The present invention relates to a machine for automatically stringing plastic bags for produce and the like, which constitutes an improvement over the machines of Edward E. West patents, Nos. 2,511,658—June 13, 1950, and 2,727,477—December 20, 1955.

The machines of the aforesaid patents accomplished the stringing of open mesh type bags automatically as distinguished from the old hand methods. In view of the open mesh nature of the bags strung on these machines, it was necessary to pleat or corrugate the mouths thereof and to deliver draw strings through the pleated mouths to permit of the latter to be opened and closed. While these machines have very satisfactorily strung open mesh type bags, this particular bag has largely been supplanted by polyethylene and other plastic bags which are provided with hemmed mouths and consequently necessitate the insertion of the draw strings through the hems thereof. For this reason, the present machine was designed to enable the stringing of plastic hemmed bags.

It is, therefore, the principal object of the present invention to provide a novel and improved automatic machine for uniformly stringing plastic hemmed bags.

Another object is the provision of an automatic machine having a turret head with a series of radially extending bag supporting members for supporting plastic hemmed bags during insertion of and knotting of the draw strings.

A still further object is to provide a novel needle construction having means associated therewith for clamping a draw string and directing blasts of air into the ends of the bag hems for expanding the latter to enable the free passage of the needles through the hems.

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

FIGURE 1 is a front elevation of the complete bag stringing machine;

FIGURE 2 is a front elevation of the turret head, showing the relative positions assumed by the bag supporting members during the various operations;

FIGURE 3 is a section on the line 3—3 of FIGURE 2, showing a portion of the cam and associated mechanism for actuating the bag supporting members;

FIGURE 4 is a side elevation of one of the bag supporting members;

FIGURE 5 is a section through one of the bag supporting members showing the bag assembled thereon and the relative positions of the stringing needles;

FIGURE 6 is a side elevation of the bag stringing mechanism and operating mechanism therefor;

FIGURE 7 is a section through the needle saddle;

FIGURE 8 is a section through the needles;

FIGURE 9 is a front elevation of plastic hemmed bag strung on this machine;

FIGURE 10 is a perspective view of the hemmed mouth of a bag after stringing and knotting;

FIGURE 11 is a section through the bag on the line 11—11 of FIGURE 10;

FIGURE 12 is a plan view of a portion of the machine, showing the string feeding mechanism; and

FIGURE 13 is a side elevation of the string supply and associated mechanism.

Prior to considering the structural details of the machine, the general operation thereof will be generally discussed. The open hemmed mouth of a polyethylene bag is manually placed over the horizontally disposed extending series of adjustable bag supporting members of a rotating turret head having four series of radially extending bag supporting members, the bag supporting members are moved inwardly and laterally adjacent one another to enable the bag to be positioned thereon and are, thereafter, expanded to retain the bag thereon, the turret head is rotated ninety degrees to carry the bag to a downwardly extending vertical position where the hemmed mouth is opened by air pressure from the needles and prior to and during the forward passage of the needles through the bag hems to receive and grip a string fed thereinto, and the needles are thereafter retraced through the hems to carry the string therethrough, the ends of the string are then knotted; and a further ninety degree rotation of the turret delivers the strung and knotted bag to a horizontal rearwardly extending position where the bag is removed and stacked.

As this bag stringing machine generally applies the same general design and functions in the same general manner as the machines of previously mentioned West Patents 2,511,658 and 2,727,477, it is not believed necessary to give a detailed description of the specific construction and operation of the present machine. However, it should be noted that the aforesaid West patents relate to machines for stringing and knotting open mesh type fabric bags, whereas the method of this invention has been revised and so improved that it will accommodate, string and knot plastic bags having preformed hems in the mouth ends thereof. In the machines of the West patents, an unhemmed bag was positioned on the horizontally disposed bag holding arms of the turret head, with the arms being slightly collapsed to receive the bag, and a ninety degree rotation of the turret delivers the arms and bag to the downwardly depending vertical stringing action, at which time the arms were further collapsed or moved inwardly to enable fingers to move between the arms to pleat the mouth of the netted bag arranged thereon. The stringing needles were then caused to pass through the pleated bag mouth so as to pick up a string and retrace the same through the pleated mouth to enable the ends of the string to be thereby knotted. Upon a further ninety degree movement of the turret to a rearwardly extending horizontal position, the pleating fingers are rocked out of engagement with the bag and bag holding arms are moved to partially open or extended positions so that the strung bag is somewhat loosely supported thereon and the strung bag is removed therefrom and stacked. After removal of the bag from the arms, a further ninety degree rotation of the said arms to a vertical extending position causes the arms to be moved to their fully extended or expanded position. This cycle thereafter continues, with it being apparent that while one bag is being positioned on one set of turret arms, the preceding two bags are being removed from and strung on their respective turret arms. In other words, the upright turret arms are the only ones not handling a bag.

