*—6*b* in Fig. 6 showing the tea-ball sizing adjustment mechanism.

Figure 7 is a detailed front view of the main clutch control.

Figure 8 is a cross-sectional view taken on line 8—8 in Figure 7.

Figure 9 is an end elevational view of a portion of the machine showing the tag feeding and attaching mechanism with the stapling means omitted.

Figures 10 and 11 are cross sectional views taken on lines 10—10 and 11—11, respectively, in Figure 9.

Figure 12 is a cross-sectional view showing the bag material severing and sewing means.

Figure 13 is a detailed cross-sectional view taken on line 13—13 in Figure 12 showing the thread cutting and separating means.

Figure 14 is a detailed front view showing the machine needle, presser foot and material guiding means for sewing the bottom closure seam.

Figure 14*a* is a detailed elevational view showing the sewing machine feed dog and guide for sewing the bottom closure seam.

Figure 15 is a detailed cross-sectional view taken on line 15—15 of Figure 14.

Figure 16 is a detailed front view in elevation of the bag material feeding member corresponding to a view taken on line 16—16 in Figure 12.

Figure 17 is a cross-sectional view taken on line 17—17 in Figure 16.

Figure 18 is a cross-sectional view taken on line 18—18 in Figure 16 showing a one way clutching means.

Figure 19 is a detailed front view of the bag tea filling means.

Figure 20 is a cross-sectional view taken on line 20—20 in Figure 19.

Fig. 20*a* is a fragmentary elevational view showing the accelerating and decelerating movement arrangements of the sewing machine when applying bottom closures on unfilled bags.

Figure 21 is a fragmentary detailed section in plan taken on line 21—21 in Figure 19.

Figure 22 is a detailed front elevational view of the transfer means from the bag filling to the top closure means.

Figure 23 is a cross-sectional view taken on line 23—23 in Figure 22.

Figure 24 is a detailed view taken in plan on line 24—24 in Figure 23.

Figure 25 is a detailed plan view of the carrier for the top closure means.

Figure 26 is a detailed cross-sectional view in elevation taken on line 26—26 in Figure 25.

Figure 27 is a detailed front view taken on line 27—27 in Figure 26 showing the machine needle,

presser foot and material guiding means for the top closure.

Figure 28 is a detailed plan view of the thread severing means for separating the bags.

Figure 29 is a cross-sectional view taken on line 29—29 in Figure 28.

Figure 30 is a sectional view taken on line 30—30 in Figure 29.

Figure 31 is a detailed view similar to Figure 29 showing the shears open.

Figure 32 is a detailed sectional view corresponding to a section taken on line 32—32 in Figure 30.

Figure 33 is a detailed plan view of the tag feeding, attaching and discharging means.

Figure 34 is a detailed cross-sectional view taken on line 34—34 in Figure 33.

Figure 35, 36 and 37 are detailed cross-sectional views taken on lines 35—35, 36—36 and 37—37, respectively, in Figure 34.

Figure 38 is a detailed cross-sectional view of the staple wire feeding means taken on line 38—38 in Figure 35.

Figure 38*a* is a cross-sectional view of the staple wire before it passes through the shaping means of the stapling device.

Figure 38*b* is a cross-sectional view of the staple wire after it passes through the shaping means of the stapling device.

Figure 39 is a detailed cross-sectional view taken on line 39—39 in Figure 38.

Figure 40 is a detailed plan view of the means shown in Figure 38 in position for cutting and bending the staple wire.

Figure 41 is a detailed cross-sectional view taken on line 41—41 in Figure 40.

Figure 42 is a section similar to Figure 38 showing the wire staple completely formed for attaching the string to the bag.

Figure 43 is a detailed plan view of the string severing means.

Figure 44 is a detailed cross-sectional view taken on line 44—44 in Figure 43.

Referring in detail to the drawings and particularly to Figures 1–6, inclusive, 60 denotes generally a complete full automatic machine constructed to embody the invention and comprising in combination cooperating apparatus, devices and mechanisms for making complete tea balls M of the pillow type with stapled string handles S and tags T or the like articles on large scale production.

As seen from Figures 1, 16 and 17, said machine 60 comprises a tea supply feed measuring mechanism A which provides successive charges of predetermined quantities of tea to bags M1 made by an apparatus B which receives cloth for making said bags M1 of cut unit sections M2 from a tubular cloth strip M3 of a suitable supply C.

The bags M1, after being filled with tea by a hopper 64 as shown in Figs. 19, 20, 21, and 23 are transferred to apparatus D for sewing the top closure seam O. See Figs. 25, 26, 27 and 28. The closed bags M4 are next operated upon by a string handle and tag applying device E to anchor one end of each string handle S to bag M4 at the top closure seam O, the finished bags M finally being transferred to discharge apparatus F with the string handles S and tags T in non-tangling position ready for packing in shipping containers.

All the parts of machine 60, namely, the measuring feed mechanism A, bag making apparatus B, bag cloth supply C, top closure apparatus D, string handle and tag applying device E, and discharge apparatus F, are interconnected in cooperating timed relation by suitable driving and power transmission means G. This driving and power transmission means G is controlled through the operation of a hand shift lever 65, the interconnecting portions of which by a suitable clutch control 65*d* can selectively operate the machine 60 in conjunction with the string handle attaching device E or with the latter shut off, as will hereinafter be described.

The tea supply feed measuring mechanism

The mechanism A may be constructed of parts assembled to operate in the manner similar to that disclosed in Letters Patent No. 2,015,071, granted September 24, 1935 to Louis Hirschorn and Hans Irmscher and is seen to comprise a tea storage receptacle 61 in which the bulk of the tea supply is stored. Said receptacle 61 has extending diagonally therein a stirrer 61*a* which is intermittently driven through a ratchet drive 61*b*. The latter is actuated by a crank and lever drive 61*c* which in turn is operated from a cam mechanism 61*d*. A bell crank and linkage 61*e* is also driven by said cam mechanism 61*d* for operating the ratchet tooth roller drive 61*f* to feed the tea from said receptacle 61 to a conveyor 61*g* which empties into an auxiliary feed receptacle 62*a* having an agitating means 62. The stirrer 61*a*, ratchet tooth roller drive 61*f* and the conveyor 61*g* serve to break up any mass or lumps of tea so that the latter is fed to said receptacle 62*a* in a loose, freely flowing stream. Said conveyor 61*g* is driven through a ratchet wheel drive 61*h* which interconnects with the bell crank and linkage 61*e*.

The auxiliary receptacle 62*a* is provided with converging bottom walls, one of said walls being formed by a slidable bar 62*b* which rests upon the backing plate 62*c*, the other of said walls by a swinging bar 62*d* secured to a lever 62*e*. The swinging bar 62*d* moves in the path of flow of the tea and when swung upwardly into the auxiliary receptacle 62*a* keeps the tea from escaping therefrom, said bar 62*d* being provided for this purpose with an arcuate shaped extension gate 62*f* which moves in position to shut off said flow. The bar 62*d* is swung back and forth in unison with the movement of the linkage 61*e*, and the bar 62*b* is actuated through the linkage 62*k* and cam 62*j* for slidable movement back and forth upon the supporting plate 62*c*.

The receptacle 62*a* empties into a flexible conduit 62*g* which is vibrated by a shimmying motion to prevent the tea from clogging therein, and serves as positive feeding means to the restricted inlet of a rotary measuring device 63. The shimmying motion of said conduit 62*g* is provided through a cam transmission 62*h* driven by a vertically extending drive shaft 66 which also drives the cam 62*j* and the cam 61*d* of the receptacle stirrer 61*a*.

