

Sept. 16, 1952

E. E. WEST

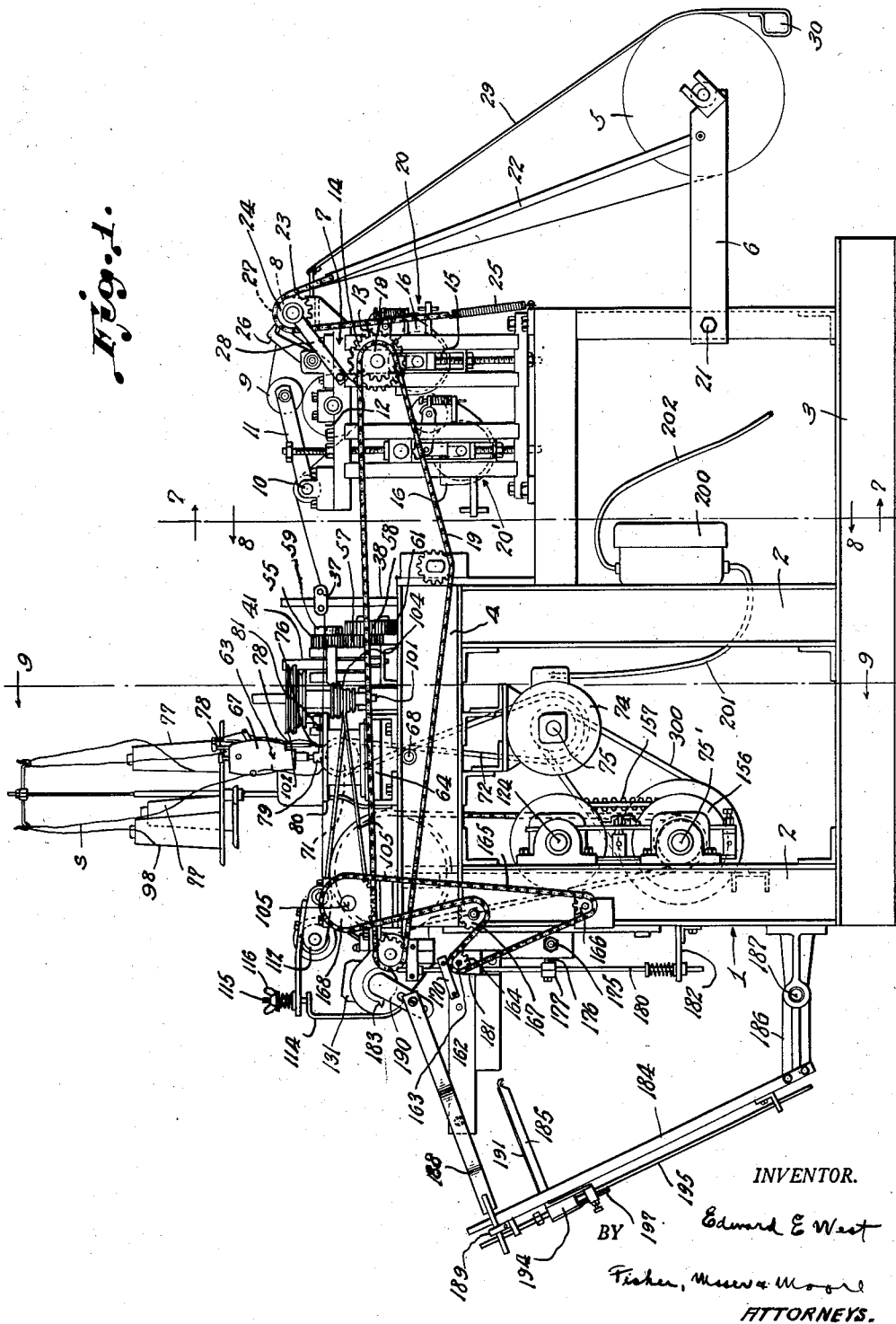
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INDUSTRIAL BAG STRINGING MACHINE

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17 Sheets-Sheet 1

Fig. 1.