Inasmuch as the present machine is intended to handle prehemmed and preformed plastic bags, the four pairs of bag holding arms of the turret head are not equipped with pleating fingers and are so mounted that they are partially collapsed at the horizontally forwardly extending bag receiving station to enable a previously hemmed bag to be inserted thereon, after which a ninety degree rotation of the turret moves the arms with a bag thereon to the downwardly depending stringing station, during which travel, the arms are moved to fully expanded position so as to stretch and retain the bag thereon. After the hemmed mouth is strung at the downwardly depending station, the arms with the strung bag thereon are moved to the rearwardly extending horizontal position and the arms are again partially collapsed to release their stretch-
ing engagement with the bag and permit the latter to be removed therefrom and stacked. A further ninety degree rotation of the turret moves the arms to a vertical idler or unbagged position, with the arms still being in the partially collapsed position they were in at the bag removing station. Thus, as the cycle continues, the unbagged arms are in position to receive another bag when they reach the forwardly extending horizontal bag feeding station.

As the general arrangement, construction and driving mechanism for the present bag stringing machine is substantially the same as that shown in the previously mentioned West patents, it is not considered necessary to fully illustrate and describe the same.

Referring more particularly to the drawings, wherein like reference characters designate similar parts throughout the several views, the numeral 1 denotes a main frame mounted on a base 2, and comprising two spaced vertical cam boxes 3 and 4, the latter of which is divided by a wall into two cam compartments. Extending longitudinally through and suitably journaled in the cam box 4 is a main drive shaft 8 which is driven through the usual drive connections by an electric motor on the frame. Extending transversely through and suitably journaled in the spaced cam boxes 3 and 4 is a horizontal driven shaft 19 which is arranged above and at right angles to the main driven shaft 8. The horizontal shaft 19 is drivenly connected by gearing and the like with the main driven shaft 8.

Just as in the machines of the West patents, the present apparatus is provided with a rotating turret head 22 having four radially extending series of expandable bag supporting members for receiving preselected, preformed and hemmed plastic bags in a horizontal position and for intermediately rotating the bags to a downwardly depending vertical stringing position, thence to a horizontal rearwardly extending horizontal position where the strong bags are removed from the head and delivered into a stacking hopper, and thence to an upwardly extending vertical idle position, after which the head is further rotated to return the bag supporting members to the first mentioned horizontal bag receiving station in position to receive another bag for stringing. It will, of course, be understood from the following description that while one bag is being positioned by an operator on the turret head, the preceding bags are simultaneously being stringing and removed therefrom, so that the turret head simultaneously accommodates three hemmed plastic bags for the purposes hereinafter set forth.

