

April 24, 1945.

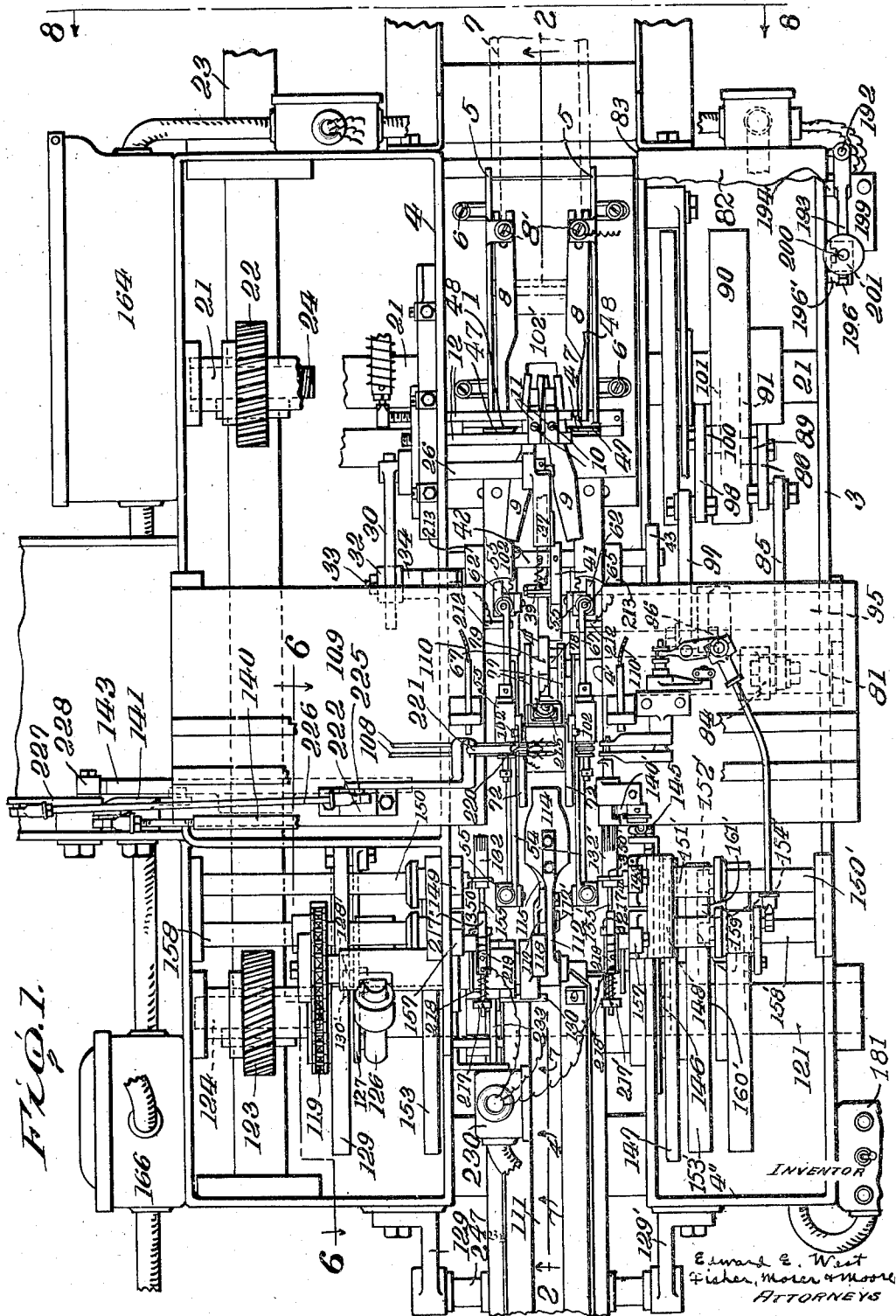
E. E. WEST

2,374,572

BAG STRINGING MACHINE

Filed Jan. 26, 1942

16 Sheets-Sheet 1



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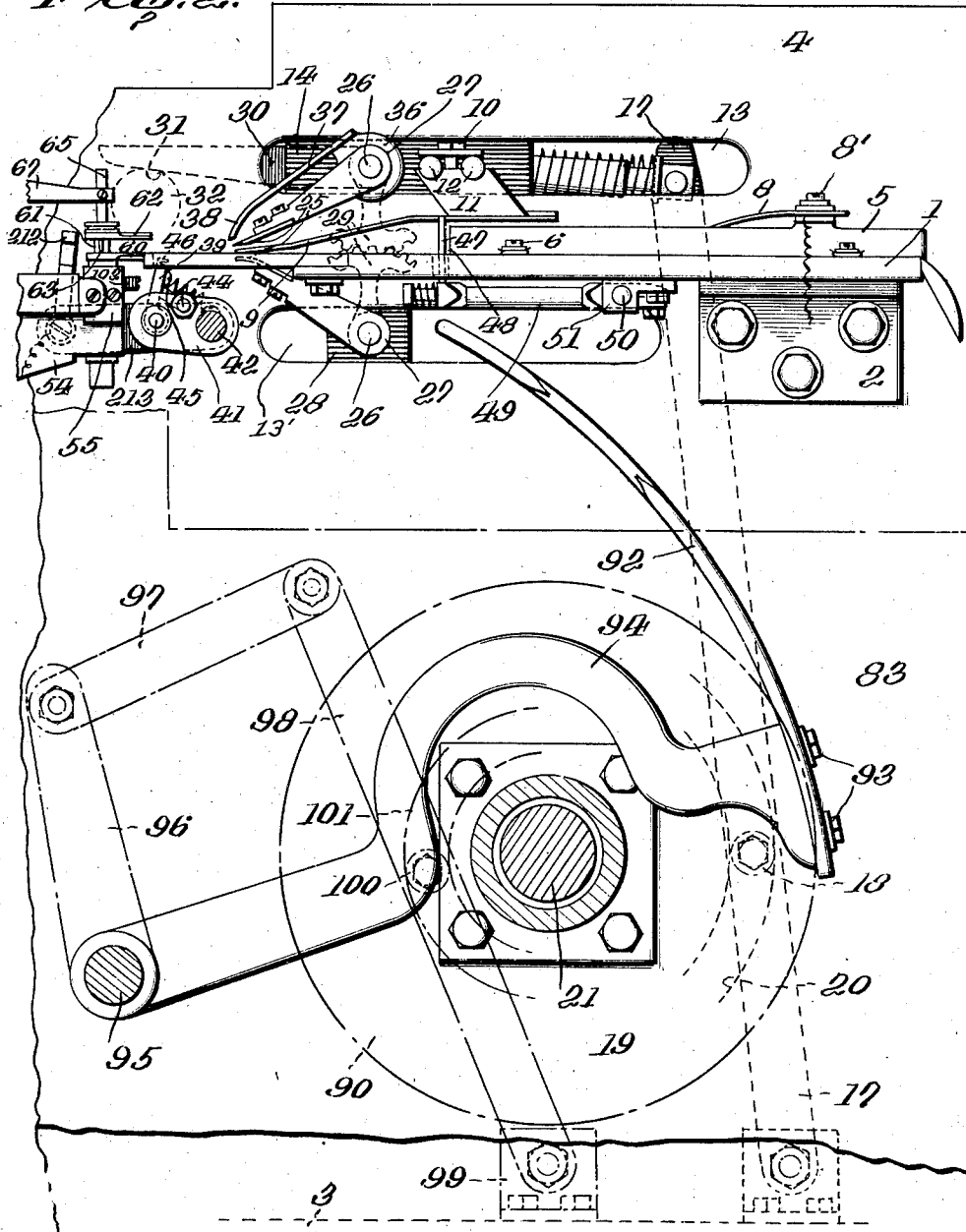
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16 Sheets-Sheet 2

FIG. 2.



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16 Sheets-Sheet 3

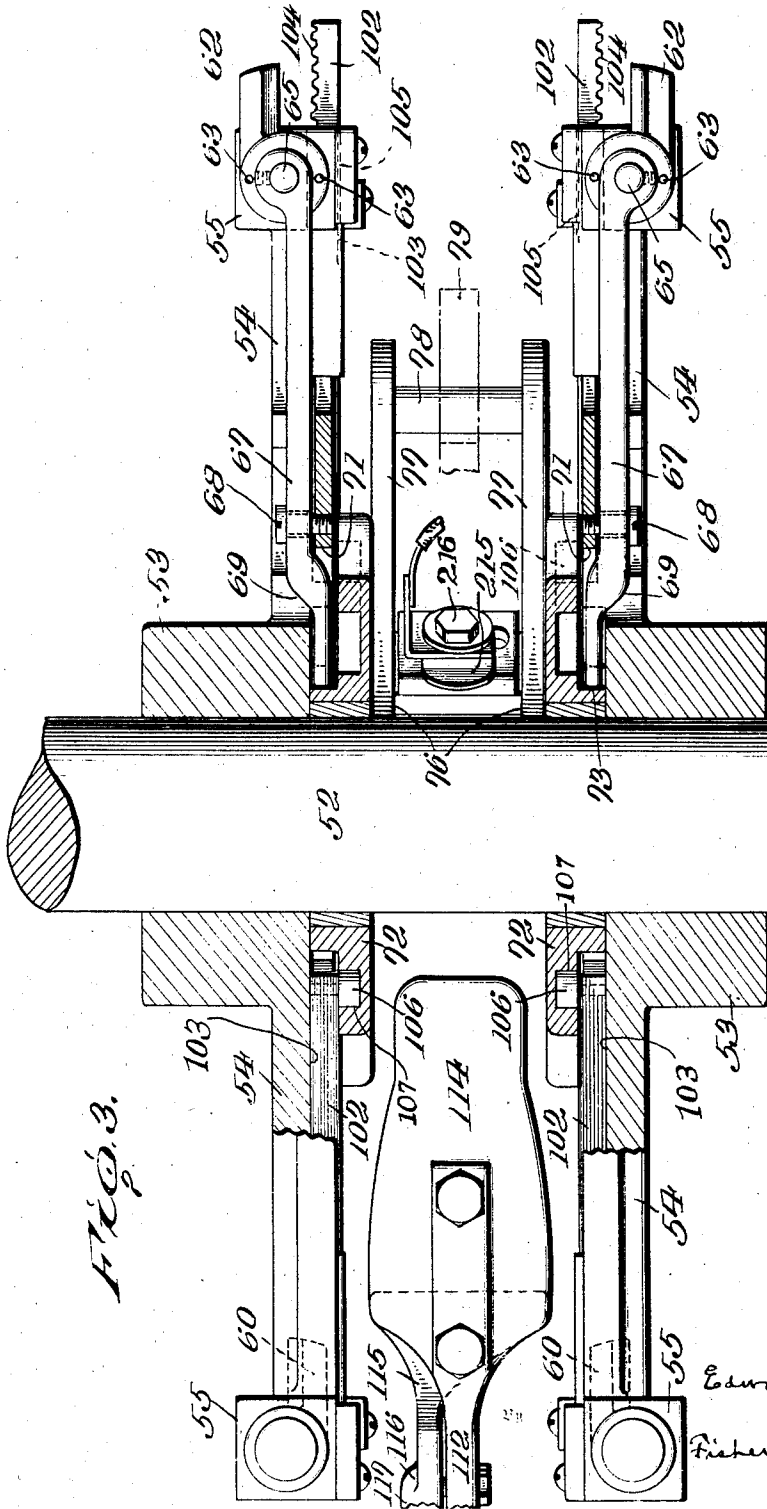


FIG. 3.

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16 Sheets-Sheet 4

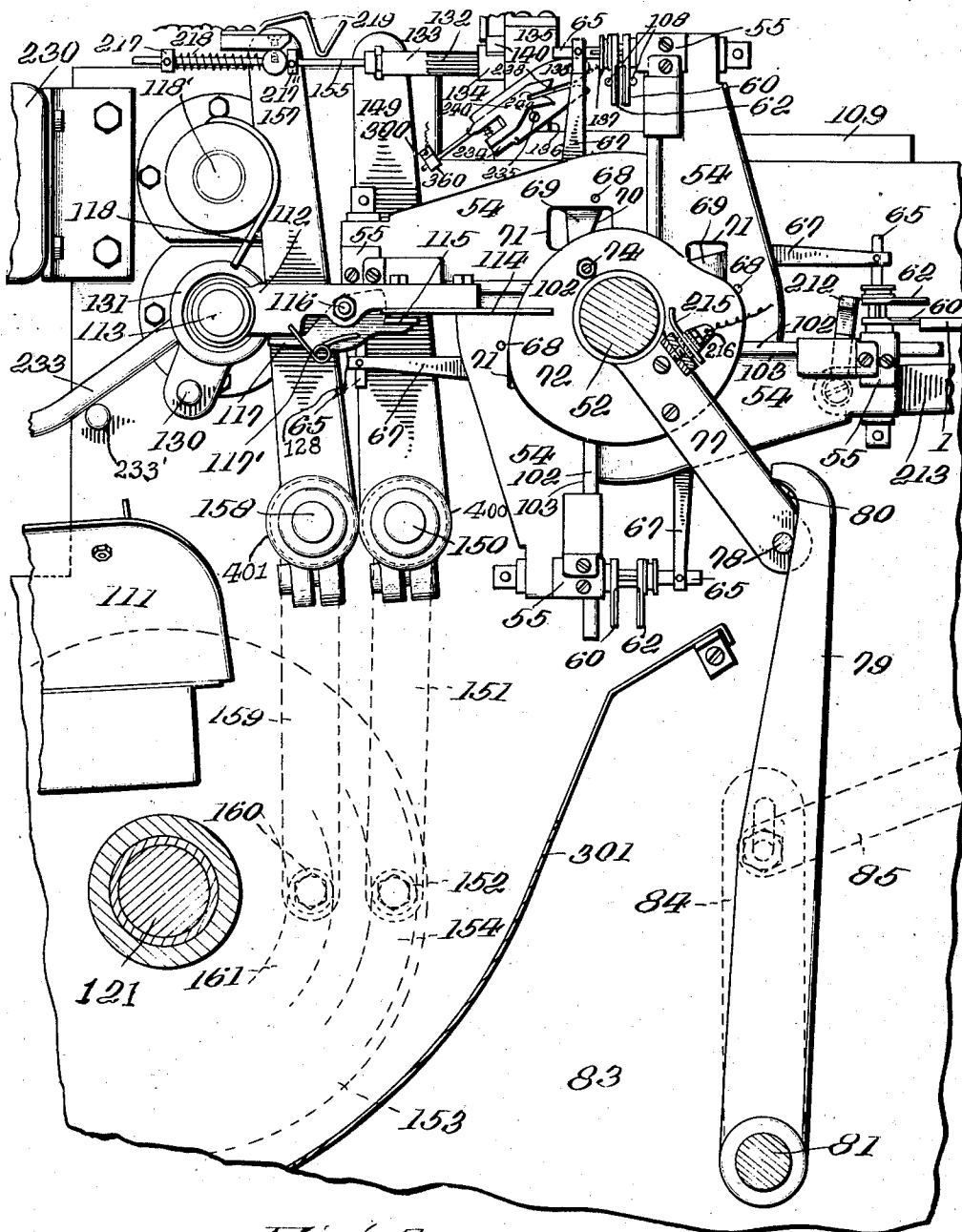


Fig. 4.