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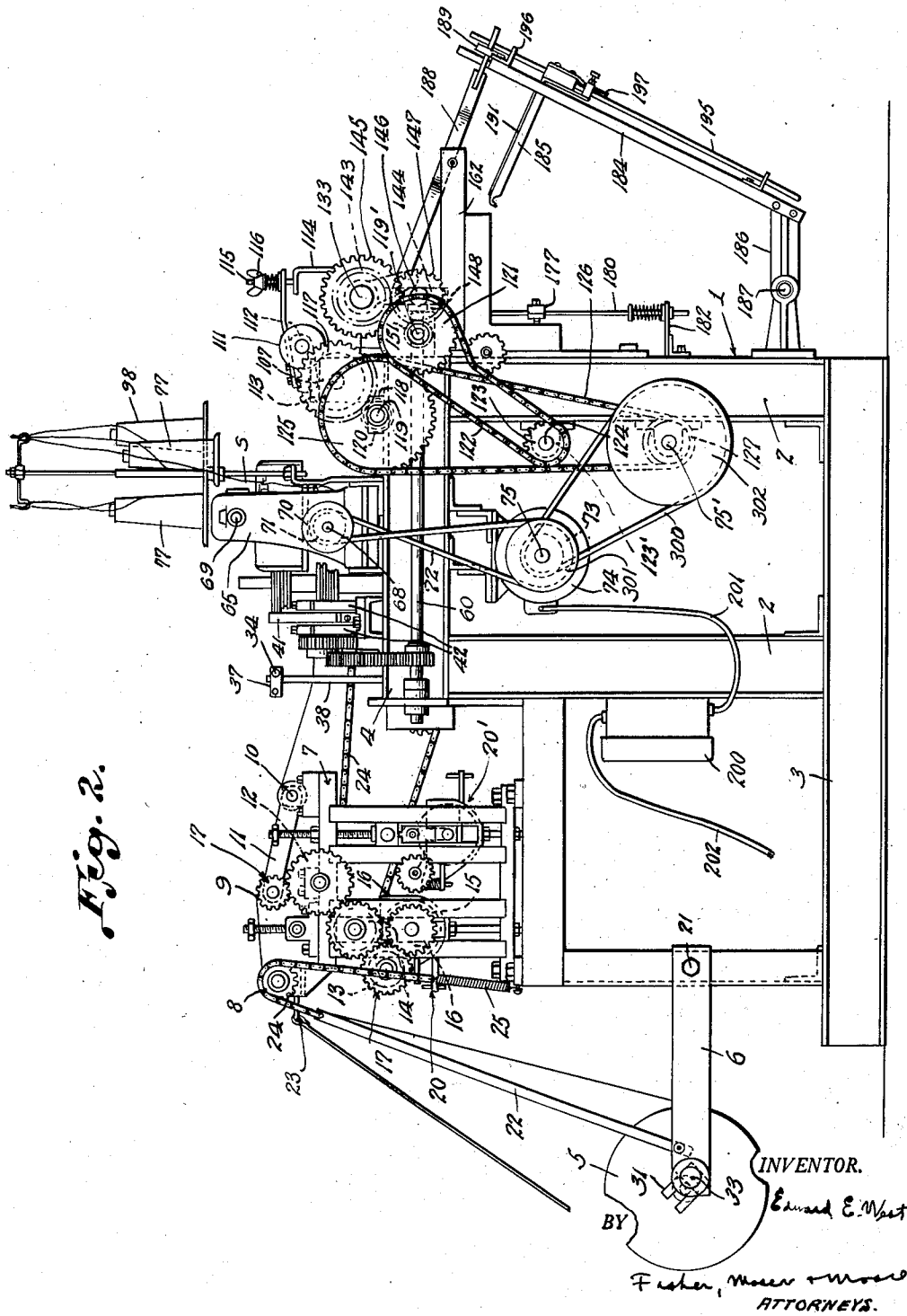
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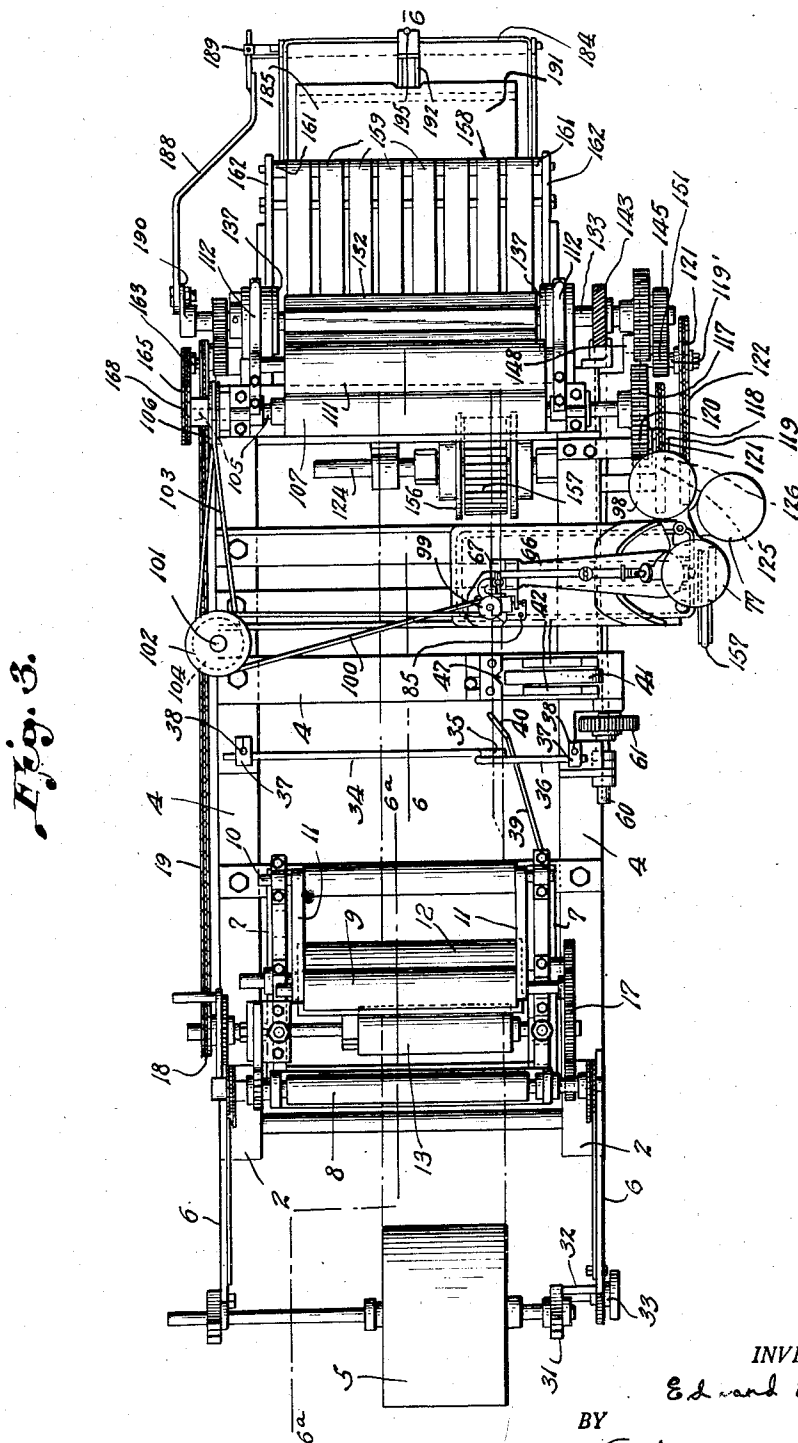
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INDUSTRIAL BAG STRINGING MACHINE