The rotating bag holding turret head 22 is mounted on a horizontal shaft 8, suitably journaled in the spaced walls 24 and 25 of the cam box 4 and projecting laterally from the wall 24 adjacent the upper end thereof, and the extended end of shaft 23 is journaled in the upper end of an upwardly extending bracket 26 mounted on the upper end of cam box 3. The bag holding turret head comprises two spaced annular plates or discs 28-28' carrying a series of radially extending groups of removable bag supporting fingers 29. Each group generally consists of four fingers 29a, 29b, 29c and 29d and a stationary finger 29e, although depending on the size or width of the bag being positioned thereon, only three fingers may be arranged thereon. Each of the four fingers of the four spaced groups thereof is removably connected to T-shaped carrying blocks 30 sleeved on four pairs of spaced rods 36 extending transversely between and suitably secured by nuts 37 to the turret head plates 28-28'. The blocks 30, carrying the stationary fingers 29e, adjacent plate 28', are bolted thereto so as to be fixedly mounted on the rods 36, and the remaining four blocks of each group are slantly arranged thereon. As each group of bag supporting fingers and their supporting and operating mechanism is substantially the same, it is necessary to describe only one group thereof. Thus, one end of one of a series of four rods 39 is threadedly connected, as at 40, to the third block 30, that is, the block adjacent the one fixed to the inner side of plate 28', may point intermediate the base portion thereof, and the rod 39 is sleeved through aligned bores in the base portions of the remaining two blocks 30. The outer end of each of the rods 39 project through plate 28, and carries a cam roller 44 which is seated in a relatively wide cam groove 45 formed in the annulus of a cam 45 carried by shaft 19.

The cam 45 is bolted to the upper end of bracket 26 so that the turret head rotates relative to the stationary cam 45.

The curvature of the cam groove is such that, during rotation of the turret head, the rods 39 reciprocate through the plate 28 so as to move the slantly arranged blocks and supporting fingers 29 toward the fixed blocks and supporting fingers 29a and 29c. The movement of the blocks and bag supporting fingers 29 is effected by a series of interconnected pivoted X-shaped toggle links 46. The latter intersect or cross one another and are pivoted together at their points of intersection and to the underside of each of the blocks in the center thereof by pins 49 extending from the blocks. The outer ends of the links 46 are pivoted together, as at 50, as the turret head rotates to the block carrying finger 29c, a sliding movement of the rod 39, under the cam 45, will push the block and, the interconnection of the blocks, will cause the latter with their supporting fingers to be moved from the spaced partially collapsed bag feeding position to the spaced fully extended or expanded vertical bag gripping and stringing position. In other words, the interconnecting links 46 constitute a pantograph or toggle to move the blocks and bag supporting fingers toward and away from each other.

As best shown in FIGURE 2, each of the bag supporting fingers 29 consists of an elongated finger having relatively flat top and bottom surfaces engaging end portions 52. The flat faces of the fingers 29 are curved inwardly, as at 53, adjacent the base thereof to provide curved needle receiving grooves or openings to permit passage of the stringing needles therethrough.

The bag holding turret head is intermittently rotated to carry the bag holding members to the various stations by means of a Geneva mechanism which generally approximates that shown and described in the aforesaid West patents. Each step by step movement imparted to the Geneva gear causes the turret head to rotate one quarter of a revolution thus moving the first bag receiving members 29 from a horizontal to a downwardly depending or vertical stringing position, thence to a horizontal delivery station, and finally to an upwardly extending vertical or idle position.

A polyethylene or other transparent plastic preformed and hemmed bag 300, shown in FIGURES 9 and 10, is positioned on the turret head by the machine operator grasping the same and inserting the open hemmed mouth thereof over the horizontally disposed bag supporting fingers 29 and pushing the same therealong until the bag abuts metal stops on the blocks. As the bag supporting fingers 29 are in their partially collapsed position when the bag is sealed thereover, the bag will be more or less loosely positioned thereon. The ends of the bag hems 301 are apertured, as at 302, to provide openings for the entry and passage of the needles therethrough.