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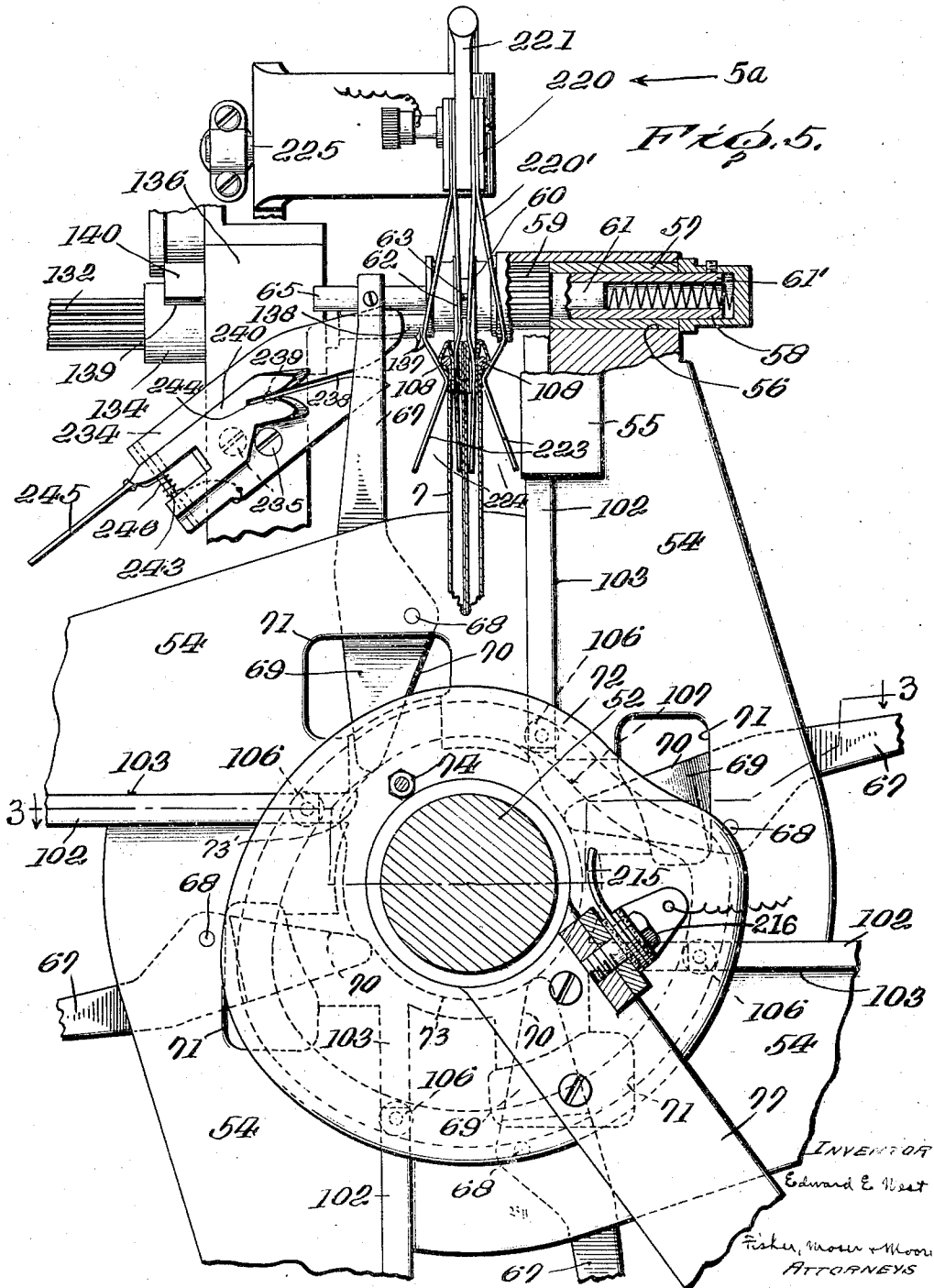
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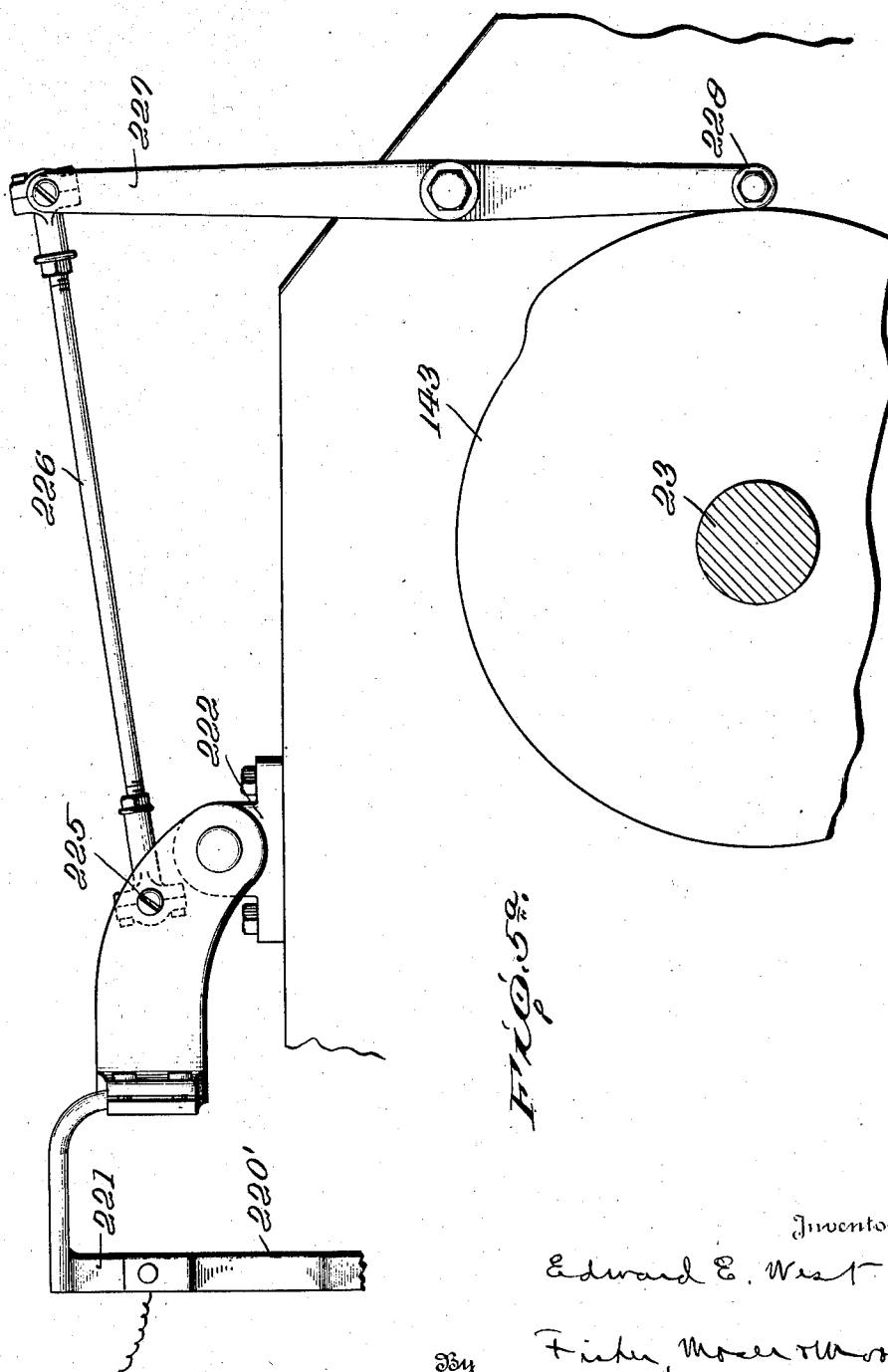


FIG. 5

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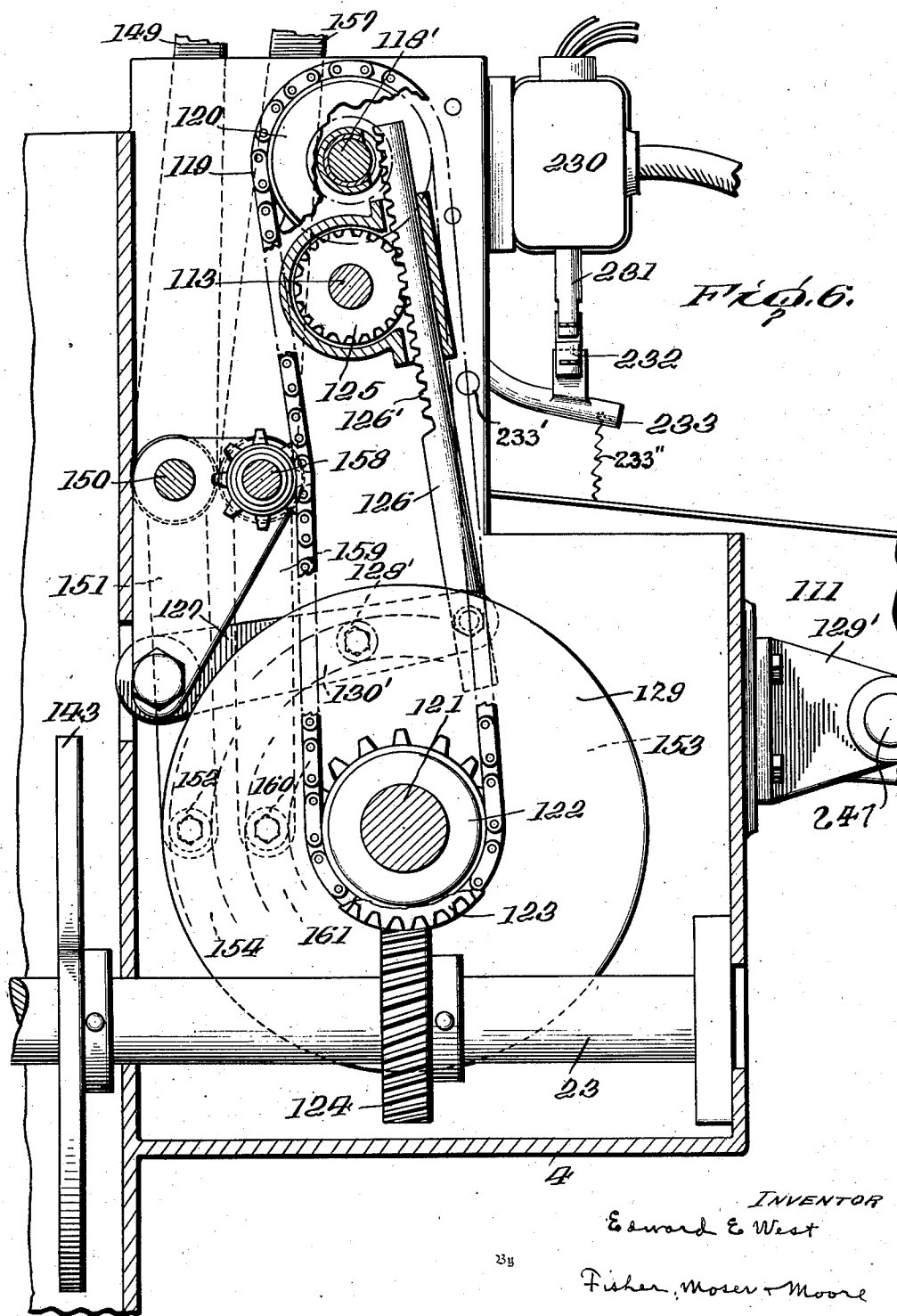
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16 Sheets-Sheet 7



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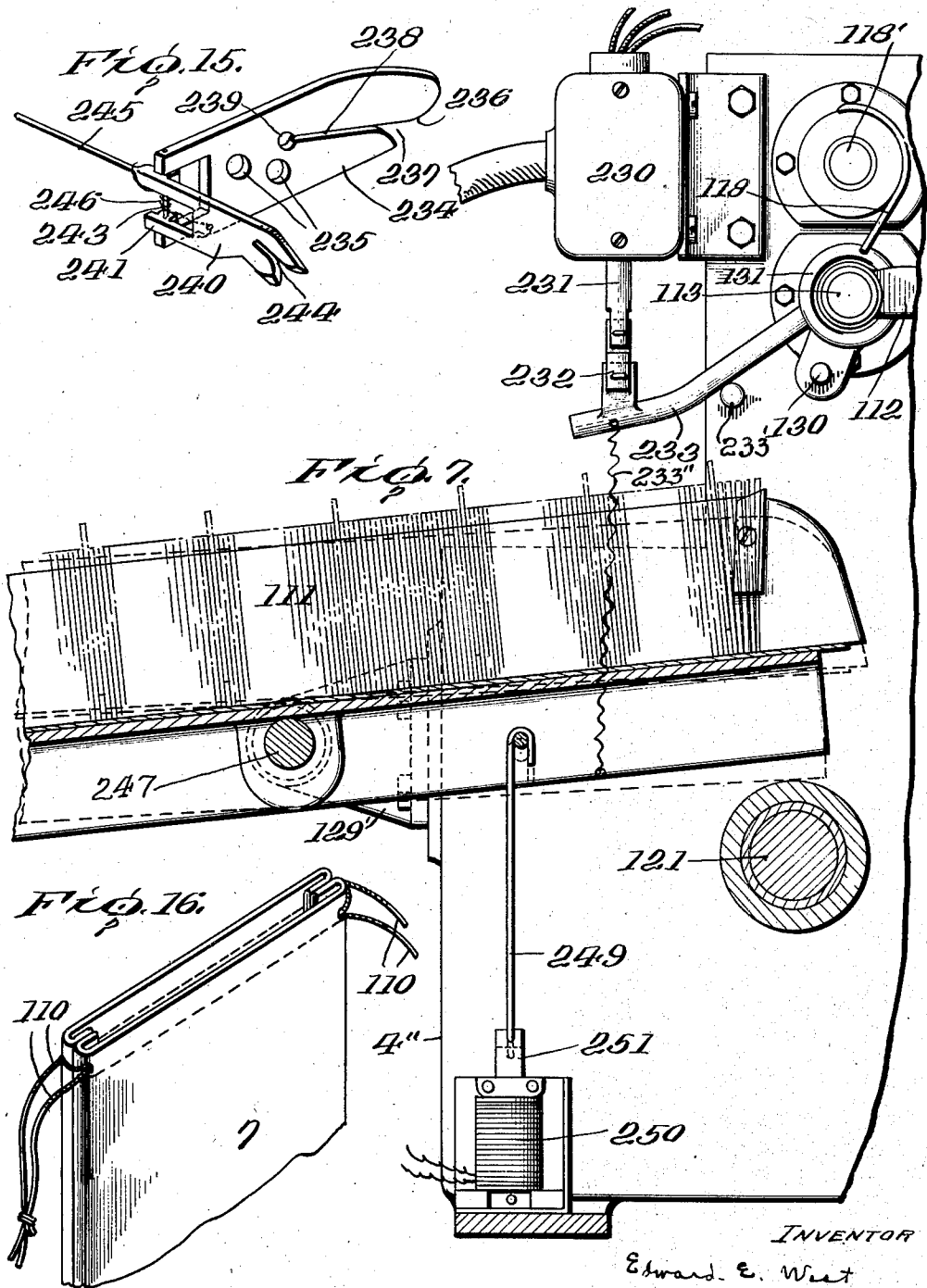
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16 Sheets-Sheet 8