The lower end of said drive shaft 66 is formed with the crank portion 67 which through a reciprocating rack 68 rotates the measuring device 63 so that a predetermined amount of tea is taken from the flexible conduit 62*g* and delivered to a feed hopper 64, all in the manner described in detail in the aforementioned patent application.

The drive shaft 66 below the crank portion 67 carries a drive cam 165 for operating a shear 70 (see Figs. 28 to 33, inclusive) to sever the interconnecting thread stitches formed between

successive bags M4 after the top closures O have been applied by a sewing machine 153 in the manner hereinafter described.

Said drive shaft 66 below said cam 165 is terminated by a bevelled gear drive 71 which connects with a jack shaft 72, the latter being driven through a pair of helical gears 73 by a main power shaft 74. Said main power shaft 74 may be driven by a motor or other suitable power source (not shown) through a belt 65*a* and said clutch control 65*d*, as shown in Fig. 5.

It is also desirable to provide between the cam 165 and the bevel gear drive 71 a clutch 208 having an operating handle 209 (see Figure 1) which serve to selectively cut off the operation of the tea supply feed measuring mechanism A. Said clutch 208 may be of any well known construction and preferably being of the friction or spring pressed contacting surface type which is adapted to yield should any obstructions such as a nail pass to the measuring device 63. By operating said handle 209, the entire mechanism A driven by said vertical drive shaft 66 and the crank portion 67 is made inoperative. The remaining apparatus, devices and mechanisms forming machine 60 may be operated and are controlled through the lever 65 as described above.

The vertical drive shaft 66 has a semi-circular housing 66*a* which extends therearound and is bolted to the top of frame H of machine 60. This housing 66*a* serves as guard to shield the said shaft 66 and the moving parts driven thereby, and also supports a top bearing 66 of said shaft.

Bag cloth supply and feeding mechanism

Referring now to Figures 1, 2 and 5, the cloth supply C may be enclosed in a container 80, the tubular cloth strip M3 preferably being flat rolled and is unwound by passing out through a slot 80*a* provided in the container 80 and around a suitable projecting guiding pin 82 which extends from the frame H of the machine 60. Said strip M3 is then fed to the bag making apparatus B by means of a reciprocating cloth feeding mechanism 83.

As seen from Figures 1, 2, 5 and 6, the cloth feeding mechanism 83 comprises reciprocating gripping means formed by a jaw 83*a* and a bar 83*b* cooperating therewith which clamp the strip M3 during its lowest or retracted position and on moving up draws up the strip M3 from the container 80, unwinding same to feed an amount to the bag making apparatus B sufficient to make a single bag. The jaw 83*a* and bar 83*b* of said gripping means are carried on the free end 83*d* of a cam lever 83*c*, the inner end 83*e* of said lever 83*c* cooperating with a cam 83*f* which is seen to turn with a main cam shaft 84. Said cam lever 83*c* is fulcrumed on bolt 83*g* supported on a bracket 83*h* which extends from the frame H.

The fulcrum bolt 83*g* is adjustable along a slot 83*j* in the cam lever 83*c* as shown in Fig. 6*b* so that the movement of the lever can be varied for supplying a desired length of the strip M3. By this simple adjustment and another of equal simplicity hereinafter described, the size of the bag made by the machine 60 may be varied, this variation resulting in shortening or lengthening the depth of the bag.

Now referring to Figures 6, 16, 17 and 18, it is seen that there is pivotally attached to move with the lower end of cam lever 83*c* a vertically extending connecting rod 83*k*, the upper end 83*m* of which is pivotally connected to a vertically slidable frame member 83*n*. Said member 83*n* is guided in its movement by a vertically extending rod 83*o* which is engaged by the side bearing block 83*p* extending from said frame 83*n*. The free end 83*d* of lever 83*c* carries a vertically extending bar 83*r*, the upper end of which slides in a bracket 83*s* having a suitable screw adjustable friction tension means 83*t* to control the reciprocating movement of the mechanism 83 in order that the same may operate smoothly.

The frame 83*n* has mounted thereon a pair of clamping feed rollers 83*u* which cooperate with the jaw 83*a* and bar 83*b* of the cloth feeding mechanism 83 to feed the bag strip M3 from the container 80 to the bag making apparatus B. Said rollers 83*u* are journalled on clutch shafts 83*v* which permit each of the rollers 83*u* to rotate only in one direction, the rotation taking place on the downward movement of the frame 83*n*. Each shaft 83*v*, as shown in Figure 18, comprises a pivoted spring pressed clutch pawl 83*w* which engages the counterbored annular surface 83*i* of the feed rollers 83*u* for eliminating any possible free turning movement of said rollers 83*u*. A friction belt 83*x* is threaded to extend between said rollers 83*u* for eliminating any possible free turning movement of said rollers 83*u*. Said belt 83*x* may be anchored at one end at a bracket 83*y* extending from the frame 83*n*, the other end thereof is provided with a tension spring 83*z* which may be secured to the machine frame H.

Suitable interconnecting guides 83*l* mounted above and below the rollers 83*u* may be provided for retaining the cloth strip M3 in proper alignment with relation to said rollers 83*u*.

Extending through the leading end of the tubular strip M3 and engaging between the rollers 83*u* there is a tongue member 85 having an enlarged upper portion 85*a* which may be cutaway along its opposite edges at 85*b* so as to be slightly narrower than the width of said bag strip M3. The portion 85*a* of said tongue member 85 is gradually tapered downwardly in thickness for a short length to provide a relatively thin flexible portion 85*c* in the remainder length thereof to extend a distance below the rollers 83*u*, as shown at 85*d* in Figures 16 and 17, the enlarged portion of the tongue 85*a* being limited in its downward movement with respect to the tubular bag material M3 by a pair of spaced rods 85*e*.

The portion 85*c* of tongue member 85 passing within said strip material M3 and between the rollers 83*u* is formed with an S-shaped bend to retain the tongue member 85 within said material M3 to permit movement of said material with respect thereto in the following manner. The upward movement of the slidable frame 83*n* takes place while the jaw 83*a* and the bar 83*b* grip the strip material M3 together with the tongue portion 85*c* therein. Just prior to the upward movement of said frame 83*n*, shear blades 86 complete the severing of the upper portion or bag section M2 from the strip material M3 which is to form a single tea bag. The shear blades 86 thereafter open up to permit the passage therethrough of said strip material M3 gripped and carried by the frame 83*n* carrying within said material M3 the tongue 85, said material M3 then moving from a lower position below the shear blades 86 to the fully raised position above said blades 86 as shown in Figures 16 and 17.

The strip material M3 at this extreme raised position will be engaged and held by suitable means forming part of the bag making apparatus

B hereinafter described and the frame 83*n* will thereafter start in its downward movement. During this downward movement, the rollers 83*u* are released for rotation and ride along the outside of the strip material M3 which is held by its upper end against return movement. Due to the S-shaped form of the tongue member 85 retained between the rollers 83*u*, said tongue member 85 will be retracted within the material M3 and will move in unison with said rollers 83*u* until the enlarged end 85*a* again takes the position below the shear blades 86, as shown in Figure 17. At this time the frame 83*n* has arrived at its lowermost position and the strip material M3 above the enlarged tongue 85 is then again free to permit the severing thereof by the shears 88 to form the bag section M2.

As said bag material M3 before being cut is projected up beyond the end of the enlarged upper portion 85*a* of the tongue member 85 and the shear blades 86, said enlarged tongue portion 85*a* spreads open the upper end of the bag material M3 sufficiently to permit the same to be drawn over spaced fingers 90 which are in parallel alignment with the wide sides thereof extending in the same plane, as shown in Figures 16 and 17. These fingers 90 are rotatably mounted about spaced axes passing through the length thereof by means of shaft portions 90*a* which are journalled in cooperating toothed segment member 91. Said segment members 91 are pivotally mounted on stud shafts 92 which are spaced and extend in parallel relation to a radial axis X—X of a horizontally disposed turntable frame 93 (see Figures 5, 16, 17 and 21).