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17 Sheets-Sheet 3



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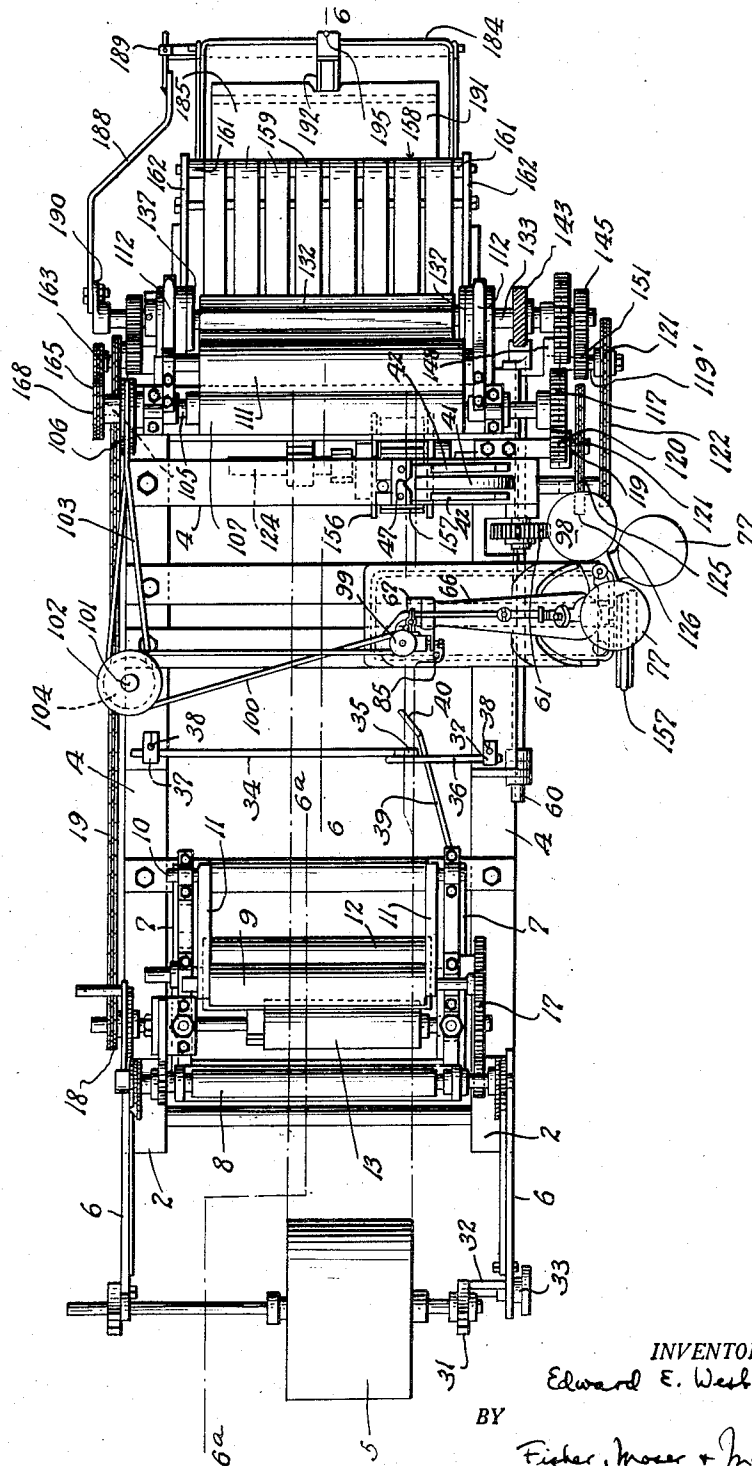
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Fig. 3A