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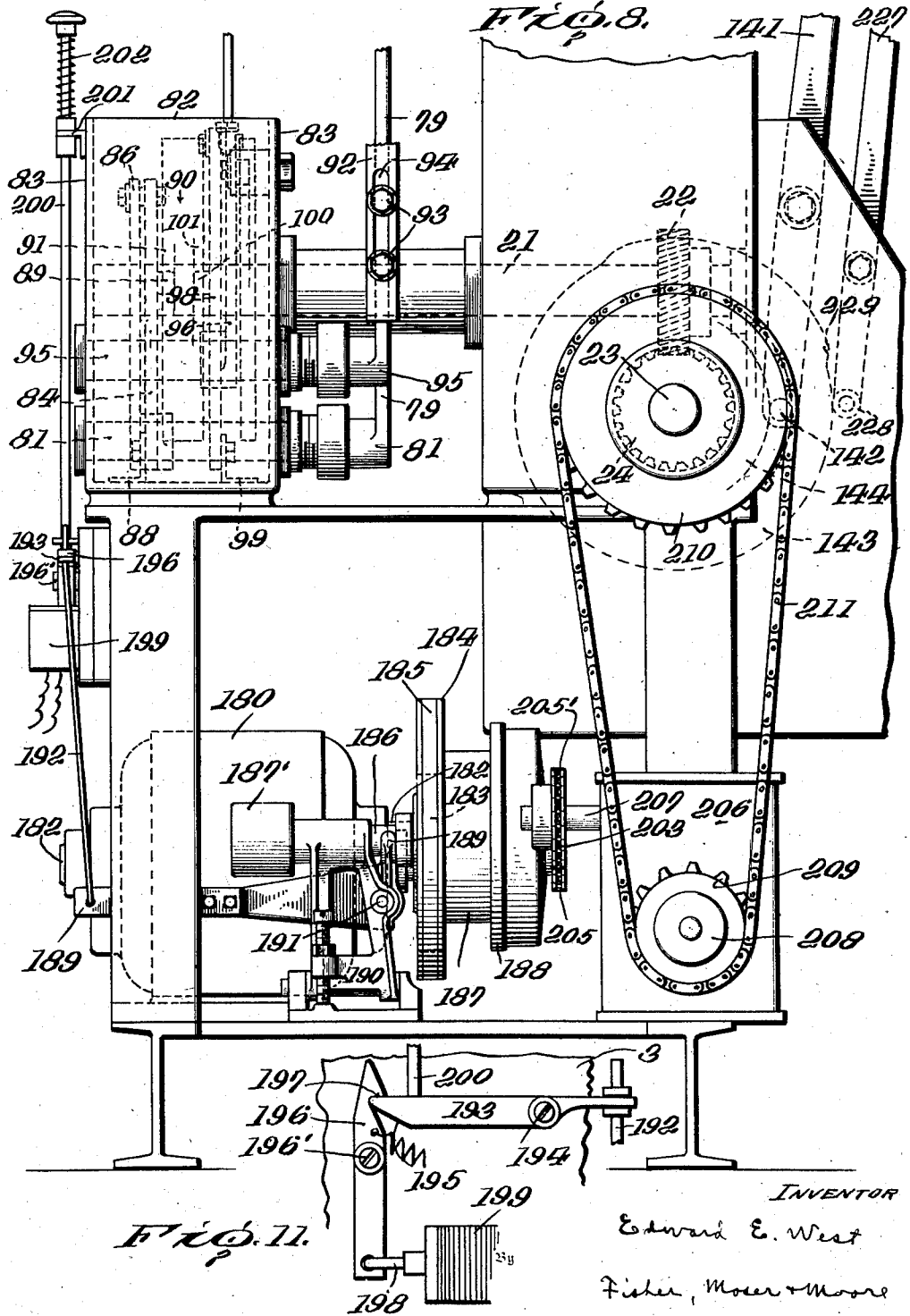
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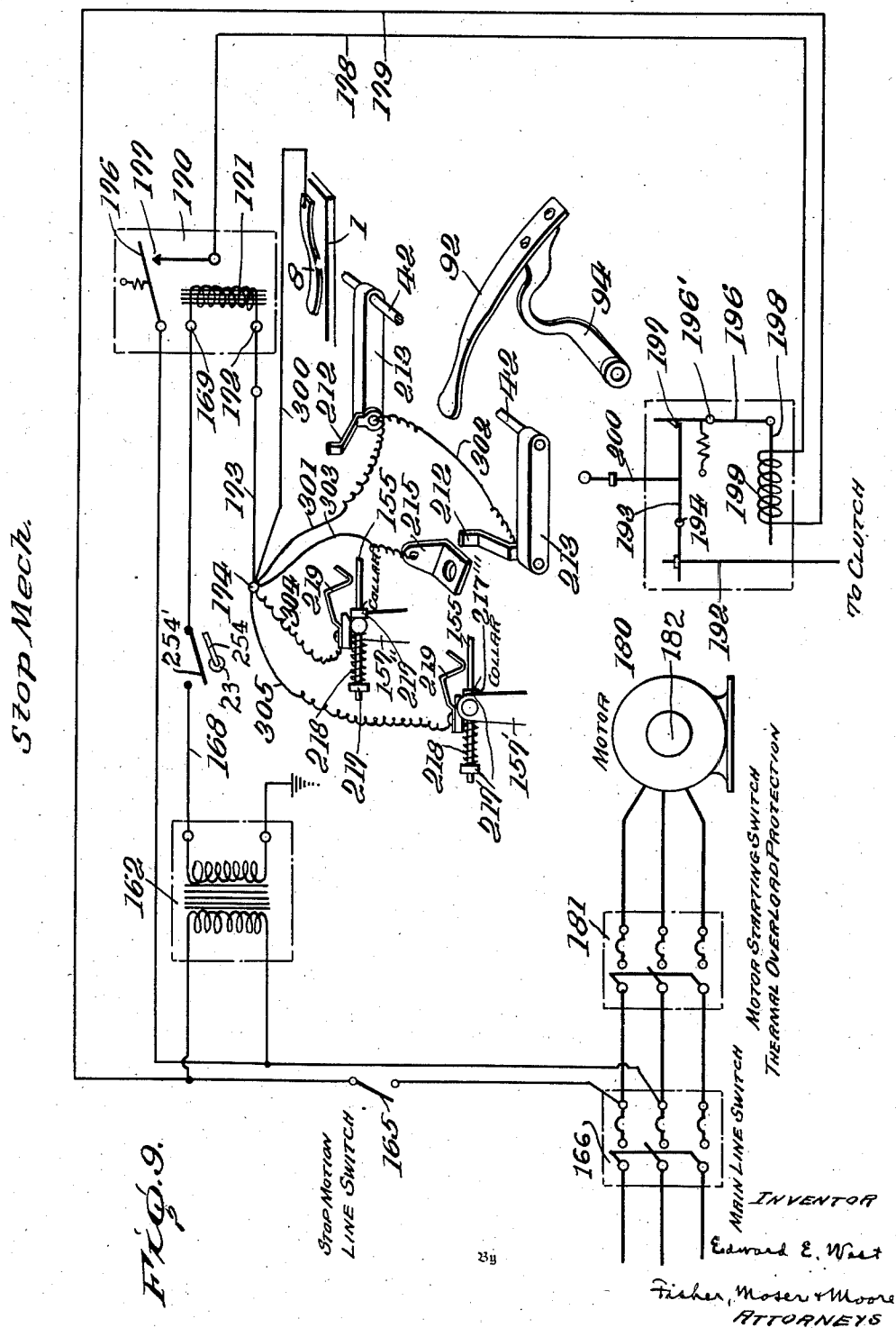
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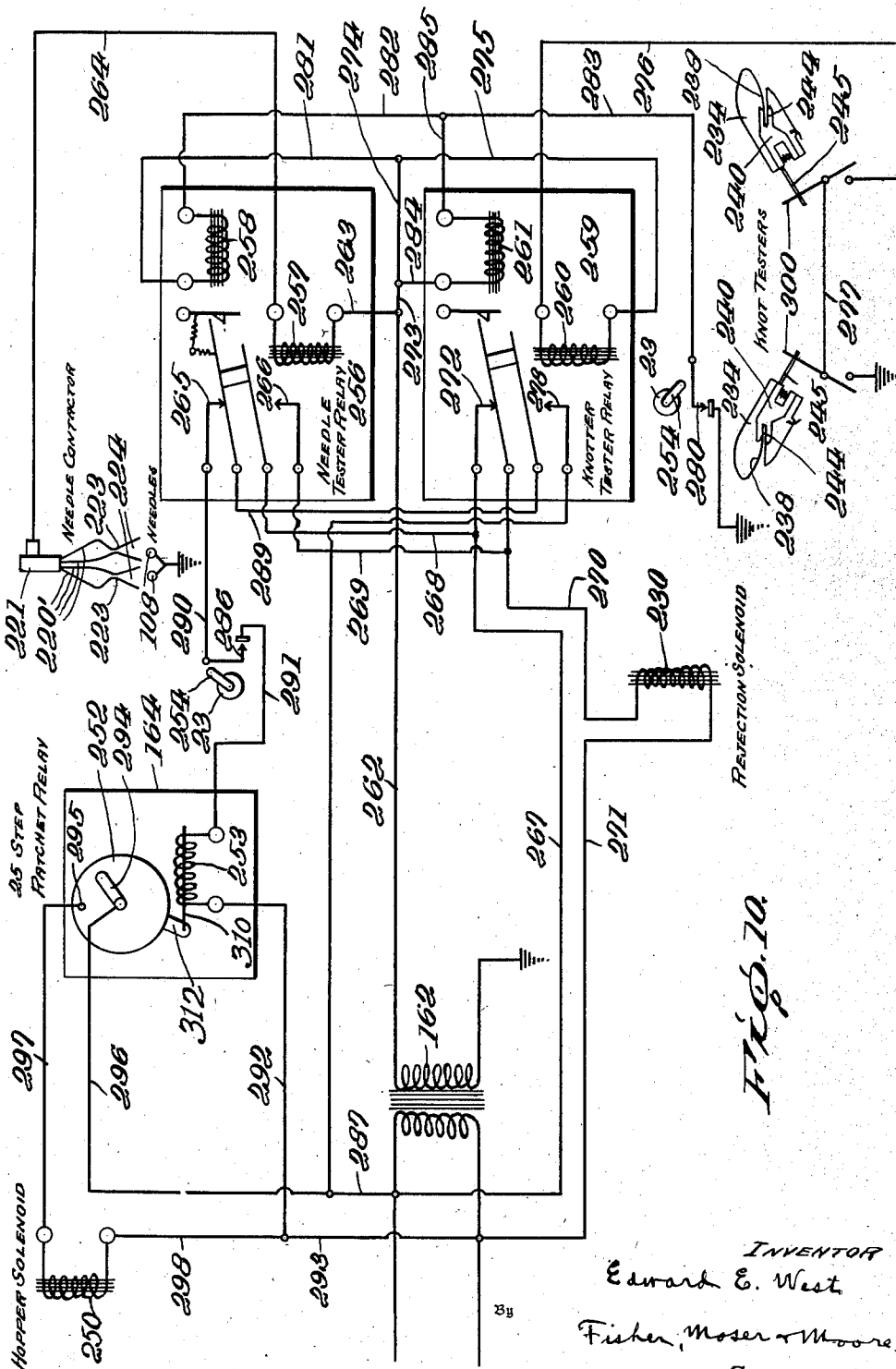


FIG. 10.

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FIG. 12.

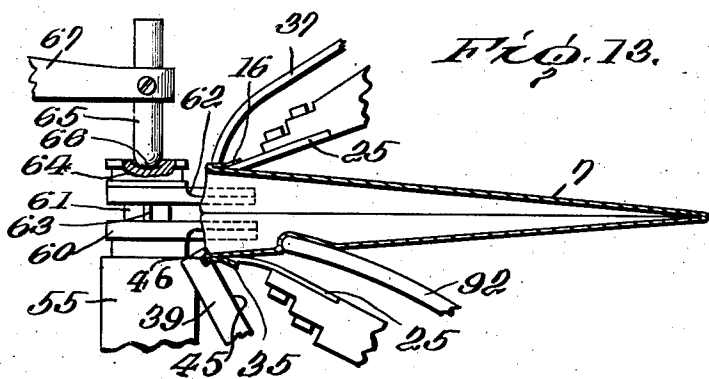
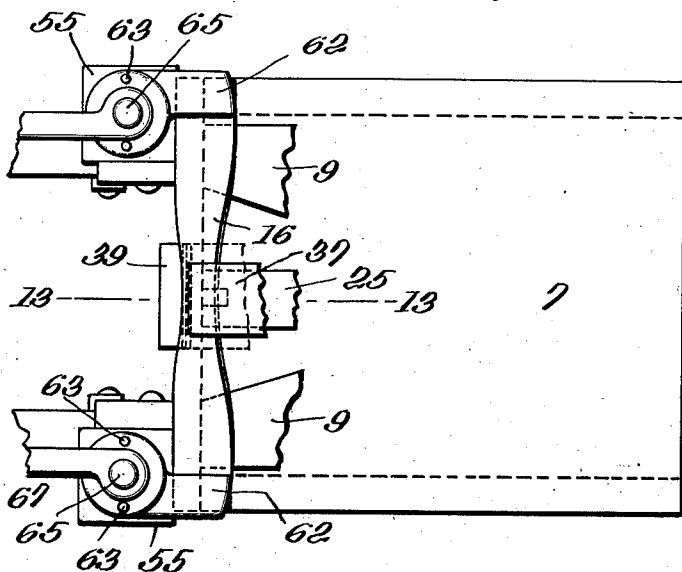


FIG. 13.

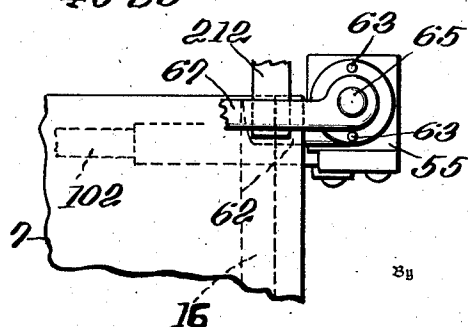


FIG. 14.

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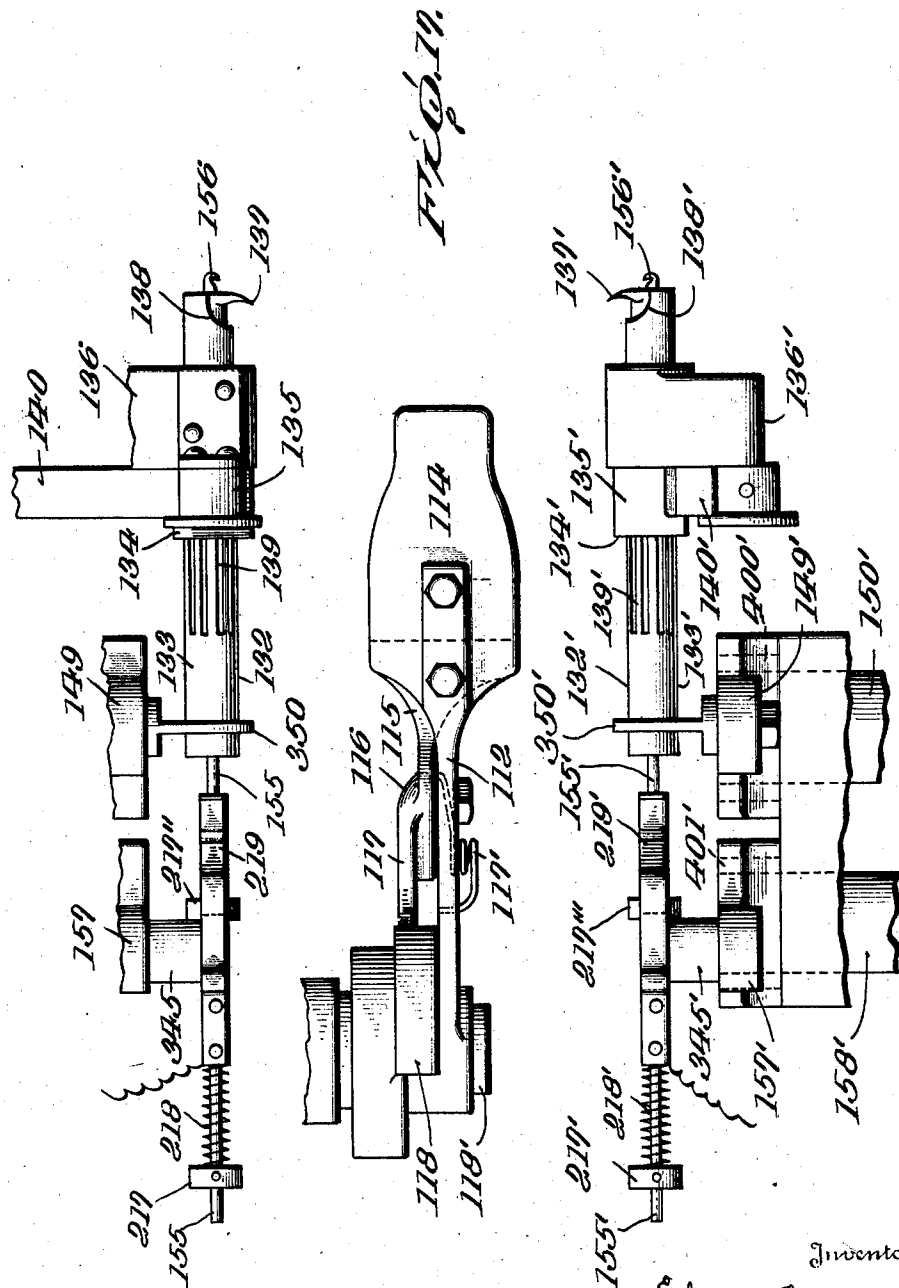
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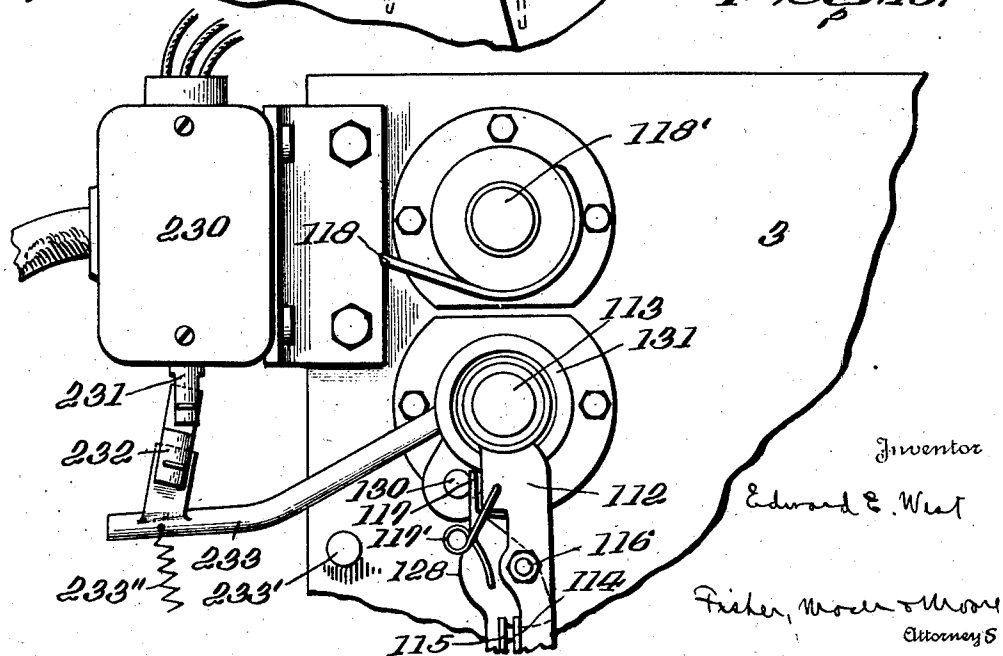
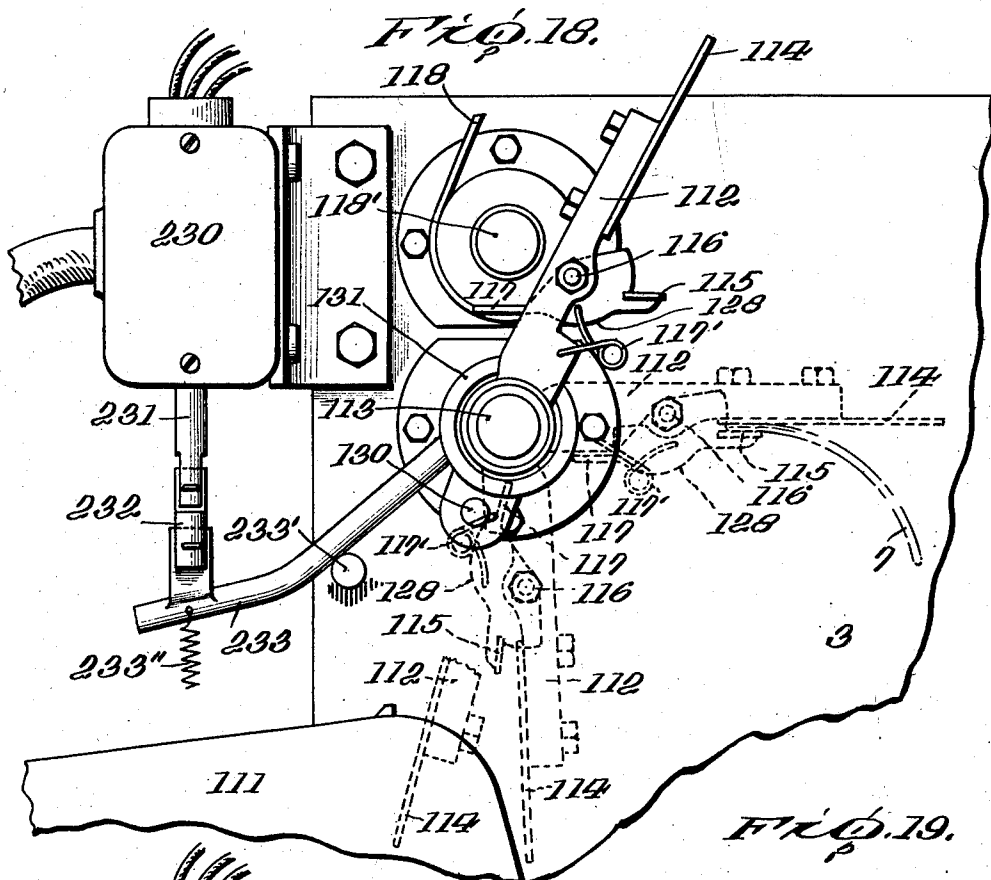
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BAG STRINGING MACHINE