As seen from Figures 16, 17 and 22 the segment members 91 carry upstanding posts 91*a* which are interconnected by a tension coil spring 91*b*. This tends to keep the fingers 90 in extended spread position, namely, in substantially parallel alignment, and is sufficient to put a slight strain on the material of the bag when engaged thereon. The turning of segment members 91 for moving the fingers 90 to and from each other is accomplished by means of a movable arm 120 which is pinned at the end of a vertically extending rod 121. The lower end of said rod 121 is extended and is pivotally secured to a cam lever 122 which has a cam roller 122*a* cooperating with a cam 122*b*, the latter being secured to a cam shaft 84, the lever 122 being fulcrumed on the jack shaft 113 (see Figures 5, 6 and 16).

The movable arm 120 is operated through said cam 122*b* and said interconnecting lever 122 and rod 121 for projecting it in the path of movement of an extending portion 91*c* integrally formed with the segment 91. The arm 120 serves to press said portion 91*c* for swinging the segments 91 which are interlocked through teeth 91*d* against the action of the spring 91*b* to bring the fingers 90 together so that they will readily enter the open upper end of the cloth M3. This action takes place at a hereinafter called "first station" where the bag strip material M3 is fed to the turntable assembly forming the bag making apparatus B.

The turntable frame 93 is in the form of a spider having a hub 93*a* which is secured to rotate with a vertical shaft 94, the latter being journaled in the spaced upper and lower ball bearings 95. The lower ball bearing 95 is supported by a cross tie plate 96 and the upper bearing 95 on an angle bracket 97 which are carried by the machine frame H. Adjacent to the upper bearing 95 carried by the angle bracket 97 and below the frame 93, there is provided a gear wheel 98 secured to turn with said hub 93*a*. Said gear wheel 98 meshes with a pinion 99 supported on a bracket 100*a* extending from an upper horizontally extending arm 100*b* which turns on shaft 94 and also has bolted thereto an upright support frame 100, as shown in Figures 5 and 20. Said arm 100*b* and a similar lower horizontally extending arm 100*c* spaced therefrom support said frame 100 for free turning movement on the shaft 94, said arms 100*b* and 100*c* being assembled to fit between the cross tie plate 96 and angle bracket 97, as shown in Figure 5.

Referring now to Figures 2 and 20, the pinion 99 is seen to be driven by means of a flexible shaft drive 101. The lower or drive end of said shaft 101 comprises sprocket wheel 102 which is connected through a linkchain 103 with an intermediate idler sprocket 104, the latter being mounted to turn on shaft 105. Said chain 103 is driven through a sprocket 106 mounted to turn with the vertically extending shaft 66 (see Figure 2), the latter being driven through the bevelled gears 71 as shown in Figure 5.

The spaced fingers 90 carried by the spider frame 93 are adapted to rotate vertically through an arc of 90 degrees so that said fingers 90 can swing from a position of alignment of the flat sides in the same plane as shown in Figures 16 and 17 to an alignment with the flat sides in parallel planes as shown in Figures 19 and 20 for opening the bag M1 to receive a charge of tea. To accomplish this rotary movement, short crank arms 90*b* are provided and disposed at different levels, said arms being pivoted to turn with the shafts 90*a*, as shown in Figure 16, one of the crank arms 90*b* of each pair of fingers 90 (the one on the right) being located just below the level of stud shaft 92, and the other (on the left) is located above stud shaft 92. As seen in Figure 21, these crank arms 90*b* are connected to opposite ends of a forked member 90*c*, the bent middle portion of said member 90*c* engaging around pivoting pins 90*d* which extend up from cam levers 90*e*. The latter are pivoted at 90*f* uniformly on the rim portion of the spider frame 93 to permit swinging the free ends thereof which carry rollers 99*g* to ride in a cam groove 107*a* of a relatively stationary cam member 107. Said cam member 107 is supported on the hub portion 93*a* of the spider frame 93 but is retained against rotation by the upper end 97*a* of the angle bracket 97 secured to the cross plate 96 which in turn is supported on bed frame H (see Figures 5 and 12).

The upright support frame 100 carries gibb mounting 108 for adjustably carrying a sewing machine 109. Said frame 100 with the gibb mounting 108 oscillating to permit the advancement of the needle 109*d* of sewing machine 109 while applying a stitch seam closure Q at the bottom of the cloth bag section M2 in the manner hereinafter described. Said machine 109 is driven through a pulley 109*a*, a belt 109*b* which runs over two angularly disposed idlers 110, and a drive pulley 109*c*, the latter being mounted to turn with the main drive shaft 74, all as shown in Figures 2, 5, 6 and 12.

The oscillating of the support frame 100 together with the sewing machine 109 about the shaft 94 carries the pinion 99 permitting the sewing machine 109 to accompany the bag sections M2 during the seam sewing operation. As seen in Figure 12, said oscillation is accomplished by providing a connecting bar 111 which has one end pivoted 111*a* to the sewing machine 109 and

the opposite end connected through a ball and socket joint 111b with a bell crank 112, said bell crank opposite the ball and socket joint 111b being terminated by roller 112a which rides on a cam 114, the latter being keyed to turn with a cam shaft 84. A tension spring 115 keeps the roller 112a pressed against the cam 114, as is clearly shown in Figures 5 and 6.

As seen from Figs. 5, 19 and 20, the oscillation movement of machine 109 takes place during a step by step movement which is a direct result of providing the pinion 99 which meshes with the gear 98 with the flexible shaft 101 as is explained in a preceding paragraph. The pinion 99 is supported as shown on bracket 100a which is bolted on the arm 100b, the latter being mounted to swing about the vertical shaft 94 of the machine supporting frame 100. Thus, as the sewing machine is oscillated through the linkage and cam (as has been previously described in the specification), it causes the pinion 99 with its support 101 to oscillate therewith. Since the latter meshes with the gear 98 there will be a step by step movement given the frame 93 due to the movement of the pinion at its supporting bracket 101 as shown in Fig. 20a.

Before the bag M1 with the bottom seam sewn closure Q reaches the filling or charging station, the thread interconnecting the bottom seams Q of the adjacent bags M1 is severed. For this purpose there is provided a suitable shearing or severing means 116. As shown in Figures 12 and 13 said severing means 116 consists of a stationary blade 116a and a movable blade 116b, which is pivoted on screw 116c carried by a suitable bracket 116j which extends from the machine frame H. The end 116d opposite the cutting edge of said shear blade 116b connects with a rod 116e. The latter pivotally connects with a cam lever 116f which carries a roller 116g riding on a cam 116h, said cam being pinned to run with the cam shaft 84 (see Figures 5 and 6).

The movement of each bag M2 through the sewing machine 109 is a continuous one and as the needle 109a thereof ceases to pass through the bag material, it forms a strand of chain stitches J until the next successive bag M2 is brought to said needle by the fingers 90. As the sets of fingers 90 are spaced close together the distance between two successive bags M1 leaving the sewing machine 109 is only sufficient to permit the passage of the blades of the severing means 116. The severing of the interconnecting strand J is such that there is practically no necessity for trimming the bags M1, the seam Q terminating substantially with the end of the material of the bag M1.

The machines 109 and 153 each require two yarns or threads which are supplied from four spools 210 carried on a cage bracket 211, the latter being supported from the machine frame H as shown in Figure 1.