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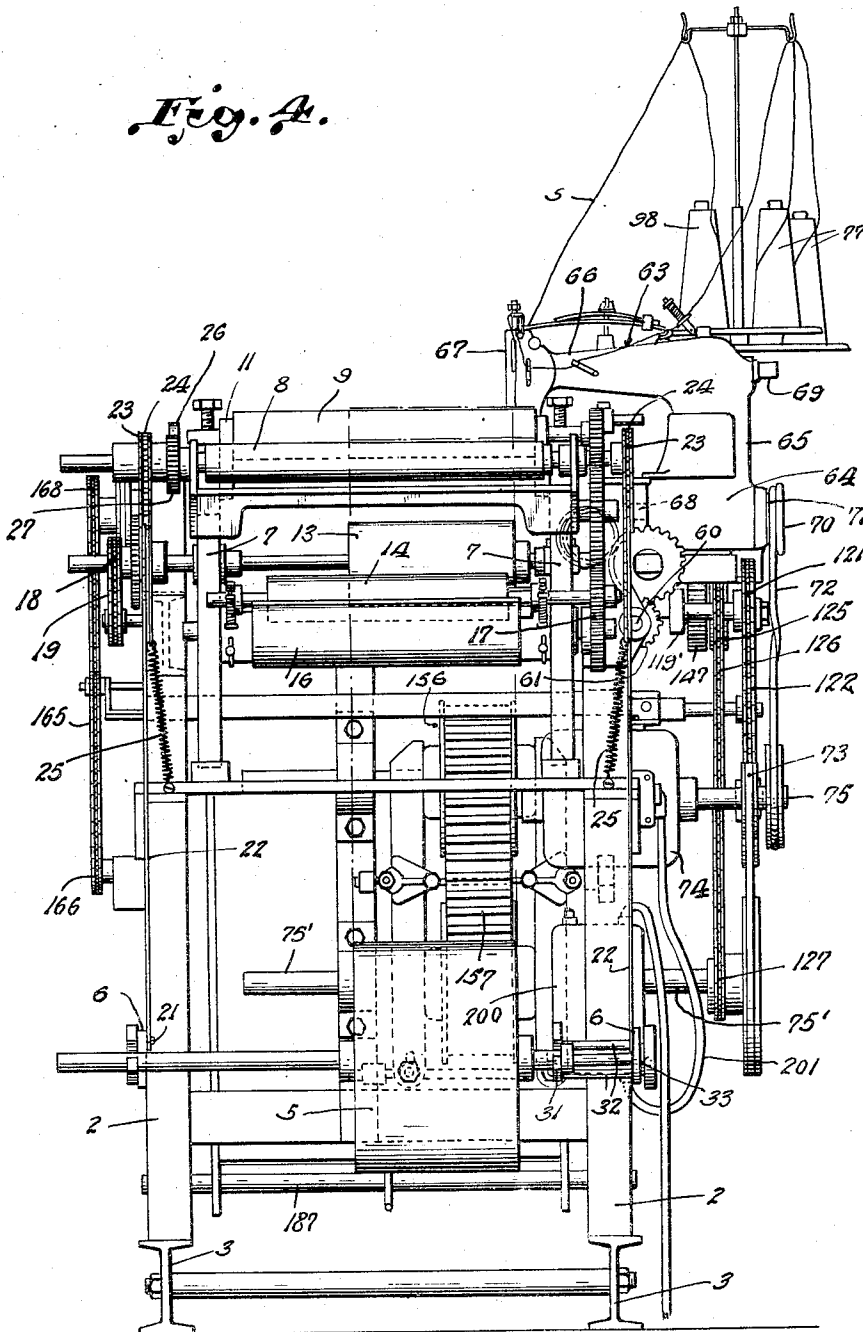
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INDUSTRIAL BAG STRINGING MACHINE

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Fig. 4.



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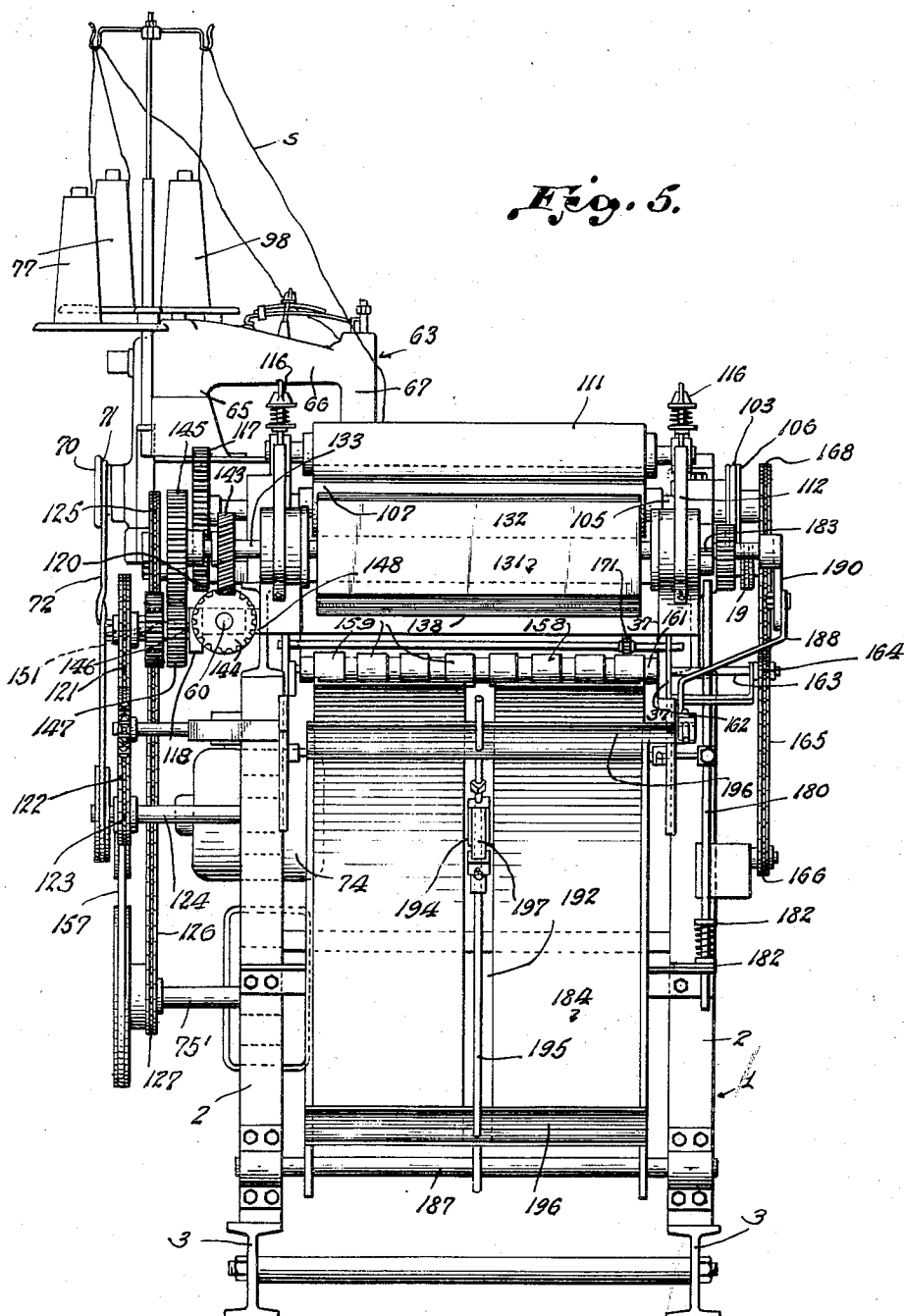
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INDUSTRIAL BAG STRINGING MACHINE