The bag holding turret head is provided with their operating mechanism which are particularly shown and described in Edward E. West Tobacco Bag Stringing, Patents Reissue 22,596; 2,567,986; 2,486,350 and the previously mentioned West Patents 2,511,658 and 2,727,477 on Bag Stringing Ma-
machines, are provided with a draw string and operated in generally the same manner and by the same mechanism disclosed in the foregoing patents and, therefore, detailed drawings and description of the individual parts will be dispensed with. However, the needle mechanism has been revised in the present machine, as hereinafter indicated, so that hemmed plastic bags may be strung thereby. The needles comprise pointed Shank members 81 reciprocantly mounted in tubular sleeve members 82 for opening and closing the needle parts 83 formed by the ends 84 of the sleeves and the rear faces 86 of the pointed ends 85 of the pair of needles 81, and clamping the ends of a draw string 118 therein. The shanks 81 are hollow to provide conduits or air flow passages 81’ extending longitudinally therethrough, which conduits 81’ extend into the pointed ends 85 thereof and thence diverge angularly, forwardly and inwardly, as at 81’, and open into the side walls of the ends, intermediate the pointed tips and rear faces 86 thereof. In other words, as best shown in FIGURE 8, the angularly disposed passages 81” in the two needles extend inwardly and forwardly in opposing directions for a purpose to be hereinafter described. The needles are rigidly supported at their rear ends by and are fixed in a needle saddle 89 suitably secured to the top of a needle carriage 90. The needle carriage is provided with laterally extending side flanges 91 which interfit in grooves 93 (see FIGURE 7) formed in a pair of sliding movement relative thereto. Blocks 96 are suitably secured to supporting brackets 95 carried by the cam box walls 24 and 25. The rear ends of the pointed shank members project rearwardly through and are fixed in a small block 96, suitably mounted on the carriage 90 for sliding movement relative thereto. Block 96 is suitably engaged against the tension of springs 97 mounted on posts 98 by means of a small cam 99 carried by one arm 101 of a crank 100. The arm 101 is rotatably mounted in a block 102 mounted on the needle carriage 90. The other arm of crank 100 carries arm 104 periodically actuated by a horizontally disposed arm 105 which is pivotally mounted on the top plate 94 by links 106—106’ so that the arm is vertically moveable relative to the plate. The needle carriage is reciprocated back and forth by the action of a suitably acted arm 107, in turn pivoted to one end of the rear end of the carriage block 102, and the other end of the arm 107 is pivoted to the upper end of a vertically disposed lever 108 which is pivotally mounted at its lower end, at 109, to the machine frame. A cam roller 110 is mounted on the lever 108 and rides in a cam groove 112 mounted on the side face of a cam 115 mounted on the main longitudinal driven shaft 8. The curvature of the cam groove 112 is such that as the cam is rotated, the roller 110 will be acted upon and the lever 108 and arm 107 will be rocked and the needle carriage 90 reciprocated. During the reciprocation of the needle carriage, the needles are moved to open and closed positions to receive and clamp a draw string and thereafter release the same after the string has been delivered through the bag hems by the needles by the action of the horizontally disposed arm 105 on the crank 100. The arm 105 is raised and lowered by means of an offset arm 113 connected to the upper end of a vertical lever 114 which is journaled on the frame, as at 114’. A cam roller 116, carried by the lower end of lever 114, rides on the periphery of a cam 115 on driven shaft 8. The curvature of the cam 115 is such that rotation of the cam causes the lever 114 to be vertically moved and the arm 105 to be raised and lowered to open and close the needles.

After the needles have passed through the bag hems on the forward stroke, it is necessary to feed a string into the needle jaws so that the string will be drawn through the bag hems on the rearward stroke of the needles. As the string feeding and associated mechanism generally approximates that shown and described in West Patent 2,727,477, the same need not be fully described herein. As best shown in FIGURES 2, 3 and 12, an accurately shaped horizontally disposed string feeding guide tube 117, through which extends the string 118 drawn from a string supply spool 200 (FIGURE 13) is fixedly mounted adjacent its rear end in an upstanding post 119 carried by a crank arm 120 pivoted to the frame. The crank arm 120 is pivotally connected by a link 122 to the upper end of a vertical lever 123 fulcrumed on a shaft 124 in the cam box 3. The lever 123 is formed with a crank arm 125 carrying a cam roller 126 on the end thereof which rides in a cam groove in one side face of a cam 127 (FIGURE 12) mounted on the horizontal driven shaft 19. The curvature of the cam groove is such that rotation of the cam 127 rocks the lever 123 and swings the string tube 117 through an arc and reciprocates the same through two spaced guide blocks 129 on a top supporting plate 130, suitably mounted on the upper end of the cam box 3, and across the path of the needles 81 to carry the string across into position to be gripped by a string gripper 131. During the reciprocation of the string guide tube 117 across the path of the needles, the former pass through aligned slotted openings 133 in the needle guide blocks 129, the latter also being formed with longitudinal openings for the guiding of the needles therethrough. The string is also caused to be clamped in the feeding tube, by mechanism shown and described in the aforesaid West patent, so that, after the string has been clamped in the needle eyes, the string may be clearly severed. The string gripper and associated mechanism approximates that shown in the West patent.