The means for mounting the strip material M3 to the fingers 90 and severing the bag section M2 is accomplished through the cam 116h (see Figures 6 and 12) which serves through coaction with a branch arm 116k extending from the said lever 116f to actuate a rod 117 connected therewith and pivoted thereto at 117a. The end 117b opposite said pivot 117a operates a gripping means denoted generally at 118. (See Figures 16 and 17.) Said gripping means 118 has spaced jaws 118a formed on the extremity of a T-shaped member 118b. The end of member 118b opposite the jaws 118a being pivoted on stud shaft 118c carried by a bracket 118d which is rigidly supported from a relatively stationary part of the machine frame H.

The gripping means 118b is loosely mounted on the stud shaft 118c and when effective is pressed by a spring 119 carried by a hub 119a of a lever 119b, the latter being pivoted on the stud shaft 118c. Said lever 119b has an arm 119c extending therefrom which is pivotally connected to the upper end of the rod 117 as is shown in Figures 12, 16 and 17. The hub 119a carries a pin 119d which is adapted to engage the T-shaped member 118b for retracting the gripping jaws 118a to release the upper end of the cloth M3 from engagement between said jaws 118a and the fingers 90.

The upper end of the bag strip material M3 after being retained in place by the gripping jaws 118a is severed by the shear blades 86 as shown in Figures 16 and 17. Said shear blades are pivotally mounted on a bolt 86a which is carried by a support 97a extending from the angle bracket 97. The power end 86b of the blades 86 is connected through a twisted link 86c and a double linkage 86d to a pivot bolt 86e carried at the end of a bar 86f which is secured by any suitable fastening means such as screw fastening 86g mounted on a rock shaft 86h. The bar 86f has an outwardly extending cam lever 86j which terminates in a roller 86k riding in a grooved cam 86m, the latter being secured in turn with the cam shaft 84 as shown in Figures 2, 5 and 12.

On the operation of the shear blades 86, the upper end of the strip material M3 is severed leaving a bag section M2 carried by one pair of the fingers 90 of the turntable apparatus B. The fingers 90 as they rotate move the lower open end of the bag section M2 onto a presser foot 124 which has a trough shaped portion 124a, the bottom surface 124b of which is slightly inclined upward with relation to the movement of the sections M2. This portion 124a and surface 124b are so designed and constructed as to positively contract the lower edges of bag section M2. The outer end of the inclined portion 124a terminates in a tail piece 124c wherethrough the machine needle 109d extends. In order that said needle may form an overlocked stitch seam by said machine 109, the presser foot 124 may be attached to the sewing machine by any suitable means such as bracket 109e and may be resiliently supported through a spring mounting 124d. Behind the presser foot 124 is a feed dog 125 which has a slot 125a wherethrough the needle 109d extends in register with the tail piece 124c.

The turntable apparatus B has a step by step movement, the "first station" being located to take advantage of one of the times when the parts of said apparatus are not rotating, that is, when they are stationary. The bag section M2 as it leaves the said "first station," passes on to the "second station," namely to the sewing machine 109 where the bottom open end has the overlocked seam Q applied thereto. While the fingers 90 of the turntable apparatus B are in motion and also while they are stationary in said step by step movement, the sewing machine 109 is swung to move with the bag sections M2 as they advance during the sewing operation by a swinging of the support frame 100 through the means already described, and by said means said machine 109 is also swung in a counter direction to the advance movement of the bag sections M2 while the latter are stationary during said step by step movement. This advance and counter

direction movement is alternately at accelerating and decelerating speeds to make the sewing operation continuous, that is, the to and fro movement of the machine 109 is so timed with relation to the step by step movement that said sewing machine 109 continues to apply seams Q on consecutive bag sections M2 without stopping or interruption in regular sequence.

The fingers 90 of the turntable apparatus B with the bags M1 in their rotation after passing the "second station" arrive at the "third station," namely, that where the bags M1 are filled one at a time through the upper or open end thereof. As seen from Figures 19 and 20, the moving parts of turntable apparatus B during this filling operation are in a relatively stationary position of said step by step movement which permits intermittently the moving of the strip material M3 onto the fingers 90 at the "first station" and also the cutting of the thread stitches between successive bags M1 by the shears 116 through the operation of the parts already described above and shown in Figures 12 and 13.

At the "third station," fingers 90 have been rotated to the position with the wide sides thereof in parallel alignment, thereby opening up the bag M1. This movement as has been described above is caused by the cam 107 and the cam levers 90e to swing the fingers 90 on their vertical axes from the position shown in Figures 16 and 17 to that shown in Figures 19 and 20. The bag M1 on the fingers 90 then being open, permits the lower spout portion 64a of the hopper 64 to enter therein. This spout portion 64a is raised and lowered by means of a horizontal arm 64b which in turn is secured to move with a vertically extending rod 64c the lower end of which is connected to a cam lever 64e, the latter being pivoted at 64f on a horizontally extending auxiliary shaft 126. The mid-portion of said cam lever 64e carries a roller 64g which rides on a cam 64h, the latter being secured to turn with the cam shaft 84, as shown in Figures 6, 19 and 20.

The rotary measuring device 63 connects with the spout portion 64a through the hopper 64 and in order that said portion 64a may clear the moving parts carried by the turntable apparatus B when the latter is in motion there may be provided suitable aligning guiding means, such as for example, a slot plate 64j which engages the collar 64k on the arm 64b. The cam timing due to the plate 64j is such that the spout portion 64 enters the bag M1 simultaneously with the release of a charge of tea by the measuring feed device 63. The moving parts of apparatus B remain relatively stationary at such time to permit the tea to pass through the hopper spout 64a and into the bag M1. The spout 64a is then retracted by the camming action and the upward movement of the rod 64c aided by the cam 64h through the connections described above.

In order that the bag M1 may be in the properly aligned position for filling, there is provided a stationary arcuate shaped guide or rail 127 which is supported by a bracket 127a from the frame H. Below the rail 127 there may be provided an open container 128 for receiving any spillage from the spout 64a or from any damaged, torn or defective bags M1 positioned under the rotary measuring device 63. (See Figures 19 and 20.)

As shown in Figure 5, to protect the moving parts of apparatus B, a cover plate 123 is provided to terminate the upper end of the shaft 94, said cover plate being of sufficient diameter to act as a shield for said parts. Said plate 123 may be secured in place by any suitable means such as bolt 123a.

Apparatus for sewing top closure

The bags M1 after they have been successively filled at the "third station" are carried by the turntable apparatus B which rotates to a "fourth station" where each filled bag M1 is transferred to the apparatus D for sewing the top closure seam O. The "fourth station" is shown in Figure 5 where the filled bag M1 arrives at a stationary position in the step by step movement of apparatus B on a line passing through the axis of apparatus B and apparatus D. The fingers 90 which at the "third station" were effective to hold the mouth of the bag M1 open and carry same, now at the "fourth station" are turned and swung together sufficiently to release the frictional engagement thereof with said bag M1. The weight of the filled bag M1 causes it to drop down into a gripping receptacle 129 of the top closure apparatus D positioned thereunder in readiness to receive same.

The gripper receptacles 129 each terminate an arm 130, said arms being mounted one above the other for independent rotation on a vertically extending center shaft 131. The gripper receptacles 129 however are positioned in the same horizontal plane as shown in Figures 5 and 25.

Each of the gripper receptacles 129 comprises a stationary outside wall 129a which has a lower end 129b thereof shaped to conform to the contour of a filled bag M1, and an inside wall 129c hinged by a suitable fitting 132 to the arm 130. (See Figures 22 and 23.)