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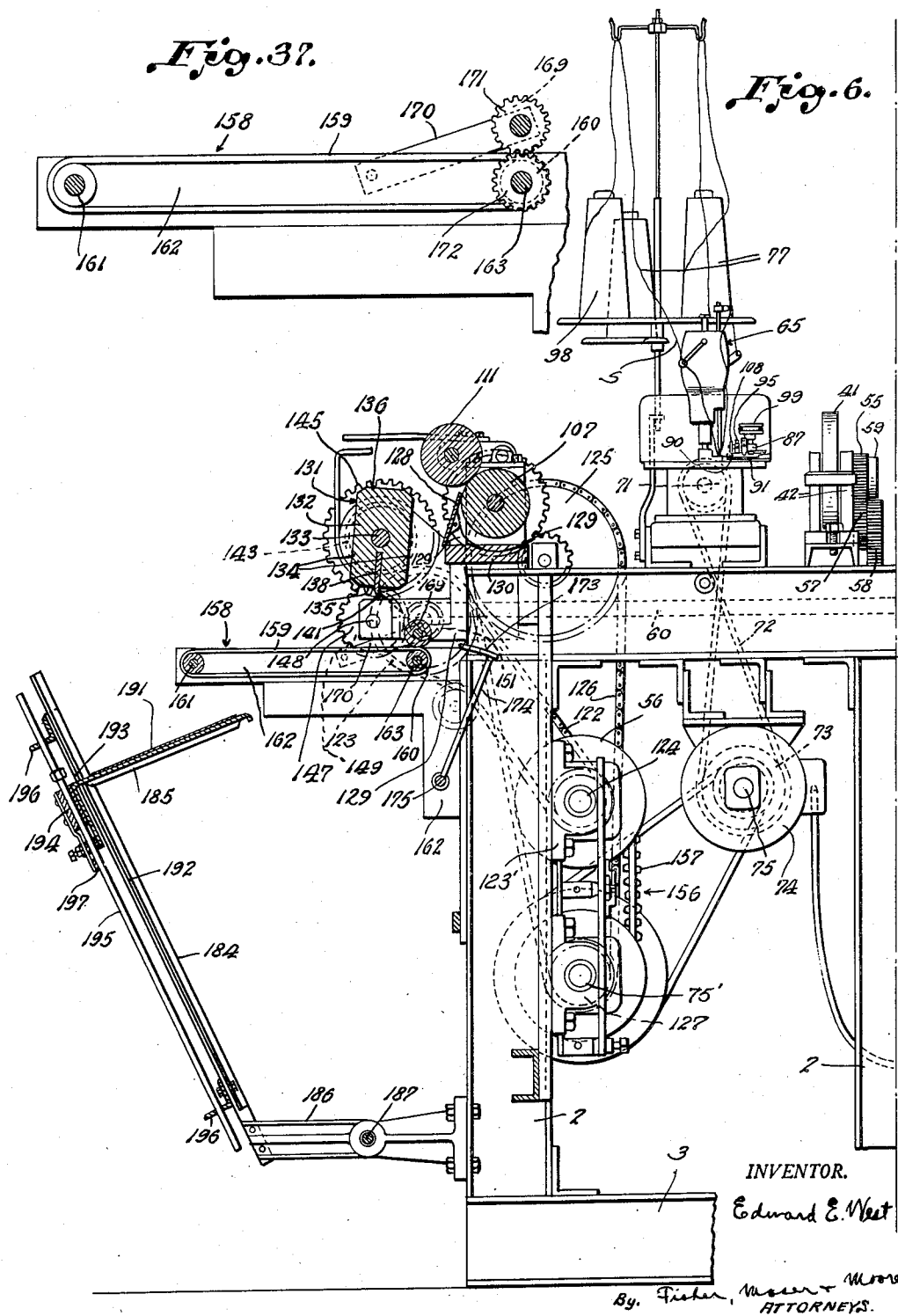
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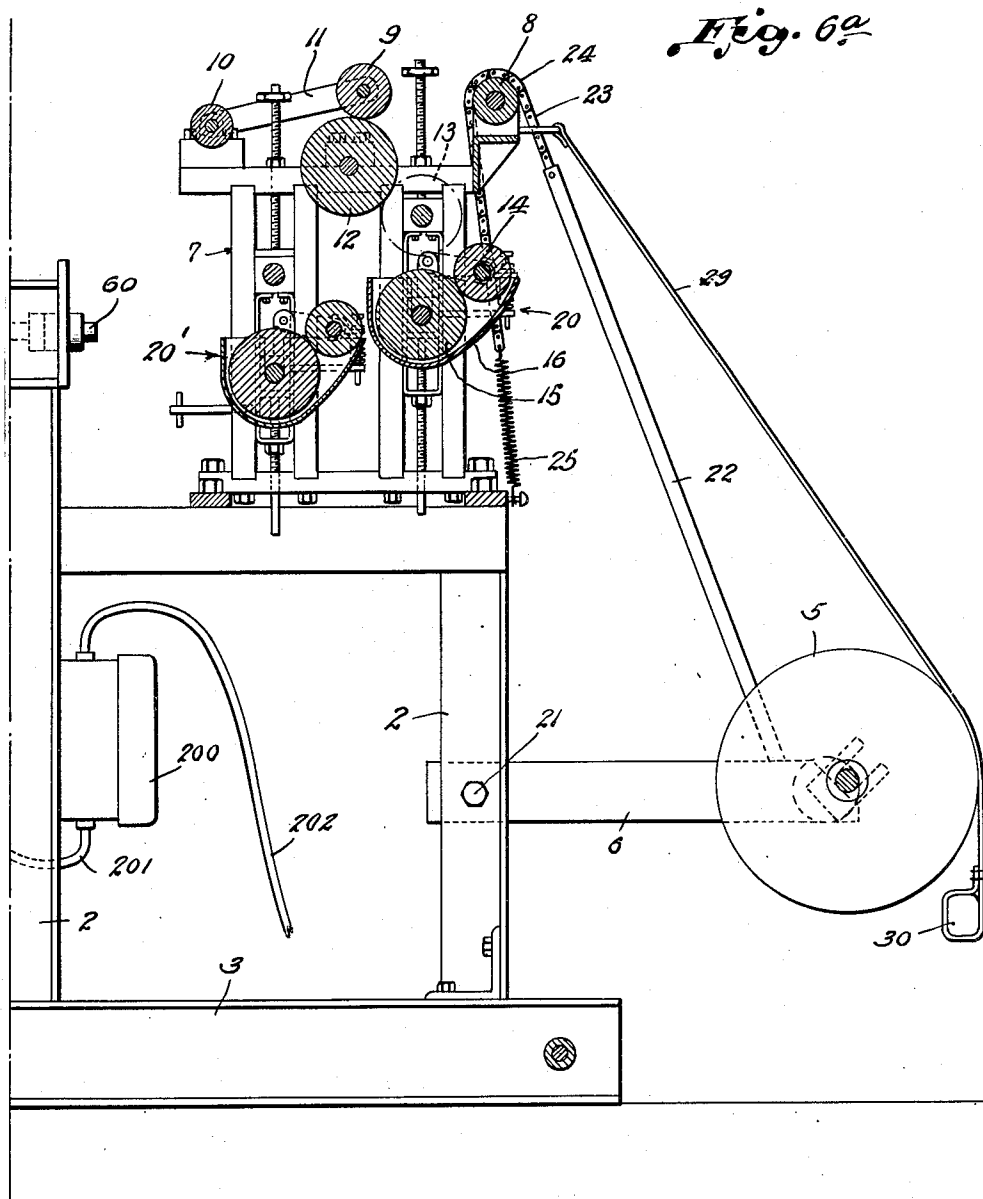
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INDUSTRIAL BAG STRINGING MACHINE