A cutter rod 185 lying approximately parallel with the string guide tube 117 is journaled in the spaced guide blocks 129 on plate 130, and the forward end of the rod 185 is provided with a laterally extending cutter blade 186. The latter coacts with a stationary blade 185’ secured to one side of one of the needle guide blocks cuting the string fed across the needle guide tube 117, after the string has been gripped by gripper 131 and pulled outwardly by a bent string hook formed on the upper end of a vertical lever 188 (FIGURE 1). The lever 188 extends through an elongated guide slot in a bracket 190 secured to the side of the cam box 3, and is pivoted at its lower end, at 191, to the machine frame. The cut of rod 185 is connected at its upper end to a crank 194 fixedly secured to the cutter rod 185. The lower end of lever 195 is pivoted to the outer end of an arm 196 positioned in cam box 3 and which arm is fulcrumed, as at 197, to the cam box wall. A roller, carried by arm 196, engages with and rides in a cam groove in the face of cam 196 mounted on the horizontal driven shaft 19. The curvature of the cam groove is such that the lever 195 and crank 194 are rocked to actuate the cutter rod to sever the string 118.

It will be noted that the string supply spool 200 is mounted on a laterally extending rod 201 connected to an upright supporting post 202 (FIGURE 13) which is preferably arranged adjacent the machine. The string is spirally wound on the spool 200, in a conventional manner, and the end thereof projects through a circular wire ring 203 formed on the end of a vertical wire 204 suspended as at 205, from the outer end of a laterally extending rod 206 connected to the upper end of post 202. The wire ring
is aligned with and spaced from the outer end of spool 200 so that, as the string is withdrawn from the spool, the frictional engagement of the string with the wire ring 203 in its passage therethrough will tend to prevent the string from slipping around and becoming entangled on the spool. After passing through the ring 204, the string 113 feeds through the wide end of a hollow elongated tapered cone 207 (FIGURE 12) supported by a bracket connected to cam box 3. Thus, the string will be fed in a more or less straight line by the time it passes through the reduced end of the cone 207 so that the string guide tube 117 accurately and uniformly feeds the string into the needle jaws.

When the string has been gripped by gripper 131 and the string guide tube 117 retracted across the path of the needles 81, the bent string hook on lever 189 will draw the string outwardly to provide the necessary length of string. During this operation, the needles have reached the end of their forward stroke and the jaws 83 thereof are opened and positioned in alignment with the string guide tube 117 and string gripper 131, at which time the gripper and cutter 186 simultaneously move downwardly a relatively short distance thereby permitting or placing the string in the open jaws 83 of the needles, at which time the needles are actuated to cause the jaws 83 to close upon and grip the string, and the cutter blade 186 is actuated to engage the stationary blade 186' and the string is severed or sheared. During this movement, the gripper 131 is actuated to free or disengage the string. The needles are now in position to move rearwardly and carry the string through the bag hems into position to be acted upon by a string knottor for knotting the free ends of the string. As the knottor mechanism generally resembles that shown and described in the aforementioned West patent, it is not considered necessary to further allude thereto herein.