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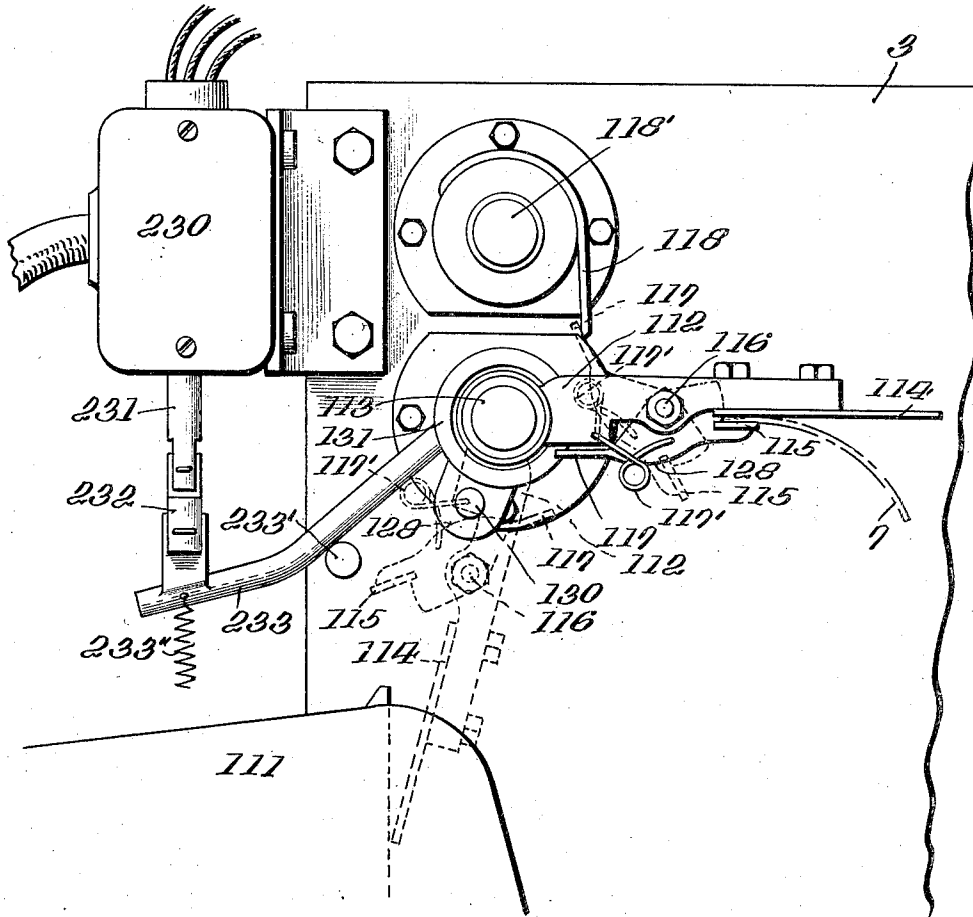


FIG. 20.

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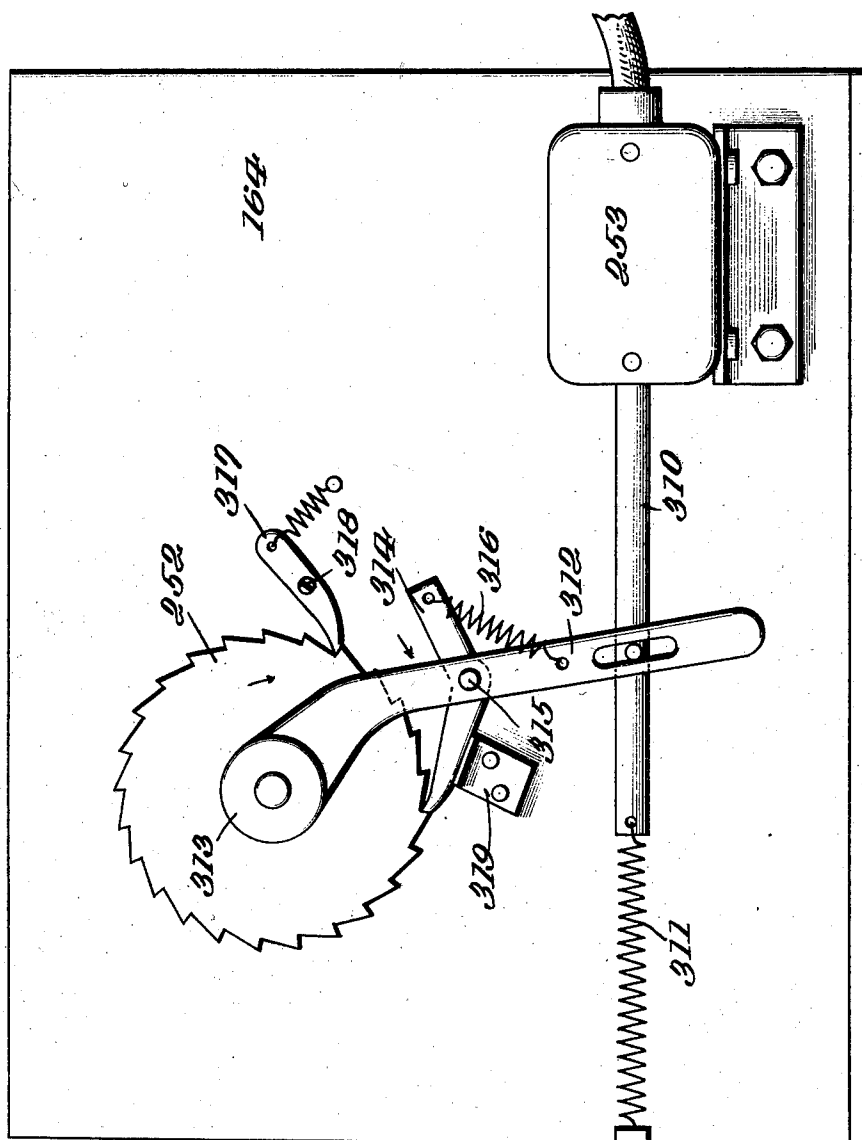
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BAG STRINGING MACHINE

Filed Jan. 26, 1942

16 Sheets-Sheet 16



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UNITED STATES PATENT OFFICE

2,374,572

BAG STRINGING MACHINE

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Application January 26, 1942, Serial No. 428,280

29 Claims. (Cl. 112—2)

This invention relates to improvements in bag stringing machines.

The principal object of the present invention is to provide bag supporting, gripping, turning and delivering mechanism for bag stringing machines.

Another object is the provision of improved bag supporting, gripping, turning and delivering mechanism particularly adaptable for use with bag machines for stringing bags on the outside.

Another object is the provision of improved bag supporting, gripping, bag opening and delivering mechanism, having means associated therewith for automatically stopping the machine, at various stations, to prevent improperly strung bags from passing through the machine.

Another object is to provide an improved bag stringing machine incorporating automatic stopping means for stopping the machine at various stations, and automatic needle inspecting and knot testing means for rejecting improperly strung bags.

Another object is to provide an improved bag stringing machine having automatic stop, needle inspecting, knot testing and bag counting mechanism associated and synchronized therewith.

A further object is the provision of improved feeding, gripping and turning mechanism for bag stringing machines.

Still another object is the provision of an improved bag stringing machine having bag delivering and automatic counting mechanism associated therewith for counting a predetermined number of properly strung bags being positioned within the bag receptacle.

These and other objects and advantages will be apparent as the specification is considered in connection with the accompanying drawings, wherein:

Figure 1 is a plan view of the complete bag stringing machine, showing the relative positions of the feeding, gripping, turning, stringing and bag delivering mechanisms;

Figure 2 is an enlarged elevation of the bag feeding carriage, bag grippers and turning member, partly in section and taken on the line 2—2 of Figure 1;

Figure 3 is a plan view, partly in section, of the turret head and the bag hem grippers, on the line 3—3 of Figure 5;

Figure 4 is a side elevation of the turret head, bag grippers, string knotters, bag delivering member and associated operating mechanism,

partly in section and taken on the line 4—4 which is a portion of the line 2—2 of Figure 1.

Figure 5 is an enlarged view, similar to Figure 4, showing the bag grippers operating cam, one of the bag grippers, a knotter, needle inspecting and knot testing mechanism;

Figure 5^a is a side elevation of the needle inspection mechanism, looking in the direction of the arrow 5^a of Figure 5.

Figure 6 is a section on the line 6—6 of Figure 1, showing the operating mechanism for actuating the knotter, bag delivering paddle and releasing the bag grippers;

Figure 7 is a section of the line 7—7 which is a portion of the line 2—2 of Figure 1, showing the bag hopper, and bag rejection solenoid;

Figure 8 is a front elevation of the stringing machine, looking in the direction of the arrows 8—8 of Figure 1, showing the main driving mechanism and associated operating cams and levers;

Figure 9 is a diagrammatic view of the automatic stop mechanism for stopping the machine at the various feeding, turning, gripping and knotting stations;

Figure 10 is a diagrammatic view of the automatic bag rejecting and counting mechanism for counting the properly strung and rejecting the improperly strung and/or knotted bags;

Figure 11 is a side elevation of the clutch release solenoid and associated operating linkage;

Figure 12 is a plan view of one pair of grippers and the bag pushing and bag opening fingers, in the positions they assume when a bag is gripped and opened preparatory to being strung;

Figure 13 is a section on the line 13—13 of Figure 12;

Figure 14 is a side elevation of one pair of the gripper jaws in the position they assume when the bag has been turned right side out by the turner member;

Figure 15 is a perspective view of one of the pair of knot testers;

Figure 16 is a perspective view of a portion of the bag, after being turned right side out and strung;

Figure 17 is a plan view of the left and right hand knotters and bag delivering paddle.

Figure 18 is a side elevation of the bag delivering paddle and associated operating and bag rejecting mechanism showing the paddle in full line open position, and in the right hand dotted line position showing the lower paddle jaw as it starts to open;

Figure 19 is a side elevation of the bag rejecting mechanism, and a portion of the delivering

paddle showing the paddle jaws in bag rejection position;

Figure 20 is a side elevation, similar to Figure 18, showing in dotted lines the bag paddle movable jaw in open or bag releasing position; and

Figure 21 is a side elevation of the bag counting mechanism for counting properly strung bags.

In the present bag stringing machine hemmed bags are fed, in chain connected form from a source of supply, to a horizontally disposed feeding and cutting mechanism which engages the hems of the successively fed bags, severs the connecting seam threads, and carries successive bags into one pair of horizontally disposed grippers, there being four radially extending pairs of gripping members mounted on a rotating turret head. The bags are then turned right side out, preparatory to being operated upon by a stringing mechanism, after which the bags are removed from the turret head grippers and are delivered to a receptacle. Automatic stop, bag rejecting and counting mechanism is associated with the various feeding, turning, stringing, and delivering means for automatically stopping the machine, at various stations should the machine fail to function properly, and rejecting the improperly strung and counting the properly strung bags, as they are positioned within the bag receptacle.

Referring more particularly to the drawings, wherein like reference characters refer to like parts throughout the several views, the numeral 1 designates a substantially flat, rectangular feed or transfer plate which is rigidly supported by suitable brackets 2 (see Figure 2), secured to a side wall 4 of the main machine frame 3. A pair of spaced, longitudinally extending, bag guide runners 5, suitably secured by screws or the like 6 to the top face of the plate 1, cooperate with the plate to provide a guide or runway along which chain-connected, hemmed bag blanks 7 are fed from a source of supply, not shown. A pair of forwardly extending, substantially flat, spaced spring fingers 8 (see Figures 1 and 2), secured at their rear ends to the runners 5, as at 8', lightly rest upon the top surfaces of the bag blanks 7 and serve to retain the same in proper alignment, as the bag blanks are fed along the feed plate 1, between the runners 5.

The thread connected bag blanks 7 are pushed forwardly along the feed plate 1 by a pair of spaced, forwardly and downwardly extending, relatively flat, bag pusher fingers 9, secured by bolts 10 to the bottom face of a pair of blocks 11 carried by the outer ends of a pair of laterally extending rods 12, projecting through a longitudinal guide slot 13 in the side wall 4. The rods 12 are fixedly mounted within a vertically disposed block 14, slidably arranged in the guide slot 13. This structure, as well as the following feeding mechanism is described in detail, in my pending application, Serial No. 357,457 filed September 19, 1940. The fingers 9 extend underneath and into the top hem 16 of the bag blank 7 and the same are reciprocated forwardly, relative to the stationary feed plate 1, to advance the bag blank thereon, by means of a vertical lever 17 (see Figure 2), pivotally connected, at its upper end, to the block 14 and, at its lower end, to the frame 3. A cam roller 18, carried by the lever 17, rides in a cam groove 20 in the side face of a cam disc 19 shown in Figure 2, mounted on a transverse drive shaft 21 journaled in the frame 3, and a gear 22 on shaft 21 (see Figure 1)

meshes with a gear 24, on a main longitudinal drive shaft 23. Rotation of the cam 19 actuates the lever 17 and reciprocates the block 14 in the guide slot 13 whereby the pusher fingers 9 are moved forwardly on the feed plate 1, and thereby move or advance the foremost bag blank 7, of the chain of bags, intermittently beneath a pair of cutters, presently described.