The upper portion 132a of the hinge 132 has a downwardly extending rod 133 which is terminated by roller 133a adapted to ride on a cam 134. Said cam 134 comprises a center piece 134a having an outside surface guiding means 134b and an arcuate piece 134c, the latter having an inside guiding surface 134d. At the time when the filled bag M1 drops from the fingers 90 to the gripper receptacle 129, at the "fourth station," the roller 133a is riding on the outside surface 134b of cam piece 134a just before entering into engagement between the surface 134b and the surface 134d of piece 134c as indicated in Figure 25 at 134e. As the arms 130 rotate in a counter-clockwise direction, the roller 133a is moved radially inward causing the inside wall 129c to swing towards the stationary outside wall 129a gripping the filled bag M1 therebetween with the upper portion of the filled bag M1 extending beyond said walls 129a and 129c.

To insure the filled bag M1 being properly located within the gripper receptacle 129, there is provided suitable pusher means comprising a vertically upstanding wall 135 which is supported by a horizontally extending bracket 136, said bracket being mounted at a mid-portion thereof to terminate a rocking rod 137. (See Figures 22 to 24 inclusive.) The end of said bracket 136 opposite the wall 135 has pivotally mounted thereon a flapper 135a, said wall 135 and flapper 135a being effective to form end closures for the gripper receptacle 129 as is clearly shown in Figure 22. Thus when the filled bag M1 reaches the "fourth station" and said bag is dropped from the fingers 90 to the gripper receptacle 129, the wall 135 and flapper 135a are caused to move to an effective position for covering the opposite ends of the receptacle 129 to form end closures. The flapper 135a is also oscillated to push the

filled bag M1 into the space wholly within gripper receptacle 129.

For operating said wall 135 and flapper 135a, the rod 137 is extended down and pivoted at 137a (see Figure 5), the lower end of which being provided with a roller 137b which rides on the vertically disposed surface 138a of a cam 138, said cam shaft being pinned to turn with the cam shaft 84. (See Figure 5.) When the rod 137 is swung so as to bring the wall 135 and flapper 135a in effective position, the flapper 135a through a crank arm 135b engages a fixed stop 139 and causes the flapper to move towards the receptacle 129 against the action of a spring 135c which normally tends to swing said flapper 135a away from the receptacle 129. It will be noticed that the cam surface 138a has protuberances 138b which serve to give the rocker rod 137 several quick successive in and out movements for tapping the bag M1 if necessary to locate the same within the receptacle means 129.

Each pair or set of fingers 90, of which there are sixteen sets uniformly spaced, as has already been described above, move in unison through operation of the mechanism shown in Figures 22 and 23 and are caused to turn with respect to each other and swing towards each other due to the action of the movement in the rod 90c and the engagement of the arms 91c cooperating with a cam means 140. In order to limit the separating or opening movement of the fingers 90 due to the action of the spring 91b, there may be provided the lug 91a which engages with the arm 91c and limits such opening movement.

The transfer of the bags M1 from apparatus B to apparatus D is accomplished with the aid of the cam means 140 carried at an upper end 141a of a vertically slidable rod 141, the latter being movably supported at 97c on the angle bracket 97. As shown in Figure 6 the lower portion 141b of the rod 141 is pivotally connected to a horizontally extending arm 142 and is mounted to rock on the auxiliary shaft 126. The arm 142 carries a roller 143 which rides on a cam 144, the latter being mounted to turn with the cam shaft 84. As the fingers 90 carrying the filled bags M1 arrive at the "fourth station" the rod 141 is raised to engage the cam 140 with the arm 91c of the segment member 91 for swinging the fingers 90 towards each other permitting the filled bags M1 to successively drop down into the gripper receptacles 129 as described above.

In order to rotate the arms 130 with the receptacle means 129 about the vertical shaft 131, there being eight such provided as shown in Figure 25, a ring drive 145 comprising a wheel rim 145a which carries uniformly spaced thereon bell cranks 145b, each pivoted at 145c, said bell cranks 145b each carry a roller 145d which rides in a fixed cam slot 146. Spaced from the roller 145d, each bell crank has a yoke or fork portion 145e which is adapted to engage with a roller 130a extending down from the arm 130. The ring drive 145 has a spider portion or spokes 145f carrying said rim 145a which turns with the shaft 131. The shaft 131 at its lower end 131a is terminated by a flange 131b which is secured in a hollow off-set hub 147a on a gear wheel 147, the latter engaging with a pinion 147b which is mounted to turn with the shaft 105. Said pinion 147b and shaft 105 are driven through the sprocket 104 and chain 103 as hereinbefore described. (See Figure 2.)

As seen in Figures 2 and 5, the shaft 131 is journalled in a hub portion 134f of the cam 134, said portion 134f having a flange 134g carried on a cross member H1 of the frame H by means of cradle member 148 which is pivotally secured to the flange 134g at diametrically opposite portions thereof through pointed screws 149. The cradle 148 connects with the cross frame H1 through a flat spring 150 which is bolted to the latter at 150a and pivoted to the cradle member 148 at 150b. A fitted portion 148a of the cradle 148 connects with an arm 148b, the latter having an elongated slot end 148c which has passing therethrough a bolt 148d extending into the frame H as shown in Figures 1 and 2. By adjusting the slotted arm 148b with respect to the bolt 148d, the entire mechanism assembled on the shaft 131 can be raised or lowered to suit the conditions of operation and particularly to enable the machine to handle various heights, that is, sizes of bags M1. This simple adjustment and that of fulcrum bolt 83g on cam lever 83c as already described is all that is required to change from one size of bag to another.

Terminating the upper end 131c of the shaft 131 is a cover plate 151 which is retained by a bolt 152 to turn with the shaft 131. Said cover plate 151 serves as a guard or shield for keeping out foreign matter or interfering with the moving mechanism of apparatus D below.

The filled bags M1 are successively carried by the gripper receptacles 129 and arms 130 from the "fourth station" into the path of an overlocked stitching sewing machine 153 which may be similar in construction to the machine 109. This machine 153, however, is normally stationary but is pivoted to permit moving the needle 153a thereof out of the effective position for adjustment or repairs. To this end, the machine 153 is supported in a gibb mounting 154 having side plate 154a which is extended by a portion 154b beyond the lower side 153d of the sewing machine 153.

The portion 154b is pivoted at 154c to a bracket 155 which is bolted in an upright position on the frame H. See Figure 26. The lower end 154d of the gibb mounting 154 is provided with an abutment plate 154e which bears on the upper end 156a of a compression spring 156, the lower end 156b of which is held in place by a retainer boss 157 formed on the bracket 155. A set screw stop 158 is threaded through the bracket 155 for adjusting the sewing machine 153 with respect to the side plate 154a.

Extending from said plate 154a through a slot 155a of the bracket 155 is a stud 155b provided with a nut and washer 155c. Normally the spring 156 tends to swing the machine 153 on the pivot 154c so that the needle 153a thereof is in a lowered position, that is, with the lowest end of the slot 155a embracing the stud 155b to adjust the machine 153 to the proper height and position for applying a top overlocked stitched closure seam O to the upper end of the filled bag M1, the machine 153 is tilted against the action of the spring 156 and held rigidly in place by tightening the nut and washer 155c on the stud 155b.

Adjacent the bracket 155 is a small pivoting support 159 which has one end 160a of a bar 160 bolted thereto. The upper end 160b of said bar 160 carries a pair of guide pulleys 161 over which the machine belt 162 runs. This belt, as shown in Figures 2 and 26, drives the sewing machine pulley 153c and extends down through the frame H and is driven by a pulley 162a, located adjacent the pulley 109c which turns with

the shaft 14, as shown in Figure 5. The machine 153 is provided with a presser foot 163 carried by a bracket 164 from the sewing machine 153, a feed dog 153b, and a spring 153d for holding the presser foot 163 against the filled bag M1.