Attached to the rear ends of each of the hollow needle shanks 81, where they project through the small block 96 of the carriage 90, is a suitably conduit 310 which extends rearwardly and downwardly of the carriage and is coupled in any suitable manner to a manifold 311, secured by an upstanding bracket 312 secured to the frame. A conduit 313, connected to the underside of manifold 311, extends upwardly and is suitably coupled to the top of a valve casing 314 secured to the side of bracket 312 adjacent the upper end thereof, and the valve is connected by a conduit 315 with a suitable source of compressed air, not shown. Any suitable valve means may be arranged in the valve casing 314, for example a spring pressed slide valve, to control the passage of air from the source of supply to the conduit 313 and thence to the manifold 311 and needle conduits 310. In the present machine, the valve is provided with a pin 316 projecting through the side of the valve casing which is adapted to be periodically engaged by the upper edge of a V-shaped segmental cam 317 which is pivotally connected at the bottom apex thereof, as at 318, to the edge of the bracket 312. An arm 319 secured to the side of cam 317 extends upwardly therefrom and carries a cam roller 320 on the upper end thereof which rides on the annulus of cam 111 and engages with a cam lug 321 thereon whereby the segmental cam 317 is rocked in a clockwise direction, viewing FIGURE 6, to move the valve pin 316 inwardly or laterally to open the valve, against the pressure of a spring or the like, not shown, to open the same so that air will flow through conduit 313 into the manifold 311 and thence through conduits 310 to and through the needles. Thus, air is caused to pass through the needles prior to their entry into the bag hems for a purpose to be presently described.

With a bag positioned on a series of bag supporting fingers at the horizontal station, the turret head is rotated to move the bag to the downwardly extending vertical stringing station, during which movement the fingers 29 are moved laterally to open or expanded positions to firmly support the bag thereon. The needles 81 are then brought into play, and, on the forward stroke of the needle carriage, the pointed shanks 85 thereof approach the apertures 302 in the ends of the plastic bag hems 301 and air is caused to flow through the passage 81' in the hollow shank 85 to carry the string in the angular passages 85, from the needle to the aperture 302 at the adjacent the pointed ends thereof so that a blast of air is directed into the hem apertures 302 which spread open the ends of the hems and causes the apertures to be aligned with the pointed ends 85 of the needles. Thus, the pointed ends of the needles are assured of uniformly and accurately entering the apertures and passing through the hems. As the air valve 314 actuation is effected by the action of cam lug 321 on cam 111, it will be understood that the blasts of air flowing through the needles will only last long enough for the pointed needle shanks to properly enter into the bag hems, after which continued forward movement of the needle carriage will result in the needles passing entirely through the hems 301 and passing through the apertures 302 at the opposing ends thereof. In other words, each needle passes through each hem and out the opposite side thereof. After the needles have passed through the needle forward stroke, a string is fed into the needle jaws by the string feed mechanism 117 and the needles are caused to be closed to clamp the string therein. The string is thereafter severed, and the string drawn outwardly in the form of a loop by lever 188. After these operations, the needles are retracted or moved forward through the bag hems into position to be acted upon by the needle knotting mechanism, not shown herein, for knotting the free ends of the string. During the knotting operation, the needle jaws are actuated to open position to release the ends of the string and the stringing and knotting is completed.

Upon completion of the stringing and knotting operations, the turret head is further rotated one quarter of a revolution to move the bag supporting fingers 29 and strung bag to a horizontal releasing and removing station. During this rotation of the turret head, the cam 45 exerts a pull on the rod 39 which in turn causes the series of interconnecting links 48 to move laterally from the fully expanded positions they assumed at the stringing station to partially closed or collapsed positions so that the bag carrying fingers 29 are correspondingly moved laterally to partially collapsed positions so that the bag is somewhat loosely supported thereon and free to be engaged by a bag removing member 249 which removes the same from the fingers and delivers it into a hopper or the like where the string bags are arranged in a stack of a predetermined number of bags preparatory to being stored or filled. As the bag removing member 249 also generally approximates and functions as that shown and described in the said West patent, no other description is considered necessary.

After the bag is removed from the rearwardly extending horizontally disposed bag supporting fingers 29, rotation of the turret head moves the same to the vertical idle position, preparatory to being rotated through another approximately ninety degrees into the horizontal bag receiving position. As the turret head is associated stringing, knotting and bag removing operations are synchronized and function in timed relation with each other, it will be apparent that while the operator is placing one bag on a set of bag supporting fingers, the preceding bags are being respectively removed from the bag fingers and stringing, so that the three main operations of applying a bag, stringing and knotting, and removing a bag are taking place simultaneously.

While I have illustrated and described a preferred form of my bag stringing machine, it will be understood that various changes and improvements may be made therein without departing from the scope and spirit of the appended claims.