An electric motor 180, of conventional construction and controlled by a switch 181, is suitably mounted on the base frame and constitutes the source of power for operating the machine (see Figures 8 and 9). The drive shaft 182, of the motor, carries a pulley 183 which is drivingly connected, by a belt 185, with a pulley 184, loosely sleeved on a transverse shaft 186 which is journaled in bearings 187 on the base. A suitable clutch 187, of conventional construction, sleeved on the shaft 186 and attached to the pulley 184, frictionally engages with the side face of a clutch disc 188, mounted on the shaft 186. The clutch 187 is slidably moved into and out of driving engagement with the clutch disc 188 by any suitable means, such as a yoke member 189 pivotally mounted as at 191, in a bracket 190. The outer end of the yoke 189 is pivoted to the lower end of an upstanding rod 192, in turn connected, at its upper end, to the end of a trip arm 193. The trip arm 193 is pivoted, adjacent one end as at 194, to the side of the frame, and its other end is formed with a taper 195 (see Figure 11) which is adapted to normally engage with a recess 197 in the upper end of an arm 196, in turn pivoted, as at 196', to the side of the machine frame. The lower end of the arm 196 is pivoted to an armature or plunger 198 of a clutch release solenoid 199, mounted on the frame and of conventional construction, hereinafter described. The free end of the trip arm 193 is adapted to be engaged by the lower end of a vertically disposed rod 200, mounted in a bracket 201, on the side of the frame, and movable vertically into engagement with the end of the trip arm 193, against the tension of a coil spring 202, to depress the tapered end 195 of the trip arm 193, into locking engagement with the rod 196. In this position, the clutch 187 is in engagement with and drives the clutch disc 188. A sprocket 203, as shown in Figure 8, mounted on transverse shaft 186 and connected to the clutch disc 188 by pins or the like (not shown) is drivingly connected by a flexible chain 205 with a sprocket 205' mounted on the end of the shaft 207 of a conventional gear reduction unit 206. The shaft 207 is drivingly connected by means of the gearing of this unit to a second shaft 208, which carries a sprocket 209 and serves to drive a sprocket 210 on the main longitudinal drive shaft 23 (see Figures 1, 6 and 8), through a flexible chain 211. Thus, the main drive shaft 23 of the stringing machine is driven by the motor 180, and the clutch mechanism permits of the drive shaft being automatically disengaged, at various stages of the bag stringing should a bag be improperly fed, gripped, turned and/or strung, as will be later described.

A forwardly extending, relatively flat, bag opening finger 25, as best shown in Figures 1 and 2, is secured to each inner end of a pair of top and bottom rock shafts 26, journaled in a pair of laterally extending bearings 27, carried by the block 14 and a downwardly depending arm 28, integrally formed thereon. The bearings 27 extend through the slot 13 and a second slot 13'. Fixed to the extended outer ends of

the rock shafts 26 are a pair of segment gears 29, in mesh with each other, with the upper segment gear having a forwardly extending, substantially horizontally disposed trip arm 30, suitably secured thereto. The arm 30 is provided with a beveled or forwardly extending and upwardly sloping bottom face 31 which is adapted to engage with and ride over a roller 32, carried by a laterally extending stub shaft 33, shown in Figure 1, journaled in a bearing 34 secured to the side frame wall 4. Forward travel of the block 14, due to the rotation of cam 19, causes the pair of pusher fingers 9 to enter into or underneath the top hem 16 adjacent the side edges thereof, and the opening fingers 25 to enter into or underneath the top and bottom hems 16 and 35 intermediate the side edges of the hems. During the forward travel of the block 14, the beveled face 31 of arm 30 slides over the roller 32 thereby raising or elevating the arm 30, and rocking the top rock shaft 26 and segment gear 29 in a clockwise direction, viewing Figure 2, which in turn rocks the lower segment gear 29 and rock shaft 26 in an opposing or counter-clockwise direction, thus causing the fingers 25 to open or expand the mouth of the bag.

Fixedly secured to a collar 36 on the inner end of the top rock shaft 26 is a forwardly and downwardly extending, relatively flat, tongue 37, as best shown in Figure 2, having the lower end thereof bent, as at 38. The tongue 37 substantially overlies and is normally spaced from the top bag opening finger 25, and the bent end 38 of the latter engages with the upper face of the top bag hem 16 (see Figures 12 and 13), when the mouth end of the bag has been expanded to open position by the bag opening fingers 25, as best shown in Figure 13. An upstanding lug 39 is carried by a stub shaft 40 journaled in the end of a forwardly projecting arm 41, which is fixed to a horizontal cross rod 42 mounted in a vertical bracket 43 (see Figure 1) on the frame and the side wall 4. The lug 39 is normally retained in vertical position by means of a spring or the like 44, connected to the lug and cross rod 42. As the bottom bag opening finger 25 enters the bottom bag hem 35, and coacts with the top opening finger to open the mouth end of the bag, the bottom hem 35 is pushed, by the bottom finger 25, into a groove or slot 46 in the rear face 45 of the lug and is momentarily clamped or positioned therein, as best shown in Figure 13. Thus, the tongue 37, bears upon the upper face of the top bag hem 16, and the lug 39 engages the bottom hem 35, preventing the hems from slipping or otherwise being dislodged from the respective bag opening fingers 25. This is a desirable and important feature because it assures of the bag mouth being held in open position to permit of the bag being turned right side out.

During the forward travel of the block 14 in the guide slot 13, the bag pusher fingers 9, having been inserted within the hem 15, push the bag forwardly along the feed plate 1 and advance the hemmed mouth thereof into a pair of grippers 60—62, mounted on a rotating turret head, presently described (see Figures 3, 4 and 5). The bag opening fingers 25, having been inserted in the top and bottom hems 16 and 35, are moved in opposing directions by the rock shafts 26, as hereinbefore described, to expand or open the mouth of the bag, after the same has been gripped or clamped by the turret head

grippers 60—62, so that the bag may be turned right side out, preparatory to being strung.

While the foremost bag blank 7 of the chain of bags is being advanced along the feed plate 1, by the pusher fingers 9, it is necessary to sever the connecting bag threads. Thus, a pair of substantially L-shaped thread cutters 47, extend upwardly and are vertically movable through guide slots 48, in the feed plate 1, as shown in Figures 1 and 2, adjacent the forward ends of the bag guide runners 5, and are movably connected to the forward ends of a pair of rods 49. These rods are fixed at their rear ends to a rock shaft 50, in turn journaled in suitable blocks 51, secured to the underside of plate 1. The cutters are provided with suitable cutting edges, not shown, so that when the rock shaft 50 and rods 49 are rocked downwardly, the cutters 47 are likewise moved downwardly through the guide slots 48, until their respective cutting edges coact with cutting edges, see Fig. 1, on the upper ends of the slots 48 and thereby shear or sever the connecting bag threads. The rock shaft 50 extends through an opening in the side wall 4 of the machine frame, above the guide slot 13', and is pivotally moved or rocked, during the reciprocation of the feeding carriage, by virtue of a trip mechanism corresponding substantially in structure with that illustrated and described in my pending application, Serial No. 357,457, previously referred to. The bag pusher fingers 9 and opening fingers 25 enter the top and bottom hems 16—35 of the bag blank 7, while the latter is stationary on the feed plate 1, with the hems to the rear of the cutters 47, the cutting of the threads being effected while the bag is in motion. When the connecting bag threads have been severed, the pusher fingers 9 deliver the foremost bag to the gripping means 60 and 62 on the rotating turret head, hereinafter described, which serves to grip and support the bag in position while the same is being turned right side out. The turret head then successively rotates the bag to a vertical stringing station, and thence to a horizontal station, where the strung bag is removed therefrom and delivered to a hopper 111. The turret head is intermittently rotated, to carry the bag grippers to the various stations, by any suitable means, such as a Geneva movement, not shown, corresponding in structure with the Geneva mechanism of my Patent No. 2,274,622.

At this point, provision is made for automatically stopping the machine, if the supply of bags runs out or a bag is improperly fed along the feed plate 1, thus preventing the continued operation of the stringing mechanism without a bag being acted upon. For this purpose, one of the flat, metal, spring bag tensioning fingers 8, secured to the rear ends of the bag guide runners 5, on the feed plate 1, is insulated from the frame and is provided with an electrical connection (see Figure 9) to be later more particularly described. During the feeding of the bags along the feed plate, by the feeding carriage, if the pusher fingers 9 fail to pick up a bag, due to the supply thereof being exhausted, the bag tensioning finger 8, which is ordinarily insulated from the plate by the bag material, will make a metal to metal contact with the feed plate 1. The flattened ends of the springs 8 are of sufficient length to always bear or rest on one or the other of the connected bag blanks so the springs will not engage and make a metal to metal contact with the feed plate 1. In other

words, if the flattened ends of the springs 8 are engaged by any part of a bag, the same will be spaced or elevated above the face of the feed plate and no metal to metal contact is made therebetween. On the other hand, if the supply of bags runs out and the pusher fingers fail to pick up a bag, the springs 8 will, of course, drop into contact with and make a metal to metal contact with the plate thereby closing the circuit. The electric circuit is thus closed and the stop mechanism is operated to disengage the clutch 187 and to stop the machine thereby enabling the operator to remedy the defect in the bag feeding mechanism, before resuming operations.

The bag holding turret head (see Figures 3, 4 and 5) comprises a shaft 52, journaled in the spaced side walls 4—4' of the machine frame. A pair of sleeves 53 are mounted upon, and keyed to the shaft 52, each of the sleeves being provided with four stub arms 54, arranged in pairs, that is, the oppositely disposed arms of the respective sleeves constitute a pair. The outer ends of the arms 54 are squared or enlarged, as at 55, and bores 56 extend therethrough, within which are fixedly mounted bushings or sleeves 57, as best shown in Figure 5. A tube 58, sleeved within each of the bushings 57, carries a gear 59 and a laterally and rearwardly extending jaw or finger 60 and a rod 61, having a corresponding laterally and rearwardly extending jaw or finger 62 is sleeved within the tube 58. The rod 61 moves vertically within the tube 58 and the lower end thereof seats upon the upper end of a coil spring 61', positioned in the tube. Vertical pins 63, fixed in the upper end of the tube 58, slidably project through openings in the enlarged upper end of the rod to guide the latter during its vertical movement within the tube 58, and to assure that the top jaw 62 is accurately aligned with the bottom jaw 60.

The enlarged upper end of the rod 61 is hollowed, as at 64 (see Figure 13), to receive the rounded lower end 66 of a downwardly depending rod 65, carried in the outer end of an arm 67, pivoted, as at 68 to the stub arm 54. The inner end of the arm 67 is formed with an offset 69 and a taper or point 70. The offset and tapered end of the arm extends through an opening 71 in the lower end of the stub arm and is adapted to engage with an annular cam track 73 on the inner face of one of two cam discs 72, sleeved on the turret head shaft 52.

The two cam discs 72 are secured together and held in spaced relation by a screw 74 (see Figures 4 and 5). Fixedly secured to the inner faces of the cam discs are a pair of spaced, parallel side plates 77, as best shown in Figures 1, 3, 4 and 5, connected at their lower ends by a cross rod 78. The cross rod 78 of the arm is adapted to be engaged by the bent upper end 80 of a vertically disposed lever 79 (see Figure 4) carried by the inner end of a horizontally disposed stub shaft 81, projecting laterally from and journaled in the spaced side walls 83 of a cam box 82 (see Figure 8), mounted on the main frame 3. The stub shaft 81 is rocked through the medium of an upstanding lever 84, pivoted at its upper end to the lower end of a link 85, the latter in turn being pivoted at its upper end to a vertically disposed lever 86 (see Figure 8). The lower end of the lever 86 is fulcrumed to a block 88 in the box 82, and the lever 86 carries a cam roller 89 (see Figure 1) which rides in a

cam groove 91 formed in the face of a cam disc 90, carried by the transverse drive shaft 21. Upon clockwise rotation of the cam 90, the stub shaft 81 is rotated in a corresponding direction, through the connecting levers and links 86, 85 and 84, whereby the vertical lever 79 is rocked forwardly to cause the bent upper end 80 thereof to engage the cross rod 78, of the arm 75, and rock the arm 75 and cams 72 in a corresponding clockwise direction, viewing Figure 4. Rotation of the cams 72 causes the arms 67 to be rocked about their pivots and the outer ends thereof to be moved downwardly thereby pushing the rods 65 against the upper ends of the rods 61. The rods 61 are thus forced downwardly in the tubes 58 against the tension of springs 61', and the top gripping jaws 62 are moved downwardly against and in gripping position with respect to the bottom jaws 60. This results in the gripping jaws 60—62 engaging with and gripping the sides of the top and bottom bag hems 16—35, as best shown in Figure 12. With the bag hems in this gripped position, the bag opening fingers 25 are expanded to open the mouth of the bag, to permit of the bag being turned right side out, as presently described.

When an opened bag is gripped and supported in substantially horizontal position, by the pairs of gripping jaws 60—62, the bag is engaged by a curved turner member or plate 92 (see Figure 2). The turner member 92 is adjustably secured, by bolts or the like 93, to the curved upper end of a lever 94, which is carried by the inner end of a stub shaft 95, journaled in the side walls 83 of the cam box 82. The shaft 95 is rocked by a vertical lever 96 pivoted, at its upper end, to a link 97 in turn pivoted to the upper end of a lever 98. The lower end of the lever 98 is journaled in a block 99, in the cam box, and a cam roller 100 (see Figures 1 and 8), mounted on the lever 98, rides in a cam groove 101 in the side face of one of two cam discs 90. Rotation of the cam 90, in the clockwise direction, previously described, actuates the lever 98, link 97, lever 96 and rocks the shaft 95 so that the lever 94 and turner member 92 are swung upwardly and forwardly in an arc. The upper end of the turner member 92 is thereby moved upwardly through a longitudinal slot 102' (see Figure 1) in the forward end of the feed plate 1, into engagement with the bottom face of the gripped bag, to the rear of the bottom hem 35 and intermediate the pairs of side hem gripping jaws 60—62, as best illustrated in Figure 13. Continued travel of the member 92 causes the bottom face of the bag 7 to be pushed forwardly through the mouth thereof of which is expanded or opened and gripped by the pair of bag opening fingers 25, and the tongue 37 and lug 39 (see Figure 12).

In the event the turner member 92 misses the closed end of the opened bag or otherwise fails to properly turn the bag right side out, provision is made for automatically stopping the machine, at this station, to enable the operator to remedy the trouble or to remove the bag from the machine. Thus, an upstanding spring steel, leaf contact 215 (see Figure 5) is secured by a screw 216 to the upper end of one of the arms 77 and normally insulated from the machine by the bag cloth on the turner 92. However, if the mouth end of the bag is not properly opened by the opening fingers 25, and the turner 92 should miss the bag, the head of the turner will engage with and make a metal to metal contact with the leaf contact member 215. This completes the stop

motion circuit, hereinafter described, and particularly illustrated in Figure 9, to disengage the clutch members 187—188. If the turner enters the bag and the latter is properly turned, at the forward end of the turning stroke, the turner will be covered by the bag and insulated from the contact 215 so that no metal to metal contact is made therewith.

Rack bars 102 (see Figure 3) are slidably mounted in longitudinal slots 103 in the outer ends of each of the turret head stub arms 54, and the racks 104, on the outer ends thereof, extend through slots or grooves 105, in the sides of the squared ends 55 of the stub arms, and engage with the gears 59 (see Figure 5) on the tubes 58. The rack bars 102 are moved through the slots 103 and 105 to rotate the gears 59, by means of cam rollers 106, on the inner ends thereof, which ride in cam grooves 107, as shown in Figures 3 and 4, in the sides of the cam discs 72. While the turner member pushes the closed or bottom end of the bag through the open mouth thereof, the feeding carriage begins its return movement thus withdrawing the fingers 9 and 25 from the top and bottom hems 16—35 and permitting the rotation of the gripper jaws 60—62, and the bag will be pulled or stretched into position to be strung. During the pushing of the closed end of the bag through the mouth thereof, by the turner member 92, the rotation of the cams 72, and the curvature of the cam grooves 107 thereon, acts on the cam rollers 106 and pulls the rack bars 102 outwardly through the slots 103 and 105. This movement of the rack bars 102 causes the racks 104 to rotate the gripper tube gears 59 (see Figure 5) in opposing directions. Thus the gripper jaws 60—62 are correspondingly rotated in clockwise and counterclockwise directions respectively (viewing Figure 3), from their normal extended positions, on the outside of the turret arms 54, to positions on the inside of the arms, and within the turned bag, as partially shown in Figure 14, and as the turner member 92 reaches the end of its working stroke and turning of the bag right side out is completed.