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17 Sheets-Sheet 8



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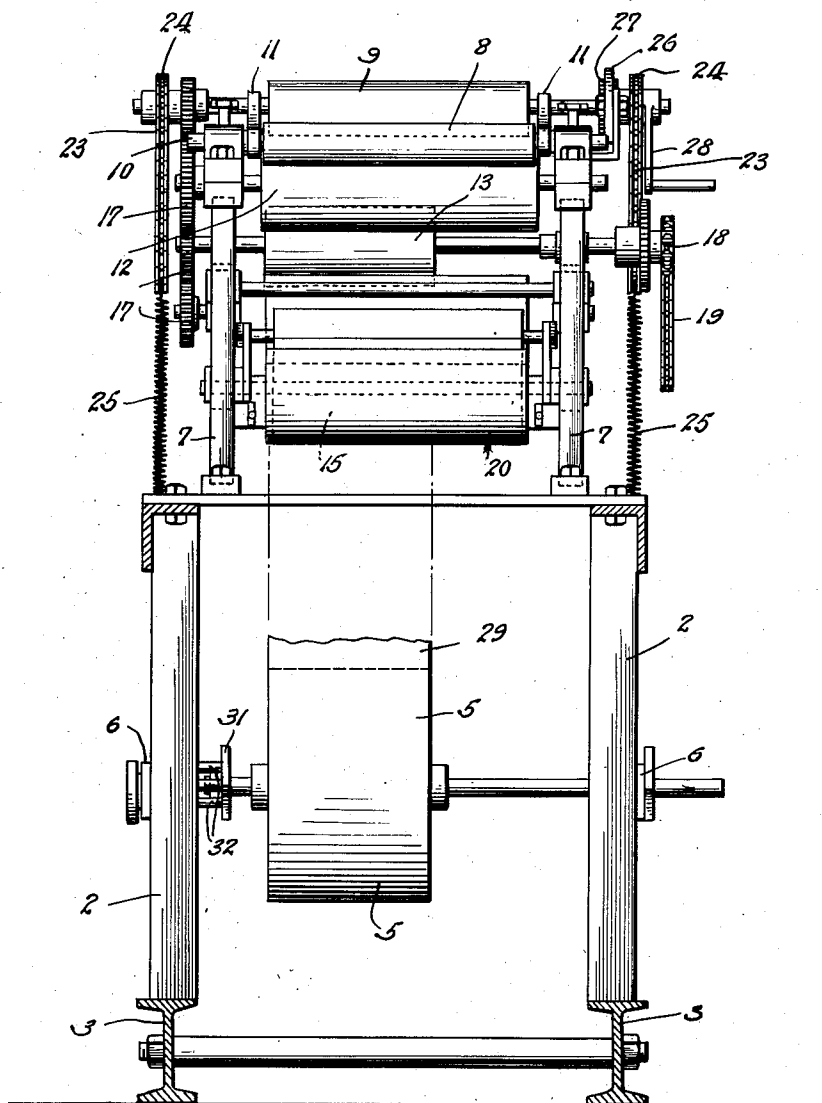
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INDUSTRIAL BAG STRINGING MACHINE

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Fig. 7.