As each bag M1 is fed through the sewing machine 153 it passes along the inclined surface 163b of the trough 163a and the edge portions at the top opening thereof are brought into proper position for sewing the overlocked stitch by the needle 153a. The movement of the bag M1 is continuous and as the needle 153a ceases to pass through the bag material it forms a strand of chain stitches R until the next successive bag M1 is brought to the needle 153a by one of the arms 130. The cam groove 146 is so designed that the filled bag M1 as it leaves the "fourth station" in its approach towards the sewing machine 153, is given a relatively fast movement so that the successive arms 130 are brought close together, the distance between the bags M1 being such as to form the shortest possible interconnecting strand by the stitches R as seen from Figure 25.

As the bag M4 with the top opening closed by the overlocked stitched seam O applied by the sewing machine 153 leaves the latter and passes the shears 70, it is given a slight rapid movement so as to provide a tension on the interconnecting strand formed by stitches R. This tension is desirable to facilitate the cutting by the shears 70 which must be quickly effected since the arms 130 at all times are in continuous motion.

The shears 70, as shown in Figures 25 and 28 to 32, inclusive, are bolted to the housing 66a by a bracket 70a which pivotally connects with one end 70b of a lever 70c. The middle portion of said lever 70c has a roller 70d which rides on the cam 165, the latter being mounted to rotate with the vertical shaft 66. This cam 165 has a notch portion 165a into which the roller 70d enters due to the action of the tension spring 70e which has one end thereof anchored to the sewing machine bracket 155 and the other secured to the end 70f of lever 70c. Said end 70f terminates in an arm 70g which carries a bolt 70h for securing thereto a stationary blade 70j of said shears 70. Also mounted for rotation on said bolt 70h there is a sleeve member 70k to which is fastened, by any suitable means such as a key 70m, a cutter 70n for cooperating with the blade 70j. The sleeve member 70k has a projecting portion 70p which cooperates with a fixed stop 70q, the latter terminating a strap 70r which is bolted to project from the sewing machine bracket 155. There is also provided a coil spring 70s which has one end thereof secured to the sleeve member 70k as at 70t, the other end of which is anchored to the arm 70g at 70u. Said arm 70g also has pivoted thereto a latch 70w which has the catch 70x thereof adapted to engage a ledge 70y provided on sleeve member 70k.

Thus in the movement of the shears 70 as a unit to and from the bags M4, due to the roller 70d entering and leaving cam notch 165a, simultaneously causes the projecting portion 70p to move away from the stop 70q during the movement of said shears 70 toward the bags M4 for tripping the catch 70x to release the cutter 70n. The latter then is activated to sever, that is, snip, the tensioned strand R. On the return movement of the shears 70, the stop 70q moves to abut the projecting portion 70p and the spring 70s acts to swing the cutter 70j to its open position. The catch 70x is then permitted to engage the ledge 70y to retain the same until again released. Said catch 70x has a counter weight portion 70z which tends to permit the catch 70x to move by gravity into said engaging position.

As seen from Figs. 27 and 28, the distance between two successive bags M4 as they leave the sewing machine 153 is only sufficient to permit the passage of the shears 70 and the severing of the tensioned interconnecting strand R is such that there is practically no necessity for further trimming the bag M4. The seam O thus terminates substantially with the end of the material from the bag M4.

The parts are so designed that the snipping movement of the shears 70 takes place during the travel movement of the shears 70 towards the strand R, that is, when the roller 70d enters the cam notch 165a, the arm 130 carrying the bag M4 moves in advance of the shears 70 with a quick motion due to the action of the cam groove 146 to a "fifth station" where the stapling of one end of the string handle S to the bag M4 is done by the string handle applying device E.

Now referring to the drawings, Figures 38 to 39, inclusive, the stapling operation will now be apparent. With the parts assembled and positioned as shown in Figure 38, the movement of the rod 171r moves the cam plate 171j to first cause the former 167b to move from the position shown in Figure 38 to the position shown in Figure 40. This movement cuts off a length P of wire W equivalent to the outer distance between the two formers 167b, and as the leading ends of said former move past the groove 167j, the severed piece P of wire W is bent U-shaped about a shaping end 175a of a movable stop piece 175. Said stop piece 175 is pivotedly mounted on a stud 175b carried on the end of the vertical knurled wheel shaft 171a and is normally pressed down in effective position by a spring 175c which is also mounted on said stud 175b. A ledge 175d on the tie plate 167f cooperates with an under side 175e which is mounted to move with the cross head 167d and acts to lift the stop piece 175 against the action of the spring 175c.

After the parts are in the position shown in Figure 40, further advance movement of the cam 171j causes the stop piece 175d to be raised against the action of the spring 175c and the shaping end 175a to be moved out of the path of forward movement of the now U-shaped formed staple P.

String handle applying device

Referring now to Figures 1 and 34 to 44, inclusive, and more particularly, Figures 34 and 38, the closed bag M4 on arriving at the "fifth station," enters between a fixed punch jaw 166 and a cooperating movable jaw 167 of the string handle applying device E, said fixed jaw being bolted to a frame portion 168 which also serves as a support for the movable jaw 167.

The fixed jaw 166 carries an anvil or die 166a which has an extension portion 166b for guiding said bag M4 to enter into proper position for the stapling operation. Said die 166a cooperates with a central plunger or setter 167a and staple formers 167b of the movable jaw 167. Said formers 167b extend along on opposite sides of the setter 167a, the latter being carried by a cross head 167c which reciprocates in a slideway 168a provided in the frame portion 168. Also mounted for movement in said slideway 168a below the cross head 167c is a second cross head 167d

having an upstanding support 167e which carries the formers 167b, said support 167e acting as a bearing for the setter 167a. In order to keep said former and setter in position, a tie plate 167j is provided which is bolted to upstanding support 167e by means of screw 167g.

The leading end 167h of the movable jaw 167 is preferably made with a hardened plate which has a half round groove 167j extending therein at right angles to the path of movement of the setter 167a and formers 167b. Said end 167h also has passageway 167u therein which permits the setter 167a and formers 167b to pass therethrough across the groove 167j for shaping and applying the staple in the manner hereinafter to be described.

The groove 167j connects with one end 169a of a curved conduit 169, the other end 169b of said conduit being extended to receive a strand of wire W which has been rolled between a knurled wheel 171 and a smooth roller 172. The conduit 169 may be bolted to the frame of the device as at 169a. In the passage of the wire W between said wheel 171 and roller 172 it is changed from a circular shape as shown in Figure 38a to a flattened shape, as shown in Figure 38b.

The wheel 171 and roller 172 turn with shafts 171a and 172a, respectively, the drive for said shafts being supplied by the meshing gears 171b and 172b. Said gears are loosely meshed so that the space between the wheel 171 and roller 172 may be adjusted. To this end, the shaft 172a is pivotally mounted at its lower end 172c to the extension piece 171c. The latter is bolted to a third cross head 167k which is disposed in the slideway 168a aligning with and below the cross head 167d, as shown in Figure 35. This cross head 167k carries the movable jaw 167 as a unit, the leading end 167h of which is secured to the cross head 167k by any suitable means such as bolts 167m. Said bolts 167m also serve to hold a cover plate 167n which is fitted to extend over the leading end 167h. See Figure 43. The wire W is supplied to the wheel 171 and roller 172 from a suitable source (not shown) through a conduit 173.