After the bag has been gripped by the jaws 60—62 and turned right side out by the turner member 92, the turret head is rotated, approximately one quarter of a revolution, in any desired manner, such as that described in my Patent No. 2,274,622, to move the grippers 60—62 with a bag gripped and supported therein, from the horizontal feeding to a vertical stringing station. As the turret head rotates, the continued rocking of the cams 72 causes the closed gripper jaws 60—62 to complete their substantially 180° arcuate movements, from normal extended positions, to positions substantially parallel to the inner sides of the turret arms 54, as best shown in Figure 14. Thus, when the arms 54 and grippers 60—62 reach the vertical stringing station, the bag will be suspended or caused to hang downwardly between the arms 54 (see Figure 5). In order to assure of the hems being properly positioned for stringing, it is essential that the grippers 60—62 uniformly and securely grip the bag hems.

In the event the grippers fail to properly grip the hems, it is necessary to make provision for automatically stopping the machine to enable the operator to remove the bag therefrom. A pair of upstanding, inwardly bent, flat, spring contact fingers 212 are connected to the ends of two forwardly extending blocks 213, carried by the horizontal cross rod 42, which fingers are

normally insulated from the machine frame by the bag cloth (see Figures 1 and 2). The fingers 212 are positioned in the path of travel of and are adapted to be engaged by the gripper jaws 60—62, when the latter have been rotated to their gripping positions on the inside of the turned bag. That is, if either one or both of the pairs of gripper jaws 60—62 fail to engage with and grip the side hems of the bag, a metal to metal contact is made with one or both of the contact fingers 212. It will, of course, be understood that if the bag is properly gripped and the grippers are covered by the cloth, due to the proper turning of the bag right side out, no contact is made with the fingers 212. If a metal to metal contact is made therewith the fingers will be grounded to the machine thus completing the circuit to the stop motion mechanism and disengaging the clutch members 187—188, as more fully described hereinafter.

In the vertical stringing position, the grippers 60—62 will have stretched the hemmed mouth of the bag until the hems are substantially parallel and are aligned with a pair of horizontally disposed needles 108 (see Figures 1, 4 and 5). The needles, which are particularly shown and described in my Patent No. 2,274,622 and pending application Serial No. 418,998, filed November 13, 1941, are suitably mounted for reciprocation on a flat top frame plate 109, and are adapted to carry a pair of draw strings 110 through the parallel hems of the vertically disposed bag. Due to the bag being turned right side out, before being moved to the stringing station, the needles 108 enter into the outer face of and pass through the hems on the outside thereof.

The draw strings, 110 are carried through the hems 16—35 of the bag, in the vertical stringing station, and are knotted by a pair of knotters 132 and 132', mounted on either side of the turret head. As two draw strings 110 are fed to the needles, on the forward and return strokes thereof, it will be understood that the lower knotted 132', viewing Figures 1 and 17, will operate to form a knot in one draw string, introduced through the hems on the forward stroke of the needles, and the upper knotted 132, viewing the same figures, will correspondingly knot the string, drawn rearwardly through the hems on the return stroke of the needles. Thus, knots are formed on the respective ends of the draw strings. The knotted mechanism generally resembles the knotters, described and illustrated in my Patent No. 2,274,622, with the addition of an automatic stop means associated therewith for stopping the machine in the event the knots are improperly formed on the strings and become tangled in the heads of the knotters. Suffice to say that each of the knotters 132 and 132' comprise hollow knotted rods 133 and 133' (see Figures 1, 4, 5 and 17) slidably positioned within sleeves 134 and 134' fixedly secured in gear casings 135 and 135' (see Figures 4 and 17) mounted on blocks 136 and 136' secured to the top frame plate 109. The inner end of the knotted rods 133 and 133' are formed with curved, pointed hooks 137 and 137' which serve to engage the elevated string 110 and wind or loop the same around the head or inner end of rods 133 and 133', during the knotting operation, the inner end of the sleeves being cut away, as at 138 and 138', to provide clearance for the knotted hooks.

Each of the knotted rods 133—133', is rotated by means of gear teeth 139 and 139', formed in the knotted rods 132—132', which mesh with

rack bars 140 and 140' (see Figures 1, 4, 5 and 17). The left hand knotted rack bar 140, viewing the rear of the machine that is, the left side of Figures 1 and 17, is horizontally disposed and is pivoted to the upper end of a vertical lever 141 (see Figures 1 and 8), fulcrumed intermediate its ends to the machine frame. A cam roller 142, mounted on lever 141, rides in a cam groove 144 in a cam disc 143 carried by the main longitudinal drive shaft 23. On the other hand, the right hand knotted rack bar 140', is vertically disposed and is pivotally connected to the upper end of a vertical lever 145, fulcrumed to the side wall 4' of the machine frame, and carrying a cam roller 146 which rides in a cam groove 148 in the face of a cam disc 147 (see Figure 1) mounted on the transverse drive shaft 121. Thus, the knotted rods 133—133' are rotated, in clockwise and counterclockwise directions, respectively, to form the loops of the knots.

The knotted rods 133—133' are reciprocated through the sleeves 134—134' to advance the hooks 137—137' into a position adjacent to and in engagement with the strings, positioned in the needles, and then to withdraw the strings outwardly, while being rotated, so that the rods will loop or wind the strings around the heads thereof. This reciprocation of the rods 133—133' is accomplished by vertically disposed levers 149—149', pivotally connected, at their upper ends, to the knotted rods through the medium of offset yoke members 350 and 350' bolted to the levers; (see Figures 1, 4 and 17). The levers 149—149' are mounted on bushings 400 and 400' rotatably sleeved on horizontal stub shafts 150 and 150', journaled in the upper end of the machine frame, which bushings 400 and 400' are suitably connected to and rotated by means of vertical levers 151 and 151' having cam rollers 152 and 152', on the lower ends thereof. The cam rollers 152—152' ride in cam grooves 154 and 154' in the faces of cam discs 153 and 153', on a transverse drive shaft 121, journaled in the main frame. Rotation of the cams 153—153' rocks the levers 151—151' and reciprocates the knotted rods 133—133' forwardly and rearwardly in sleeves 134—134'. At the ends of their respective forward strokes, the hooked ends 137—137' of the knotted rods will engage with and hook the ends of the strings in the needles and the rods will be retracted. During the return strokes of the rods 133—133', the latter are rotated, in the manner described in my previously mentioned application, Serial No. 250,223, whereby the strings are wound around the heads of the knotters.

Knotted pins 155 and 155' slidably but non-rotatably extend through the hollow knotted rods 133—133' and are formed with curved inner ends 156 and 156', see Figure 15. The knotted pins 155—155' are slidably connected, at their outer ends, to the upper ends of vertically disposed levers 157 and 157', fixedly secured to bushings 401 and 401' rotatably sleeved on the ends of horizontal stub shafts 158 and 158', journaled in the upper end of the frame, parallel to the shafts 150—150', as best shown in Figures 1, 4 and 17. The bushings 401 and 401' are suitably connected to and rotated by vertical levers 159 and 159' in turn having cam rollers 160 thereon which ride in cam grooves 161 and 161' in the faces of the cam discs 153 and 153', mounted on the transverse drive shaft 121. The levers 159 are thereby rocked and the knotted pins 155—155' are reciprocated forwardly through the

knotted rods 133—133' so that the curved ends 156—156' thereon engage the strings, and rearwardly draw the ends of the strings through the loops, formed on the heads of the knotted rods, thereby completing the formation of the knots.

In the knotting mechanism of my Patent No. 2,274,622, it was necessary to provide string pickers for elevating the strings from the needles and holding the same in the path of the knotted rods, on both the left and right hand sides of the machine. This has proved objectionable and unsatisfactory because it slowed down the knotting operation of the left hand knotted and prevented the speed of the stringing machine from being increased to string a greater number of bags. It was discovered by lowering the left hand knotted rod 133, viewing Figures 1 and 17, to a point closer to and above the path of travel of the stringing needles, that the knotted hook 137 would engage with and pick up the end of the string from the needles, on the return stroke thereof, without the benefit of a string picker. The elimination of the string picker, on the left side of the present stringing machine, increases the speed of the latter and results in a greater number of bags being strung.

The knotted pins 155—155', which pull the ends of the strings through the loops formed by the knotted hooks 137—137', are loosely sleeved through offsets 345—345' formed on the upper ends of the vertical knotted pin operating levers 157—157'. Collars 217—217' and 217''—217''', fixedly mounted on the pins 155—155', serve as stops for the upper ends of the levers 157—157' and permit of the latter pushing the pins through the knotted rods 133—133' into engagement with the strings. Coil springs 218 and 218' are mounted on the outer ends of the respective knotted pins 155—155', intermediate collars 217 and 217' on the ends thereof and the offset portions on members 345 and 345' on the upper ends of the vertical levers 157 and 157' (see Figures 1, 4 and 17). The tension of the springs 218—218', against the upper ends of the vertical levers 157—157', is sufficient to permit of the rocking of the levers 157—157', and the reciprocation of the knotted pins 155—155' to normally pull the ends of the strings through the loops formed by the knotted rods 133—133'. However, in case the curved ends of the knotted pins 155—155' become tangled in with the strings, or stray pieces of strings become lodged and jammed in the knotted rods, the upper ends of the levers 157—157' are permitted to move relatively to the knotted pins 155—155' and the collars 217'—217''', against the tension of the springs 218—218', thereby preventing the pins from being forceably pulled therethrough with resultant breakage or other damage. That is to say, the levers 157—157' will continue to move and the springs 218—218' will be compressed, if the jamming of the knotted rod is sufficient to prevent the rods 133—133' from following their normal movement. Such continued movement of the vertical levers 157—157', against the tension of springs 218—218', causes a pair of bent, spring, metal fingers 219—219', mounted on the upper ends of the levers 157—157' and normally insulated from the pins 155—155' and one or both of the collars 217'' and 217''', to make a metal to metal contact with the collars 217'' and 217'''. Thus, the metal contact fingers 219—219' become grounded and complete the circuit to the stop motion operating coil, as presently de-

scribed. This results in the clutch release solenoid 199 (see Figure 11) being energized to disengage the clutch members 187—188, as particularly shown in Figure 9.

Upon completion of the stringing and knotting operations, the turret head is further rotated, one quarter of a revolution, to move the turret bag grippers and strung bag to a horizontal releasing and removing station. It is now necessary to open the gripping jaws 60—62 to permit of the removal of the strung bag therefrom and the delivery of the same into the bag receptacle or hopper 111. Bag supporting and delivery means is employed for this purpose. Thus a rearwardly and upwardly extending paddle or arm 112 is secured to the end of a stub shaft 113, journaled in the side frame wall 3 (see Figures 1, 3, 4 and 7). The paddle 112 is formed with an enlarged, relatively flat, top plate or jaw 114, on the upper or inner end thereof, having a co-operating gripping jaw 115 pivoted thereto, as at 116, as best shown in Figures 4, 18, 19 and 20. An outwardly extending tail 117, formed on the lower jaw 115, connected to the paddle 112 by a spring 117', is adapted to be engaged by an inwardly extending, curved arm 118, carried by a stub shaft 118', journaled in the frame wall 3, and tripped against the tension of spring 117' to closed gripping position relative to the flat top plate 114. The stub shaft 118' is rotated, to rock the arm 118 downwardly into engagement with the tail 117, for tripping the tail and moving the lower jaw 115 to closed bag gripping position against the flat top plate 114, as in full lines on Figure 4 and dotted lines on Figure 18, by means of a flexible chain 119 (see Figures 1 and 6), travelling over a sprocket 120 thereon and a sprocket 122 carried by the transverse drive shaft 121. The shaft 121 is driven by a gear 123 which meshes with a gear 124, on the main longitudinal drive shaft 23. The paddle 112 operates by oscillating to the right between the extreme positions shown in full lines in Figure 8, and the dotted line position of Figure 20. Thus movement of the paddle 112 downwardly in an arc, to remove a properly strung bag from the turret grippers 60—62 and carry the same to the hopper 111, is effected by a gear 125 on the paddle shaft 113 which meshes with and is driven by a rack 126' on a vertically disposed rod 126 (see Figure 6). The rod 126 is pivotally connected, at its lower end, to a horizontal arm 127, in turn fulcrumed to the machine frame and actuated by a cam roller 128', carried by the arm 127, which rides in a cam groove 130—130', in the side face of a cam disc 129, mounted on the transverse drive shaft 121 (see Figure 1).

During the downward movement of the paddle 112, from its normal upwardly extending position, indicated in full lines in Figure 18, to a substantially horizontal position, as illustrated in full lines in Figures 4 and 20, where the flat top plate 114 thereof engages the topmost side of the horizontally disposed bag, the lower gripping jaw 115 is in the expanded or open position shown in dotted lines to the right of Figure 20. When the top plate 114 engages the top face of the bag between the edges thereof gripped by the turret grippers, the stub shaft 118' will have rotated the inwardly extending curved arm 118 downwardly into engagement with and will have tripped the tail 117, against the tension of toggle spring 117', so that the lower gripping jaw 115 is tripped and elevated, by the action of arm 118 and toggle spring 117', from the substantially

vertical dotted line position to the right of Figure 20 to the horizontal full line position in Figure 20, into gripping engagement with the under face of the bag whereby the bag is clamped between the top plate 114 and the jaw 115. This tripping of jaw 115 to closed position moves the spring 117' past dead center position so that it now holds the clamp or jaw 115 in closed position.

At this position, that is, when the bag has been gripped by the paddle 112, the bag grippers 60—62 are opened, to release the side edges of the bag hems, by virtue of the action of the cam tracks 73 on the tapered ends 70 of the arms 67. Thus, the curvature of the cam tracks 73 is such that the tapered ends 70 ride out of engagement with raised or bumped portions 73' on the cam tracks, as best shown in Figure 5, whereby the tension of the springs 61' is sufficient to force the rods 61 downwardly. The top gripper jaws 62 are thus moved out of gripping engagement with the bottom gripper jaws 60 and the bag is released from the jaws 60—62. As the gripper jaws 60—62 are actuated to open position, the rack bars 102 are acted upon by the cam grooves and are pushed forwardly or outwardly through the longitudinal slots 103—105. The gears 59 and tubes 58 are thereby rotated in opposing directions, that is, clockwise and counterclockwise, respectively, viewing Figures 1, 3 and 4, moving the pairs of gripping jaws 60—62 to their normal, extended, bag receiving and gripping positions, on the outside of the turret arms 54. With the gripper jaws opened and released from their grip on the side edges of the bag hems, and swung to their normal bag receiving positions, and the paddle gripping jaws 114—115 in gripping position on the mouth of the bag, in the horizontal full line position in Figure 20, the movement of the paddle is continued downwardly and forwardly, in an arc, between the turret arms 54. When the paddle 112 has been rocked downwardly to a substantially downwardly depending Figure 19 position, adjacent and to the rear of the open inner end of the longitudinally disposed, longitudinal bag hopper 111, which is pivotally mounted on a horizontal shaft 247, mounted in a pair of forwardly extending brackets 129' (see Figures 6 and 7) secured to the end wall 4' of the machine, for a purpose presently to be described, it is necessary to open the paddle gripping jaws 114—115 to release the bag therefrom. As best shown in Figures 4, 7, 18, 19 and 20, a laterally extending trip arm 130 is carried by a collar 131 loosely sleeved on the paddle stub shaft 113, at a point below and spaced from and in the path of travel of the paddle 112. The trip arm 130, which is normally positioned in the path of travel of the tail 117, is first engaged by the latter and finally by the curved or humped portion 128 of the rearwardly and upwardly extending tail 117 of the lower paddle jaw 115, and consequently first moves the jaw 115 from its closed position in Figure 18, so that the lower jaw 115 is moved slightly away from the upper jaw 114 a sufficient distance to disengage or release the bag from the jaws. Finally during the continued downward and forward arcuate movement of the paddle 112, from the substantially downwardly depending dotted line position in Figure 18 to the forwardmost left hand dotted line position of this figure, the trip 130 remains in contact with the portion 128 so that the jaw 115 is moved about its pivot 116 into fully cocked or open position, and the released

or freed bag is carried or pushed through the open end of and into the bag hopper 111. In other words, the lower paddle jaw 115 is first moved slightly to free or release the gripped bag and is thereafter moved to fully cocked or open position, by the action of the trip 130 on the tail 117, to receive another bag, when the paddle 112 is returned to elevated position. After the hemmed bag has been removed from the opened jaws 60—62, the turret arm 54 continues to rotate to a downwardly depending, vertical position, and thence to the horizontal feeding station, where the jaws are in extended and open position to receive another hemmed bag.

As hereinbefore stated, provision is made for automatically stopping the stringing machine, at different stations, upon failure of the various mechanisms to operate properly. Thus, when the supply of bags gives out or bags are improperly fed along the feeding plate, a bag is improperly fed into the bag grippers; upon the failure of a bag to be turned right side out or upon the jamming of the string knotters, the stop mechanism functions to disengage the clutch members 187—188 and stop the bag stringing mechanism.