Having thus described my invention what I claim is:

1. A machine for stringing hemmed bags comprising a
In a machine for stringing hemmed bags as described in claim 3, said needles comprising hollow shanks, sleeves within which said shanks are movable, a carriage mounted for sliding reciprocating movement, said needles being supported by said carriage, said needle shanks and sleeves being relatively movable to provide string gripping means, a source of air, conduits connecting said needle shanks and sleeves for periodically conducting air through said conduits to and through said needles during their forward sliding movement towards a bag on one of said bag supporting members to open the bag hems and facilitate the entry and passage of said needles therethrough, and means for threading said needle gripping means with string, all of said means being synchronized and operable in timed relation with each other during the operation of the machine.

9. In a machine for stringing hemmed bags, a bag holder having a bag supporting member thereon for supporting a hemmed bag for stringing, said member including a series of spaced fingers mounted for lateral movement from spaced apart to collapsed positions, means associated with said fingers member for moving said fingers relative to each other, stringing needles and needle operating mechanism for entering the needles through the hems of said bag, said needles being hollow, a source of air, and means associated with said supporting member for moving said fingers relative to each other, stringing needles and needle operating mechanism for entering the needles through the hems of said bag, said needles being hollow, a source of air, conduits connecting said needles to said air source for conducting air to and through said needles to open the bag hems prior to the entry of said needles thereinto to facilitate the passage of said needles therethrough, and means for threading said needles with string, all of said means being synchronized and operable in timed relation with each other during the operation of the machine.

10. In a machine for stringing hemmed bags, having a bag supporting member thereon for supporting a hemmed bag for stringing, said member including a series of spaced fingers mounted for lateral movement from spaced apart to collapsed positions, means associated with said supporting member for moving said fingers relative to each other, stringing needles and needle operating mechanism for entering the needles through the hems of said bag, said needles comprising elongated sleeves, elongated shanks extending through said sleeves, said shanks having pointed ends and hollow bores extending therethrough, a carriage mounted for sliding reciprocating movement, said needle sleeves and shanks being supported by said carriage, means for moving the pointed ends of said shanks relative to said sleeves to provide needle gripping means, a source of air, conduits connecting said needles to said source of air, and valve means for periodically conducting air through said conduits to and through said needles during their forward sliding movement towards said bag on said bag supporting member to open the bag hems and facilitate the entry and passage of said hollow needle shanks therethrough, and means for threading said needle gripping means with string, all of said means being synchronized and operable in timed relation with each other during the operation of the machine.
being supported by said carriage, means for moving the pointed ends of said shanks relative to said sleeves to provide needle string gripping means, a source of air, conduits connecting the hollow shanks of said needles to said source of air, and valve means for periodically conducting air through said conduits to and through said shanks and bores in said pointed needle ends to blow open the apertured bag hems and facilitate the entry and passage of said needles therethrough, and means for threading said needle gripping means with string, all of said means being synchronized and operable in timed relation with each other during the operation of the machine.

10. A machine for stringing hemmed bags, a bag holder having a bag supporting member thereon for supporting a hemmed bag for stringing, said hems having the ends thereof apertured, a pair of stringing needles and needle operating mechanism for entering the needles through the hems of said bag, said needles comprising elongated sleeves, elongated shanks extending through said sleeves, said shanks having pointed ends and hollow bores extending therethrough, inwardly diverging bores in said pointed ends connecting with said hollow bores, a carriage mounted for sliding reciprocating movement, said needle sleeves and shanks being supported by said carriage, means for moving the pointed ends of said shanks relative to said sleeves to provide needle string gripping means, a source of air, conduits connecting the hollow shanks of said needles to said source of air, and cam operated valve means for periodically conducting air through said conduits to and through said shanks and diverging bores in said pointed needle ends to blow open the apertured bag hems and facilitate the entry and passage of said needles therethrough, and means for threading said needle gripping means with string, all of said means being synchronized and operable in timed relation with each other during the operation of the machine.

References Cited in the file of this patent

UNITED STATES PATENTS

2,154,743 Habas et al. Apr. 18, 1939
2,522,788 Ingraham Sept. 19, 1950
2,727,477 West Dec. 20, 1955
2,745,583 Harker May 15, 1956