For turning the gears 171b and 172b, there is mounted on the shaft 171a, a ratchet wheel 171d below the gear 171b which is actuated by a spring pressed pawl 171e which in turn is carried on a bracket 171f. Said bracket has extending therefrom a roller 171g which rides in a cam slot 171h of a cam plate 171j. The bracket 171f is pivotally mounted on the lower end 171k of an arm 171m, said arm projecting from the extension piece 171c and preferably made integral therewith. Thus on movement of the cross head 167k and as effected by the camming of the roller 171g, the pawl 171e is caused to actuate the ratchet wheel 171d and turn the same for feeding a predetermined length of wire W to form a staple P in a manner hereinafter described.

The cam plate 171j has one end 171n pivoted at 171u to member 168 adjacent to the extended portion 167p of the cross head 167k. The other end 171p of the cam plate 171j connects through a ball socket connection 171q with a rod 171r, the lower end 171s of which connects with one side of a cam 174 through a bell crank connection 171t. Said cam 174 is secured to turn with the cam shaft 84, as shown in Figures 1 and 10.

The cam plate 171j is caused to oscillate up and down on pivot bolt 171u located at the cam plate end 171n by the movement of the rod 171r. This movement of cam 171j causes a roller 167q which is carried by the cross head 167d of the formers 167b to move in a cam slot 171v of the plate 171j so that said former 167b reciprocates in the passageway 167u when the leading end or block 167h of jaw 167j and said former 167b move to and from the fixed jaw 166. Simultaneously a roller 167s, which is carried by the cross head 167c of the setter 167a is caused to move in a cam slot 171w of the plate 171j for reciprocating the setter 167a. The oscillation of said cam plate 171j also simultaneously causes a roller 167t carried by the cross head 167k to move in a slot 171x of the plate 171j which reciprocates the entire movable jaw 167 as a unit to and from the fixed jaw 166, the cam plate 171j itself being mounted to move with said movable jaw 167.

Still further advancing said cam 171j causes the setter 167a to move between the formers 167b for pushing said U-shaped staples P forward while all the cross heads 167a, and 167k also advance with the movable jaw 167 until the parts are in the position shown in Figures 42 and 44 at which time the setter 167a has forced the U-shaped staple P through the top edge of the bag M4, preferably just at or below the overlocked stitches forming the closure seam O. The ends of the staple P, through the action die 166a, are bent over towards each other, finally clamping an end string handle S by means of the staple P to the bag M4. This final clamping is accomplished at the end of the downward movement of the cam plate 171j. The latter is now moved up and brings in the parts back to the position shown in Figure 38.

Simultaneously with the completion of the stapling operation above described, while the movable jaw 167 is still in its fully advanced position against the fixed jaw 166, a chopper blade 176 which is pivotally mounted on a shoulder screw 176b projecting up from the plate 167n is swung across a path which engages and cuts the string handle S a short distance from the staple P as shown in Figures 43 and 44. The movement of said chopper blade 176 is accomplished through link 176 which has a pivoted end 176d connected to a bell crank 176e, said bell crank being pivoted at 176f to the extension piece 171c. The driven end of said bell crank 176e connects with an arm 176h through a link 176g (see Figure 9), said arm being pivoted at 176j which is mounted on a supporting bracket 177, which is bolted to the frame H. The arm 176h carries a roller 176k which rides in the cam slot groove 174a of the cam 174 on the side opposite thereof to the crank connection 171t.

After cutting the string handle S, as shown in Figure 44, the chopper blade 176 returns to the position as shown in Figure 43, and the movable jaw 167 and the parts carried thereby return to the position shown in Figure 38 ready to make or apply a staple P to the next bag M4 as fed between the stapling device H. These cycles of operation are successively repeated automatically as each bag M4 is brought in position between the jaws 166 and 167 of the stapler.

During the return movement of said stapler parts, the wire W is automatically fed to the end or block 167h in predetermined lengths equivalent to that required to make one staple P. When this stapling operation has been completed, the finished bag M between the jaws 166 and 167 is released for passing to the "sixth station," that is, transferring the bag M from turntable apparatus D to a conveyor 188 of discharge apparatus F.

If desired, the transferring apparatus F may also serve to fold the string handle S and position the tag T terminating said handles so as to superimpose the tag T on the bag M. To this end a tag positioning mechanism N is provided for placing the completed tea ball M with the string and tag thereof in a non-tangling form on the said conveyor **188** ready to pack for shipment. This feature is fully described and shown in my original application of which this is a division.

Bag transfer and tag positioning mechanism

After leaving the stapling device, the bag M is brought around on to a transfer and tag positioning mechanism N which consists of a pick up device **178** and a string manipulating means **179**, the latter serving to position the tag T in a superimposed relation to the bag M, all as fully described and shown in my aforesaid original application.

String handle and tag supplying and feeding mechanism

The string handle S and tag T units are fed from a spool arrangement carrying about one thousand units in a continuous strand, similar to the type fully described in Patent No. 1,955,809, granted to Louis Hirschhorn et al., on April 24th, 1934, but whereas the feeding of the string handle S and tag T units are intermittently fed in the construction disclosed in said patent, in the present construction, such feeding is carried on by a continuous motion in the manner fully described and shown in my aforesaid patent application, Serial No. 37,257, now Patent No. 2,290,-158.

Machine control means

Now referring to Figures 1, 3, 4, 6, 7 and 8, the control lever **65**, through which the machine **60** is connected to a suitable power source such as a motor drive (not shown), has a belt **65***a* which runs on a pulley **65***b*, the latter being mounted for free rotation on the power shaft **74**. A suitable clutch **65***d* is provided to releasably secure said pulley **65***b* to the shaft **74**, said clutch **65***d* being operated through one arm **65***c* of a bell crank **65***e* pivoted at **65***f* of the frame H. The other arm **65***g* of said bell crank **65***e* connects through a rod **65***h* with a lever **65***j* which is secured thereto, by any suitable means as for example a set screw **65***k*, said lever **65***j* being pivoted at **65***m* on a plate **65***n* which is pivotally mounted at **65***p* to the frame H. The pivots **65***m* and **65***p* are arranged for right angle movements in respect to each other to permit the swinging of the control lever **65** in two different planes in the manner hereinafter described. The control lever **65** is manipulated through the operation of the knob **65***q* which may be depressed for projecting a pin **65***r* connected therewith to release the latch **65***s* held in locked engagement by a compression spring **65***t*, said latch being pivoted at **65***u*.

To start the machine, the knob **65***q* of the control is depressed to release the latch **75***s* and is swung to the position shown in dotted lines in Figure 8. This through the connecting rods and linkage rocks the bell crank **65***e* and throws the clutch **65***d* to effective position for engaging the pulley **65***b* with the power shaft **65***c*. In this engaged position, said shaft **74** is caused to rotate the pulley **65***b* and turn the pinion of the helical gears **73**. The latter turn the shaft **74** which drives all the moving parts of the apparatus, devices and mechanisms of the machines **60** as well as the sewing machines **109** and **153** through the pulleys **109***a* and **152***a* which turn with the shaft **74**.

It is often desirable to run only part of the machine **60** and to leave part of said machine inoperative, as for example to operate the machine **60** with the stapling device E and the string handle S and tag T supply shut off. To this end the control lever **60** may be manipulated through the knob **65***q* by swinging the plate **65***n* on the pivot **65***p*, shown in dotted lines in Figure 7. The plate **65***n* has a projecting cam **65***v* which cooperates with a roller **65***w* mounted to terminate clutch lever **65***x*. The latter is pivoted at **65***y* from the frame H which has the end **65***z* thereof opposite the roller **65***w* adapted to engage a dog **204**. Said dog is pivoted at **204***a* on a lever **204***b* which is secured through hub **204***c* to rotate with the shaft **84***a*. The latter aligns with the cam shaft **84** and forms a continuation thereof but is free to turn with respect thereto, as shown in Figure 5. The dog **204** is terminated at one end by a latch tooth **204***d* and at the other end by a tail portion **204***e* which cooperates with lever end **65***z*. The latch tooth **204***d* is adapted to engage with a notch **84***b* in a disc **84***c* which is secured to turn with the cam shaft **84**.