Referring particularly to Figure 9, the stop motion equipment consists of a 60-cycle step-down type transformer 162, of the 220 volt to 6 volt cycle step-down type, mounted on a panel, not shown, in a box 164, secured to the side wall of the machine. This transformer 162 is supplied with current from a 220 volt source of power, not shown, controlled by a switch 165, in a switch box 166, secured to the side wall. One line of the 6 volt side of the transformer is grounded to the machine frame, and a wire 168 is connected to one terminal 169 of the 6 volt operating coil 171 of a single pole, single throw, normally open relay 170, mounted on the panel. The other terminal 172 of the coil 171 is connected by a wire 173 to a terminal junction point 174 which in turn is connected to the feeding plate contact 8, gripper contact fingers 212, turner contact 215, and knotter contacts 219 by wires 300, 301, 302, 303, 304 and 305 respectively. Should contact be made with any one of the stop motion contacts, the latter becomes grounded to the frame of the machine, completing the circuit to the operating coil 171. This energizes the coil 171 and causes the contacts of the relay 170 to close, which action completes the circuit through a wire 178 to and energizes the 220 volt 60 cycle operating clutch release solenoid 199 and thence back to the 220 volt side of the transformer 162 through a wire 178 thus completing the circuit. The solenoid armature 198 is thereby actuated and the arm 196 is moved about its pivot and the upper end thereof is released from locking engagement with the tapered end 195 of the trip arm 193. This operates the lever 192 and moves the yoke 189 and releases the clutch member 187 which permits of the continued running of the motor without operating the stringing mechanism. This enables the operator to make the necessary adjustments or to remove the defective bag from the machine. It should be noted that while during the rotation of the turret head the bag holding arms 54 and the levers 67 engage the free ends of the spring contact fingers 212 with a brushing contact, the timer 254 (see Figs. 9 and 10) only completes or closes the circuit in which the spring fingers are included by the engagement with the closing of contact switch 254', when the turret head is at

rest and the hem grippers 60—62 are being rotated. Thus the operation of the machine is not interrupted or stopped each time the fingers 212 are touched or brushed by the parts 54 and 67. In other words the engagement of these parts one with the other does not affect the operation of the machine, and the timer is employed to cut the current on and off merely because this proved more expedient than moving the fingers back out of the line of travel of the turret parts when the turret head is rotating.

A bag rejection mechanism is associated with the stringing needles 108 so that if the needles fail to enter and pass through the bag hems, during the stringing strokes of the needles, or the string knotters fail to tie one or both knots, the improperly strung and/or knotted bag will not be gripped and delivered to the bag hopper 111 but will be dropped onto a curved baffle plate 301 (see Figure 4) and thence passed out of the machine, as presently described. The needles are inspected or tested by means of a vertically disposed contact member 220 formed with four downwardly depending, spring metal fingers 220', secured to the inner end of a gooseneck 221 which is pivoted to a bracket 222 on the top frame plate 109, as shown in Figures 1, 5 and 5a. The four fingers 220' are bent and flared, as at 223, to form two restricted contact points 224 which fit over and in snug sliding engagement with the needles to make metal to metal contact therewith, during the rocking of the gooseneck 221, if one or both of the needles fail to enter the hems. The gooseneck is pivotally connected as at 225, to one end of a horizontally disposed rod 226 which in turn is pivoted to the upper end of a vertically disposed lever 227, pivoted intermediate its ends to the frame (see Figures 1, 5a and 8). A cam roller 228, carried by the lever 227, rides on the periphery 229 of the cam 143, mounted on the main longitudinal drive shaft 23. Rotation of the cam 143 rocks the gooseneck 221 and the contact fingers 220' downwardly into testing position relative to the needles, while the latter have been extended through the hems on their forward stroke, and rocks the gooseneck to its normal elevated position, above and out of the path of travel of the needles, before the latter return through the hems.

A 220 volt-60 cycle operating solenoid 230 is mounted on the front of the machine frame and the vertically disposed armature or plunger 231 thereof is pivotally connected, as at 232, to the outer end of a downwardly and outwardly depending lever 233, formed on the collar 131 sleeved on the stub shaft 113, as best shown in Figures 4, 6, 7, 18 and 19. The lever 233 is normally retained in lowered position against a stop pin 233' on the frame 3 by means of a pull spring 233'', connected thereto and to the frame. The trip arm 130, which is carried by the collar 131, is thus disposed in the path of travel of the tail 117 of the delivering paddle gripping jaw 115. Thus when the paddle is rocked downwardly, in an arc, and the bag is properly strung and gripped by the paddle, the lower gripping jaw 115 is tripped and swung downwardly about its pivot, in a clockwise direction, viewing Figures 4, 18 and 19, so that the jaw 115 is moved out of gripping engagement with the top jaw 114 into expanded, open or cocked position and the bag is released therefrom and positioned in the hopper 111, as previously described.

In addition to the needle inspection and bag rejection mechanism, just described, a pair of

knot testers are provided for assuring that the knots, tied by the knotters, are properly formed. The knot testers, best shown in Figures 4 and 15, consist of a pair of upwardly and rearwardly extending, substantially flat plates 234, suitably mounted, as at 235, on the top of the frame on either side of the turret. The upper end of each of the plates 234 is curved or rounded and inset, as at 236, to provide a string receiving recess 237 which converges into a downwardly extending, angular slot 238, formed with an enlarged lower end 239. The lower end 241 of a smaller contact plate 240, the upper end of which corresponds substantially in shape with the upper end of the plate 234, is pivotally mounted on a cross pin 243, positioned in the recessed lower end of plate 234. The contact plate 240 is formed with a relatively short slot 244, overlying and aligned with the lower end of the angular slot 238, and a downwardly depending tail 245 is provided thereon. As the strings are knotted by the knotters 132—132' and the turret and bag grippers 60—62 are rotated from the vertical stringing to the horizontal bag removing and delivering station, the ends of the strings 110 are pulled into the recessed upper ends 237 of the plates 234 and slide downwardly through the angular slots 238 into the enlarged lower ends 239 thereof. If the knots have been properly formed in the strings, the continued movement of the turret and grippers, causes the strings and the knots thereon to be pulled or drawn through the openings 239. If the knots, being pulled or drawn through the openings, are loosely formed and oversized, the knots will be of larger diameter than that of the openings and will frictionally engage with the walls of and lodge in the openings. This lodging or sticking of the knots in the openings 239, necessarily increases the tension on the draw strings and results in an additional or supplemental desirable pull being exerted on the knots. Thus, the knots are caused to be uniformly drawn or tightened and properly described in size sufficiently to permit of the same passing freely through the openings. These bags are then delivered to the hopper 111.

Even after being uniformly tightened, during their passage through the openings 229, the knots will be larger than and will become lodged in the slots 244 of the small contact plates 240. The rotation of the turret and grippers results in a pull being exerted on the strings, so that the knot will bear against the inner face of and will swing the contact plate, about its pivot 243, against the tension of a suitable coil spring 246, arranged thereon, and as best shown in Figures 5 and 15. This lateral and inward swinging movement of the plate 240 moves the tail 245 thereof out of engagement with one of a pair of spring metal contacts 300, mounted on the top frame, as shown in Figure 4, and breaks the contact therewith and permits of the properly strung and knotted bag being delivered into the bag hopper 111, as hereinafter described. On the other hand, if the knotter 132, for example, has failed to tie the knot, the unknotted string 110 will loosely and freely pass through the opening 239 and slot 244, without moving the contact plate 240 or disturbing the contact between the tail 245 thereof and the metal contact 300. Thus, if the tail 245 of the knot tester contact plate 240 remains in contact with the metal contact 300, current flows through the bag rejection solenoid 230, as presently described, thereby raising the armature 231, from its normal depending Figure 18 position, to

its elevated Figure 19 position, which in turn lifts the lever 233 and moves the trip arm 130 upwardly so that the same will not act on the cam face 128, of the lower paddle gripping jaw 115 so as to cock or move the latter to fully expanded or open position. Therefore, as the bottom jaw 115 has not been actuated to open bag receiving position, the tail 117 thereof, upon the return of the paddle 112 to elevated bag engaging and gripping position, will not be arranged in the path of travel of and will not be engaged and tripped by the curved arm 118, and the bottom gripping jaw 115 will remain in closed position relative to the upper jaw 114. Thus, the improperly strung bag will be engaged by the closed gripping jaws 114—115 of the paddle 112, at the horizontal station of Figure 18, and the bag will be rejected. In other words, the gripping paddle 112 will simply bear against the top face of the horizontally disposed bag and will pull or kick the bag downwardly onto the curved baffle plate 301 (see Figure 4) and out of the machine, in a manner hereinafter more fully described.

A counting mechanism is also associated with the needle inspecting and knot testing mechanism, and the bag hopper 111, just described, so that only those bags which are properly strung and knotted are automatically counted as they are positioned in the bag hopper 111. The hopper is pivotally mounted on the shaft 247, mounted in the angle brackets 129' on the forward end of the machine frame, as hereinbefore referred to and as best shown in Figures 6 and 7. The underside of the hopper is pivotally connected, adjacent its inner end, to the upper end of a lever 249, pivoted at its lower end to the upper end of a vertically disposed armature or plunger 251 of a hopper solenoid 250, mounted on the front of the frame. Referring to Figures 10 and 18, the counting mechanism comprises a more or less conventional 25 point ratchet relay 252, purchased from the manufacturer and mounted on the panel of box 164 of the present machine, and equipped with a 220 volt operating coil 253 and a timer arm 254 carried by the transverse drive shaft 23, the operation of which will be presently described.

The electrical needle inspecting, knot testing and bag counting mechanism consists of the 220 volt line switch and the 220 to 6 volt transformer 162, a needle tester-interlocking relay 256, as best shown in Figure 10 mounted on the panel, previously mentioned, and equipped with a 6 volt operating coil 257 and a 6 volt reset coil 258, a knot tester interlocking relay 259, having a 6 volt operating coil 260 and a 6 volt reset coil 261, and the previously described needle tester fingers 220' and knot testers 234.

If the needles are not in the hems of the bag, the needle fingers 220' will become grounded on the needles, completing the 6 volt circuit, illustrated in Figure 10, from one side of the 6 volt winding of the transformer 162 through wires 262 and 263 to and through the operating coil 257, of the relay 256, and thence through wire 264 to the needle fingers to ground and thence through the frame of the machine back to the other side of the 6 volt winding of the transformer 162. Thus, current flows through the coil 257 which opens the contacts 265, of the knot tester relay 256, and closes the contacts 266 thereof. The closing of the contacts 266 completes the circuit from one side of the 220 volt line through wires 267 and 268 and contacts 266, and wires 269 and 270 to the bag rejection solenoid 230,

thence through a wire 271 back to the other side of the 220 volt line. This allows current to flow through the bag rejection solenoid 230 thus raising the armature 231, see Figure 7, which in turn lifts the lever 233 and moves the trip arm 130 upwardly so that the same will not be engaged by the cam face 128, of the lower paddle gripping jaw 115. Therefore the gripping jaw 115 is not moved to fully open or expanded bag receiving position and the bag is not thereafter gripped by the delivering paddle jaws 114—115, during the movement of the gripper from the vertical stringing to the horizontal delivering stations. Consequently upon resumption of the paddle movement, the bag released or freed by the opening of the grippers 60—62, instead of being delivered into the hopper, will be moved downwardly by the paddle 112 or dropped partly by gravity from the opened hem gripping jaws 60—62 onto the curved baffle plate 301, Figure 4, and thence passed out of the machine. In other words, the improperly strung bag is rejected by the machine, and the opening of contacts 265 prevents the rejected bag from being counted as presently described. The tail 117 of clamping jaw 115 engages the trip member 130 on each working stroke regardless of whether the clamp or jaw 115 is or is not gripping a bag. The extent of throw or swing of the paddle 112, is always the same, that is, of sufficient length to permit of the paddle discharging a bag, assuming the clamp 115 has closed on one. However, in the event the next or succeeding bag, then at the stringing and knotting station, has not been properly strung or the draw string properly knotted, that bag will be rejected, that is, will be deposited upon the baffle plate 301, instead of being gripped by the clamp jaw 115. At the same time the trip 130 will be swung to the left so that only the end of tail 117 of clamp or jaw 115 will engage the trip. Consequently the movement of jaw 115 will only be sufficient to relieve the pressure on the clamped bag to release the same at the end of the working stroke but not sufficient to fully open the jaw 115. Therefore after the perfect bag has been deposited in the hopper 111, the paddle member returns to bag receiving position but of course on its next working stroke, instead of picking up another bag it will merely aid in disposing of the defective or improperly strung or knotted bag. The detecting circuits are now reset automatically, and the trip 130 will have been moved to the normal position in which the cam portion 128 rides over the trip and moves the jaw 115 to fully open or bag receiving position. The empty paddle and its jaw 115 will receive and clamp the next succeeding bag at the horizontal station on its next working stroke assuming of course that the bag detecting circuits have not again been closed in the manner previously described.

By referring to the diagram, shown in Figure 10, it will be noted that contacts 272 on the knot tester relay 259 perform the same function as contacts 266 on the needle tester relay 256. That is, the bag is rejected, when a knot has not been tied, by completing the circuit through wires 270 and 271, as explained above. However where the strings have been properly knotted or loosely knotted and later tightened, the knot tester plates 240 will be swung about their pivots by the action of the knots lodged in the slots 244 thereof. This completes the circuit from one side of the 6 volt transformer 162, through the wires 262, 273, 274 and 275 to the operating coil 260

of the knot tester relay 259. The operating coil 260 is connected through wires 276 and 277 to the two knot tester contacts 300 and thence to the ground and through the frame of the machine back to the other side of the 6 volt transformer 162. This allows current to flow through operating coil 260 which opens the contacts 272 and closes contacts 278. Upon the opening of contacts 278, the bag is counted, provided it is not rejected, as presently described. If either or both of the knots are missing, the 6 volt circuit will not be completed through the knot tester plates 240 and the bag will be rejected and consequently not counted. After this action has taken place, the contact arm 254, carried by the end of the transverse drive shaft 23 and rotating therewith, closes a contact 280, which completes the circuit from one side of the 6 volt winding of the transformer 162, through the wires 262, 273, 274 and 281 to the reset coil 258 of the needle tester relay. The relay is connected through wires 282 and 283 to contact 280 and ground, and then through the machine frame back to the other side of the 6 volt winding of the transformer 162. This also completes the circuit from one side of the 6 volt winding of the transformer by means of wires 262, 273 and 284 to the reset coil 261 of knot tester relay 259, and through wires 285 and 283 to contact 280 and ground, and thence through the machine frame back to the other side of the 6 volt winding of the transformer 162. Current thereby flows through reset coils 258 and 261 which resets the interlocking relays 256 and 258, respectively, for another cycle of the machine.

The 25 point counting ratchet relay 252, as particularly shown in Figure 21, advances one point or step for each revolution of the machine, providing contacts 265 and 272, on the needle tester and knot tester relays 256 and 259, respectively, are closed which, as explained above, will occur if a properly strung and knotted bag has been produced. This is accomplished by the closing of a contact 286 by the contact arm 254, on the transverse shaft 23, once for each revolution of the machine. The closing of contact 286 completes the circuit, from one side of the 220 volt line through wires 287 and 288 to contacts 278, on knotter tester relay 259, and thence through wire 289 to contacts 265, on needle tester relay 256. The contacts 265 are connected by wire 290 with contacts 286, and by wire 291 to the operating coil 253 of the ratchet relay 252. Wires 292 and 293 connect the operating coil 253 to the other side of the 220 volt line, allowing current to flow through the operating coil 253, which steps up the ratchet 252 one point, in an obvious manner. That is to say, when the coil 253 is energized, the armature or plunger 310 is pulled inwardly against the tension of the coil spring 311, as shown in Figures 10 and 21. This armature, being loosely connected to the lower end of an arm 312 which is journaled on the shaft 313, on which the ratchet 252 is mounted, inward movement of the armature 310 causes the arm 312 to be moved in a corresponding direction, as best shown in Figure 21. At the same time a pawl 314, pivoted at 315 to the arm 312, will be moved in an anticlockwise direction viewing Figure 21, into cocked position or into engagement with the next succeeding tooth on ratchet 252, against the tension of spring 311. A small coil spring 316 serves to maintain the pawl 314 in engagement with the ratchet 252, the ratchet being prevented from rotating in an anti-clockwise direction by

a keeper pawl 317, pivoted to the panel 164, as at 318. After the contact 286 has been broken, the armature 310 will be pulled outwardly on its working stroke, by the action of spring 311, to cause pawl 314 to advance one step or notch. This movement is limited by a stop member 319, mounted on the panel, which is engaged by the actuating pawl 314, upon completion of the working stroke. This cycle is automatically repeated for each properly strung bag delivered into the hopper 111. On the twenty-fifth step, the contact arm 294 on the ratchet relay 252 makes contact with the contact 295 thereon and completes the circuit from one side of the 220 volt line, through wires 287 and 296 to contact 295, thence through wire 297 to the bag hopper solenoid 250, and through conduits 298 and 293 back to the other side of the 220 volt line. Current thus flows through the hopper solenoid coil 250 which actuates the armature 251 thereof and pulls or tips the inner end of the bag hopper 111 downwardly momentarily, through the link 249, so that the top edge of the twenty-fifth bag, delivered into the hopper, will extend above the tops of the other bags, as best shown in Figure 7, whereupon the hopper moves back to its normal, substantially horizontal plane.