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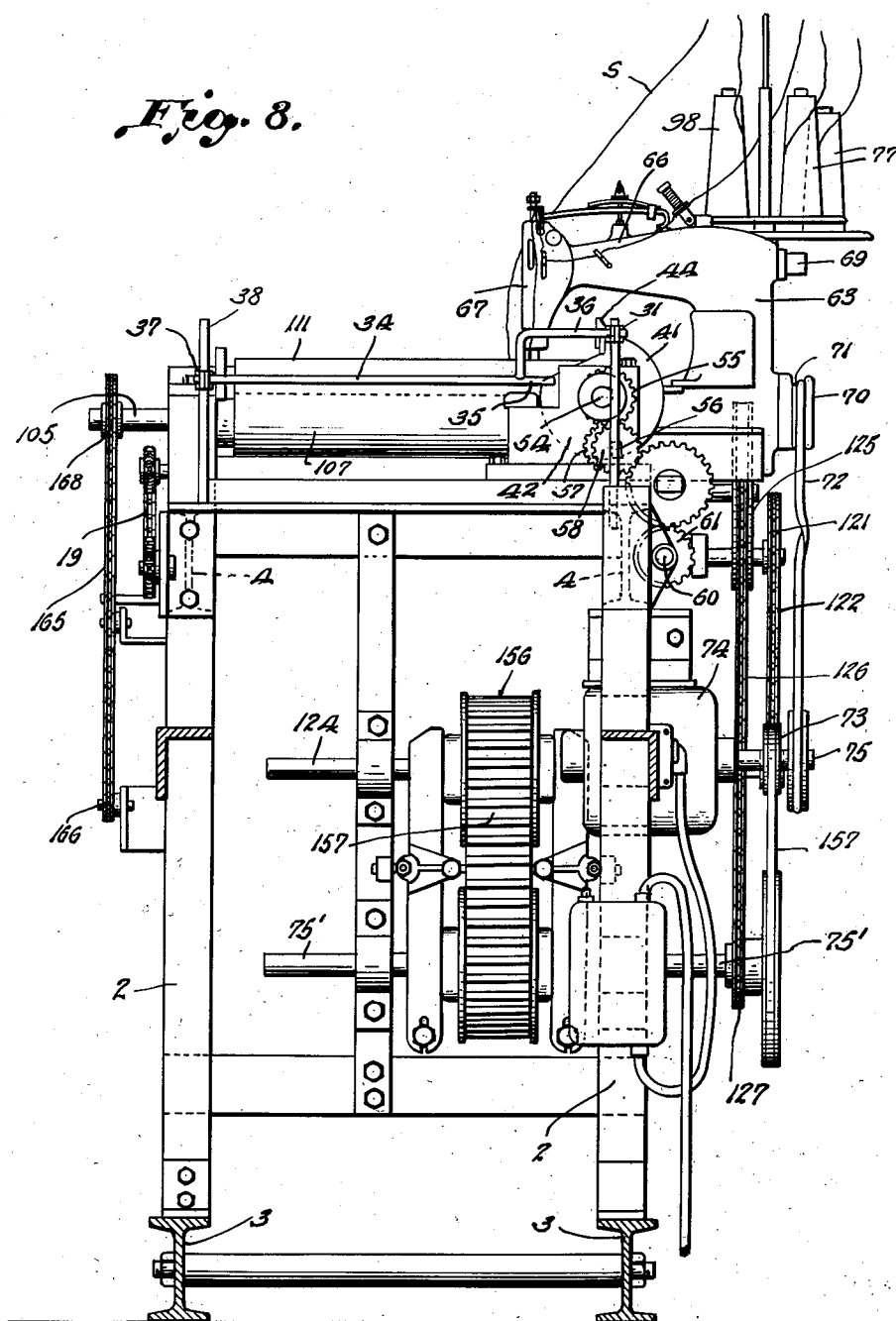
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Fig. 8.



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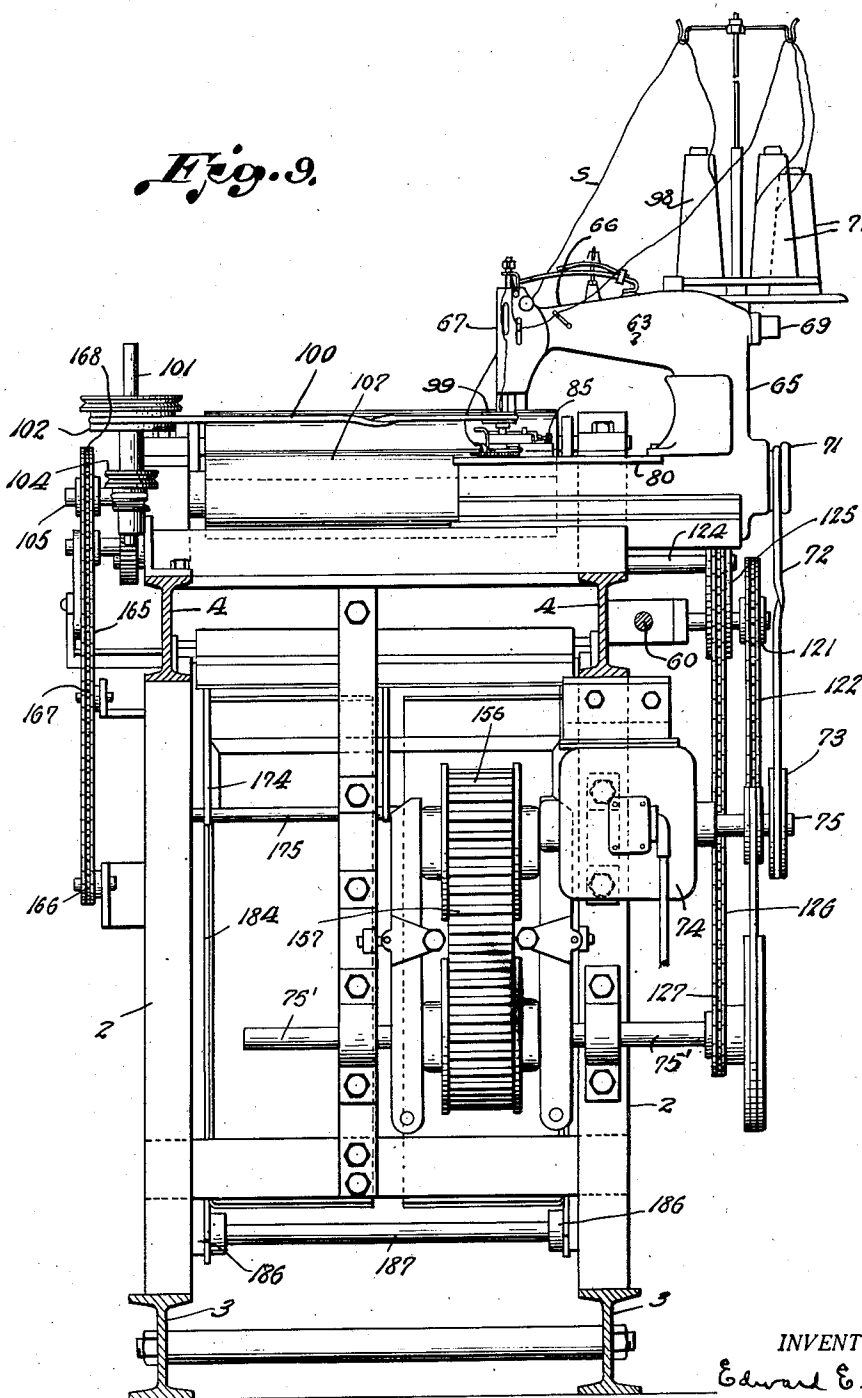