In order that the latch **204***d* of the dog **204** may be forced to engage in the notch **84***b*, a tension spring **204***h* is provided which has one end anchored at **204***f* on said hub **204***c* and the other end anchored at **204***g* on the latch tooth **204***d*. Normally the latch tooth **204***a* of the dog **204** engages in the notch **84***b*, as shown in Figure 3, thereby causing the shaft **84***a* to rotate with the shaft **84** at which time all the parts of the machine **60** operate automatically in timed relation. When, however, the knob **65***q* is swung into the position shown in dotted lines in Figure 7, the end **65***z* of the clutch lever **65***x* engages the dog tail portion **204***e* and swings the latch tooth **204***d* out of engagement with the notch **84***b* against the action of a spring **204***h*. The driving connection between the shaft **84** and **84***a* is broken making inoperative all the driving mechanism in connection with said device E including the string handle S and tag T supply driven by the shaft **84***a* while the remaining drives from the shaft **84** continue to operate.

For driving the cam shaft **84** there is provided a sprocket wheel **205** which is secured to turn therewith and through a chain drive **206** is turned by the drive sprocket **207**, the latter being secured to turn with the countershaft **72**. It is through this chain drive that it is made possible to have all the cams secured to turn with the cam shaft **84** in timed relation with the various other drives connected with or cooperating with the jack shaft **72**. The latter through the mesh gears **73** is driven by the power shaft **74** as is shown in Fig. 5.

The operation of the machine

The full automatic operation of the machine **60** will now be readily understood from the various drawings and the description of the interconnected apparatus, mechanisms and devices given above.

The machine **60** is first provided with a supply of bagging material in the form of a roll of tubular strip **M3** in the cloth supply C and the leading end of said tubular cloth strip is drawn up into the feeding position in mechanism **83**, with the tongue member **85** inserted in the upper end of the tubular strip **M3**, the upper edge of said strip and tongue member being brought to the

level just short of the shear blades 86. A supply of tea is put in receptacle 61. A fully wound string and tag spool 191 is mounted to turn on the shaft 190f, said spool 191 being then set in its lowest position, and the stapler of device E is provided with a supply of wire W extending in through the conduit 173. (See Figures 1, 9 and 38.)

After the source of power, such as a motor (not shown) is started up and made available, the machine control lever 65 is operated through the knob 65q by swinging same from the full line position shown in Figure 8 to the dotted line position for connecting in the driving and power transmission G. This operates the clutch 65d which through said transmission G drives the bag making apparatus B.

The apparatus B at the "first station" through mechanism 83, automatically feeds the bagging material strip M3, cuts the same by means of the shears 86 into sections M2 and in timed relation applies such sections to the fingers 90 of the apparatus B.

At the "second station" the overlocked stitched bottom closure seams Q are applied to the bag sections M2 by means of the sewing machine 109 which is mounted to oscillate with an intermittent movement. The strand R which interconnects the seams between adjacent bags M1 is severed by the shears 116, and since the bags M1 are mounted close together, there is no waste or extra work required in trimming.

The bags M1 at the "third station" are filled with a predetermined quantity of tea by the supply feed measuring mechanism A.

The filled bags M1 at the "fourth station" are transferred from the apparatus B to the top closure apparatus D. This latter apparatus carries the bags M1 through the stationary sewing machine 153 where the overlocked stitched top closure seams O are applied. The strand R which interconnects the seam between adjacent bags M4 is severed by the shears 70, and since the bags are brought close together by the operation of the apparatus D, there is no waste or extra work required in trimming.

The bags M4 then pass to the "fifth station" where a string handle S and tag T unit is rivetted to the mid-portion of each bag M4 at the top closure just under the seam O by the stapling device E. This operation completes the tea-balls M. The bags M are now picked up by the transferring and tag positioning mechanism N and while being moved from the device E to the discharge apparatus F, the string handle S is arranged in criss-cross fashion and the tag T is superimposed upon the bag so as to be non-tangling, the completed tea-ball M being delivered to the discharge belt conveyor 183, ready to pack for shipment.

It will thus be seen that there is provided a machine in which the several objects of this invention are achieved and which are well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a machine construction of the character described, a turntable carrier having pairs of movable fingers for receiving from below the level thereof sections of tubular bag material, means for actuating the fingers to releasably retain the bag sections in a depending position thereon, a sewing machine for continuously applying interconnected bottom closure seams on the bag sections while retained by said pairs of fingers, and shearing means mounted to swing in the path of movement of the finger retained sewn bag sections and between such adjacent sections for severing the interconnections of the seams of said latter sections.

2. The machine construction defined in claim 1 in which said pairs of fingers are spaced apart only a sufficient distance to provide clearance for the movements of said shearing means between finger retained sewn bag sections whereby cutting of the machine thread forming said continuously sewn seam interconnections is severed close to each of the adjacent bag sections to eliminate trimming.

3. In a machine of the character described, rotary carriers for receiving and supporting filled bags, means for varying the distance between adjacent carriers after receiving filled bags thereon, and means cooperating with said carrier for applying closures to said bags, said distance varying means being effective to bring adjacent carriers in closer proximity during the closure applying operation than when receiving the filled bags.

4. The machine construction defined in claim 3 in combination with severing means mounted for operation during the time said carriers are in close proximity adapted to cut apart an interconnecting portion of closures extending between adjacent bags to eliminate trimming.

5. In a machine of the character described, means for supplying bag forming material in unit sections of uniform width, a carrier for receiving said unit sections of bag material from said supplying means in a depending position, means for applying bottom closures on said sections to form bags while on said carrier with the open ends of the bags retained for filling, and means mounted for movement to and away from said carrier to vary the relative position of the unit sections with respect to the carrier for producing one of a plurality of different length bags.

6. In a machine of the character described, a device for applying string handles and tags to closed and filled bags comprising means to feed a supply of wire stapling material, means to form successive staples from said supplied material, means for anchoring each string handle and tag to a bag by the staples formed, in combination with a string handle and tag supply source, means for moving string handles and tags from said supply source to the anchoring means, and a drive interconnecting each of said means forming said device and said moving means to actuate same in timed relation for continuous operation.

7. In a machine of the character described, a carrier for independently moving successive filled bags through the machine, means for applying a closure to said bags positioned in the path of movement thereof, a stapling device for attaching a string handle and tag to each of said bags positioned in the path of movement of said bags and spaced from the closure means, said carrier having means for bringing adjacent bags in close proximity at the closure means and to increase the distance between such bags at the stapling device.

8. In a machine of the character described, a plurality of radially extending arm carriers each independently rotatable for moving successive filled bags through the machine, means for applying a top closure to said bags positioned in the path of movement thereof, a stapling device for attaching a string handle and tag to each of said bags positioned in the path of movement thereof, and means for rotating the arms at varying speeds with respect to each other whereby the distance between the adjacent bags at the closure means is different than that at the stapling device.

9. In a packaging machine of the character described, means for receiving section units of tubular material so as to position the longitudinal axes of said units vertically, means for sewing the bottoms of said units thereby forming bags with their open ends up, means for filling the bags thus formed, means for sewing the said open ends for closing the filled bags all while passing through the machine to provide packages, means for mounting one of said sewing means in relatively stationary position along the path of movement of the bags, and means for mounting the other sewing means for intermittent movement with the progress of each bag through the machine.

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