Having thus described my invention what I claim is:

1. A machine for stringing bags received wrong side out from the sewing stage, comprising gripping means, a bag feeder for feeding hemmed bags into the gripping means, means on said feeder engageable with the hems for opening the hemmed mouth of the bag, and additional gripping means for gripping the opened mouth of the bag, and turning means movably mounted on the frame and movable relative to said feeder and said first mentioned gripping means for engaging the bag and moving the closed end through the open mouth thereof, and means for inserting draw strings in the hems of said bags after reversal and while gripped by said first mentioned gripping means.

2. A machine for stringing bags received wrong side out from the sewing stage, comprising gripping means, a horizontally disposed bag feeder for feeding hemmed bags horizontally into the gripping means on said bag holder, a pair of fingers movably mounted on said feeder adapted to extend into the hems of and open the mouth of a bag, and additional gripping means for gripping the bag and holding the same momentarily in open position, and a turning member movably mounted on the frame and movable relative to said feeder and said first mentioned gripping means for engaging the bag and moving the closed end through the open mouth thereof, and means for inserting draw strings in the hems of said bags after reversal and while gripped by said first mentioned gripping means.

3. In a bag stringing machine of the character described including a frame, comprising a bag holder having rotatable gripping jaws thereon, a bag feeder for feeding hemmed bags into said gripping jaws, means for moving said jaws into gripping engagement with the hems of a bag, a pair of fingers movably mounted on said feeder adapted to extend into the hems of and open the mouth of the bag gripped by said gripping jaws, and a gripping member movably mounted on said feeder and cooperating with one of said fingers for gripping and holding the hems thereon, and a turning member movably mounted on the frame and movable relative to said feeder

and gripping jaws for engaging the bag and moving the closed end through the open mouth thereof, and means for rotating said gripping jaws to positions on the inside of the turned bag, preliminary to stringing the bag.

4. In a bag stringing machine of the character described including a frame, comprising a bag holder having pairs of rotatable bag gripping jaws thereon, a feeder for feeding hemmed bags into said gripping jaws, means for moving said jaws substantially vertically into gripping engagement with the hems of a bag, a pair of fingers pivotally mounted on said feeder adapted to extend into the hems of the bag and means for rocking said fingers in opposing directions to open the mouth of the bag, a gripping member pivotally mounted on said feeder and cooperating with the upper one of said fingers for gripping the top hem, and gripping means cooperating with the bottom finger for gripping the bottom hem whereby said hems are held on said fingers, a turning member movably mounted on said frame and movable relative to said feeder and gripping jaws for engaging the bag and moving the closed end through the open mouth thereof, and means for rotating said closed gripping jaws to positions on the inside of the turned bag, preliminary to stringing the bag.

5. In a bag stringing machine of the character described including a frame, comprising a rotatable bag holder having pairs of sleeved tubular members rotatably mounted thereon, pairs of gripping jaws on one end of said tubular members for gripping the hems and supporting a bag for stringing, a bag feeder for feeding hemmed bags into said gripping jaws, means engageable with one end of said tubular members for moving said tubular members and said jaws to closed gripping position on the ends of the bag hems for substantially horizontally supporting the bag, a turner member movably mounted on the frame and movable relative to said feeder and gripping jaws for engaging the bag and moving the closed end through the open mouth thereof, and slidable means engageable with said tubular members for rotating the closed gripping jaws to positions on the inside of the turned bag, preliminary to stringing the bag.

6. In a bag stringing machine of the character described including a frame, comprising a rotatable bag holder having pairs of sleeved tubular members rotatably mounted thereon, pairs of gripping jaws on one end of said tubular members for gripping the hems and supporting a bag for stringing, a substantially horizontally disposed bag feeder for feeding hemmed bags horizontally into said gripping jaws, cam means mounted adjacent said bag holder, pivotally mounted means associated with said cam means and engageable with one end of said tubular members for moving the tubular members and said jaws to closed gripping position on the ends of the bag hems, a turner member movably mounted on the frame and movable relative to said feeder and gripping jaws for engaging the bag and moving the closed end through the open mouth thereof, and slidable means mounted in said cam means and engageable with said tubular members for rotating the closed gripping jaws to positions on the inside of the turned bag, preliminary to stringing the bag.

7. In a bag stringing machine of the character described including a frame, comprising a rotatable bag holder having pairs of sleeved tubular members rotatably mounted thereon, pairs of

gripping jaws on one end of said tubular members for gripping the hems and supporting a bag for stringing, a substantially horizontally disposed feeder for feeding hemmed bags horizontally into said gripping jaws, cam plates rotatably mounted adjacent said bag holder, and means for rotating said cam plates, pivotally mounted arm members associated with said cam plates and engageable with one end of said tubular members for moving the tubular members vertically to closed gripping position on the ends of the bag hems, a turner member movably mounted on the frame and movable relative to said feeder and gripping jaws for engaging the bag and moving the closed end through the open mouth thereof, and rack bars slidably mounted in said cam plates and engageable with said tubular members for rotating the closed gripping jaws to positions on the inside of the turned bag, preliminary to stringing the bag.

8. In a bag stringing machine of the character described comprising a frame having gripping and supporting means thereon, means for feeding hemmed bags into said gripping and supporting means, means for opening the hemmed mouth of the bag, and means for turning the bag right side out preliminary to stringing the same, a pair of stringing needles for stringing the turned bag hems while the bag is supported by said gripping and supporting means, knotters for knotting the strings, and means associated with said knotters for uniformly tightening the knots formed by the knotters.

9. In a bag stringing machine of the character described including a frame, having gripping means thereon, a horizontally disposed feeder for feeding hemmed bags into said gripping means, means on said feeder engageable with the hems for opening the hemmed mouth of the bag, turning means movably mounted on said frame and movable relative to said gripping means for engaging the bag and moving the closed end through the open mouth thereof preliminary to stringing the same, a pair of stringing needles for stringing the turned bag hems, a pair of knotters for knotting the strings, and means mounted adjacent said knotters and engageable with said strings and knots for uniformly tightening the latter.

10. In a bag stringing machine of the character described including a frame, having gripping means thereon, a bag feeder for feeding hemmed bags into said gripping means, means on said feeder engageable with the hems for opening the hemmed mouth of the bag, turning means movably mounted on said frame and movable relative to said gripping means for engaging the bag and moving the closed end through the open mouth thereof preliminary to stringing the same, a pair of stringing needles for stringing the turned bag hems while gripped by said gripping means, and members mounted adjacent said knotters having string receiving openings therein whereby the knotted strings will be passed therethrough for uniformly tightening the knots.

11. In a bag stringing machine of the character described including a frame, comprising a bag holder having gripping means thereon, a horizontally disposed bag feeder for feeding hemmed bags into said gripping means, means on said feeder engageable with the hems for opening the hemmed mouth of the bag, turning means movably mounted on said frame and movable relative to said bag holder and gripping means for engaging the bag and moving the closed end through

the open mouth thereof preliminary to stringing the same, a pair of stringing needles for stringing the turned bag hems, knotters for knotting the strings, and plate members fixed on said frame below and spaced from the knotters and having string receiving slots therein adapted to receive the knotted strings whereby the latter will be drawn therethrough and the knots thereon uniformly tightened.

12. A machine for stringing bags received wrong side out from the sewing stage, comprising a bag holder having gripping means thereon, means for feeding hemmed bags into said gripping means, means for opening the hemmed mouth of the bag, and means for turning the bag right side out preliminary to stringing the same, stringing needles for stringing the turned bag hems after the bag has been turned by said turning means and while supported by said gripping means, knotters for knotting the strings, and means associated with said feeding, gripping, turning and knotting means acting to automatically stop the machine upon failure of a bag to be properly fed, gripped, turned and knotted by said respective feeding, gripping, turning and knotting means.

13. In a bag stringing machine of the character described, comprising a bag holder having gripping means thereon, means for feeding hemmed bags into said gripping means, means for opening the hemmed mouth of the bag, and means for turning the bag right side out preliminary to stringing the same, stringing needles for stringing the turned bag hems, knotters for knotting the strings, a bag receiving receptacle, and means for removing the turned and strung bag from said gripping means and delivering the same into said bag receptacle, and means associated with said stringing needles and knotters acting to automatically remove an improperly strung or knotted bag from the machine, and means associated with said bag removing means for counting the properly strung and knotted bags being delivered to the bag receptacle.

14. A machine for stringing bags received wrong side out from the sewing stage, comprising a bag holder having gripping means thereon, a horizontally disposed bag feeder for feeding hemmed bags into said gripping means, means on said feeder engageable with the hems for opening the mouth of the bag, turning means movably mounted on the frame and movable relative to said bag holder and gripping means for engaging the bag and moving the closed end through the open mouth thereof preliminary to stringing the same, stringing needles for stringing the turned bag hems of said bags after reversal and while supported by said gripping means, knotters for knotting said strings, electrical actuated stopping means and contacts associated with the feeder, turning means, gripping means and knotters and in circuit with the stopping means acting to automatically stop the machine upon failure of a bag to be properly fed, gripped, turned and knotted by said respective feeding, gripping, turning and knotting means.

15. In a bag stringing machine of the character described, comprising a bag holder having gripping means thereon, means for feeding hemmed bags into said gripping means, means for opening the hemmed mouth of the bag, and means for turning the bag right side out preliminary to stringing the same, stringing needles for stringing the turned bag hems, knotters for knotting the strings, a bag receiving receptacle, and gripping

means movably mounted adjacent said bag holder for gripping and removing the strung bag from the bag holder gripping means and delivering the same into said bag receptacle, and electrical actuated means associated with said stringing needles and knotters acting to automatically remove an improperly strung or knotted bag from the machine, and electrical actuated means associated with said bag removing means and said bag receptacle for counting the properly strung and knotted bags being delivered to the bag receptacle.

16. In a bag stringing machine of the character described including a frame, comprising a bag holder having gripping means thereon, a horizontally disposed bag feeder for feeding hemmed bags into said gripping means, means on said feeder engageable with the hems for opening the hemmed mouth of the bag, turning means movably mounted on said frame and movable relative to said bag holder and gripping means for engaging the bag and moving the closed end through the open mouth thereof preliminary to stringing the same, a pair of stringing needles for stringing the turned bag hems, knotters for knotting the strings, and members mounted adjacent said knotters having string receiving openings therein whereby the knotted strings will be passed therethrough for uniformly tightening the knots and means associated with said members for automatically rejecting an unknotted bag from the machine.

17. In a bag stringing machine of the character described including a frame, comprising a bag holder having gripping means thereon, a bag feeder for feeding hemmed bags into said gripping means, means on said feeder engageable with the hems for opening the hemmed mouth of the bag, turning means movably mounted on said frame and movable relative to said bag holder and gripping means for engaging the bag and moving the closed end through the open mouth thereof preliminary to stringing the same, a pair of stringing needles for stringing the turned bag hems, knotters for knotting the strings, and members mounted adjacent said knotters having string receiving openings therein whereby the knotted strings will be passed therethrough for uniformly tightening the knots and means movably mounted on said members for receiving the knotted strings being passed therethrough, and electrical actuated means associated with said means for automatically rejecting an unknotted bag from the machine.

18. In a bag stringing machine of the character described including a frame, comprising a bag holder having gripping means thereon, means for feeding hemmed bags into said gripping means, means for opening the hemmed mouth of the bag, and means for turning the bag right side out preliminary to stringing the same, stringing needles for stringing the turned bag hems, knotters for knotting the strings, a bag receiving receptacle pivotally mounted on the frame, and pivotally mounted gripping means for removing the turned and strung bag from said gripping means and delivering the same into said bag receptacle, and electrical actuated means associated with said stringing needles and knotters acting to actuate the bag delivering gripping means whereby the latter will fail to grip and will reject an improperly strung or knotted bag from the machine, and electrical actuated counting means for automatically moving said bag hopper and counting the properly strung and knotted bags being positioned therein.

19. A bag stringing machine of the character described having bag gripping and supporting means, a bag feeder for feeding hemmed bags into said gripping and supporting means, means for opening the hemmed mouth of the bag, a second gripping means for gripping the opened mouth of the bag, turning means for engaging the bag and moving the closed end through the mouth thereof, and means for inserting draw strings in the hems of said bags after reversal and while gripped by said first mentioned gripping and supporting means.

20. A machine for stringing bags received wrong side out in chain formation from the sewing stage, having bag gripping and supporting means, a bag feeder for advancing successive bags to said bag gripping and supporting means, means for severing the foremost bag of the chain from those following it, means engageable with the hem for opening the hemmed mouth of the bag, a second gripping means for gripping the opened mouth of the bag, turning means for engaging the bag and moving the closed end through the open mouth thereof while the opened mouth of the bag is gripped by said gripping means, and means for inserting draw strings in the hems of said bags after reversal and while gripped and supported by said first mentioned bag gripping and supporting means.

21. A machine for stringing bags received wrong side out in chain formation from the sewing stage having bag gripping and supporting means, a bag feeder for advancing successive bags to said gripping and supporting means, means for severing the foremost bag of the chain from those following it, means for opening the hemmed mouth of the bag, turning means movable in the direction of the bag feeding movement of said feeder for engaging the bag and pushing the closed end through the open mouth thereof and means for inserting draw strings in the hems of said bags after reversal and while gripped by said gripping and supporting means.

22. A bag stringing machine of the character described having bag gripping and supporting means, a reciprocating bag feeder for feeding hemmed bags to said gripping and supporting means, turning means movable in substantially the direction of the bag feeding movement of said feeder for engaging the bag and pushing the closed end of the bag through the mouth thereof, and means for inserting draw strings in the hems of said bags after reversal and while gripped by said gripping and supporting means.

23. The method of stringing hemmed bags comprising feeding a bag, then gripping the bag, then moving the closed end of the bag through the mouth thereof to turn the bag right side out preliminary to stringing the same, then stringing the hems of the bag right side out.

24. The method of stringing hemmed bags comprising feeding a bag, then gripping the hems thereof, then opening the end of the bag, then moving the closed end of the bag through the open mouth thereof to turn the bag right side out preliminary to stringing the same, then stringing the hems of the bag right side out, then knotting the strings of the bag, and then removing the completed bag and delivering the same and counting the properly completed bags so delivered.

25. The method of stringing hemmed bags comprising feeding a bag, then gripping the bag, then moving the closed end of the bag through

the open mouth thereof to turn the bag right side out preliminary to stringing the same, then stringing the hems of the bags right side out, then knotting the strings of the bag, then during the steps of completing the bags removing any improperly fed, gripped, turned, strung or knotted bag and then removing the completed bags and delivering the same and counting the properly completed bags so delivered.

26. The method of stringing hemmed bags comprising feeding a bag, then gripping the bag, then moving the closed end of the bag through the mouth thereof to turn the bag right side out preliminary to stringing the same, then stringing the hems of the bag right side out, then knotting the strings of the bag, and then removing the completed bag and delivering the same.

27. A machine of the character described comprising gripping jaws rotatable to a position within the mouth of a hemmed bag to support the bag during turning and stringing, means for feeding hemmed bags to said gripping jaws, and electrical means associated with said gripping jaws acting to automatically stop the machine upon the failure of said grippers to be rotated to said position within the mouth of the bag.

28. A machine for stringing bags having hems

at their mouth ends, rotatable hem gripping jaws adapted to grip the hems of a bag for supporting the bags during turning and stringing, means for feeding a hemmed bag to said gripping jaws, means for rotating the jaws to a position within the mouth of the bag while gripping the hemmed bag to facilitate the turning of the bag right side out, and means associated with said gripping jaws acting to automatically stop the machine upon the failure of the grippers to be rotated to said position within the mouth of the bag.

29. A bag stringing machine of the character described comprising bag gripping and supporting means, a bag feeder for feeding hemmed bags into said gripping and supporting means, means on said feeder engageable with the hems for opening the hemmed mouth of the bag, a second gripping means for gripping the opened mouth of the bag, turning means movable relative to said feeder and said first mentioned gripping and supporting means for engaging the bag and moving the closed end through the open mouth thereof, and means for inserting draw strings in the hems of said bags after reversal and while gripped by said first mentioned gripping and supporting means.

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