Fig. 9.

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INDUSTRIAL BAG STRINGING MACHINE

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Fig. 10.

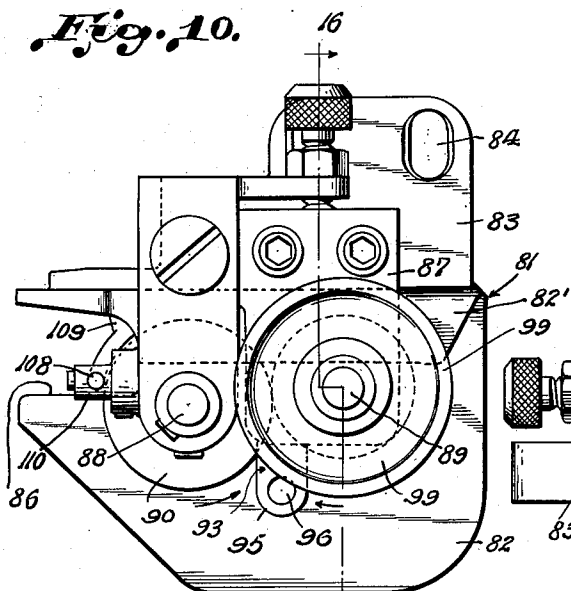


Fig. 11.

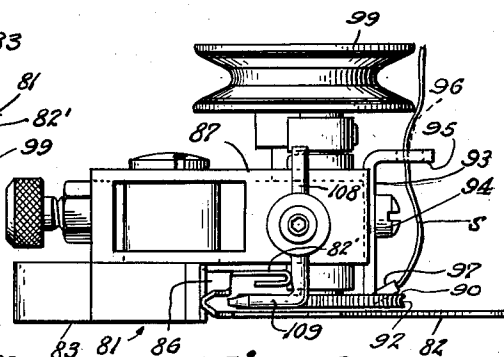


Fig. 13.

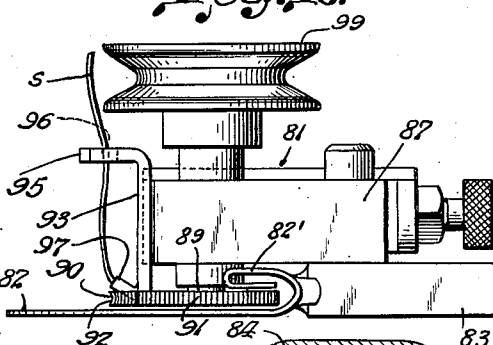


Fig. 12.

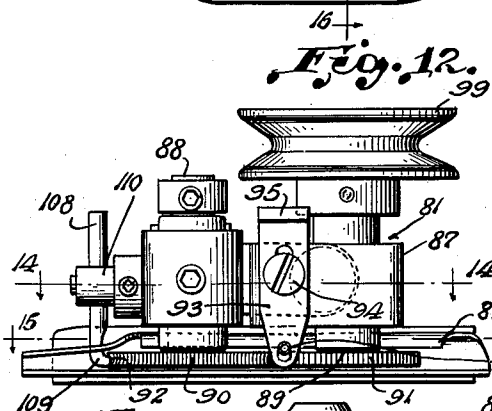


Fig. 14.

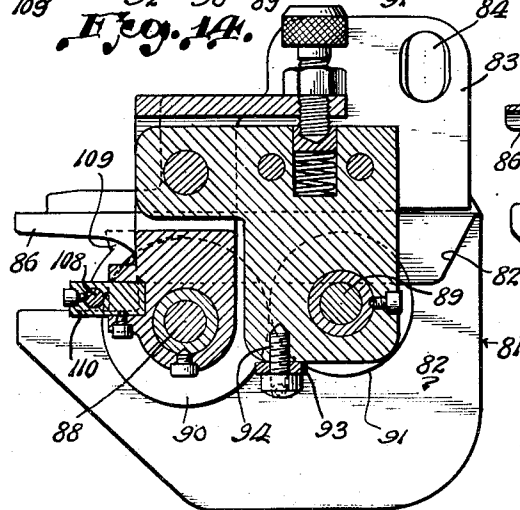
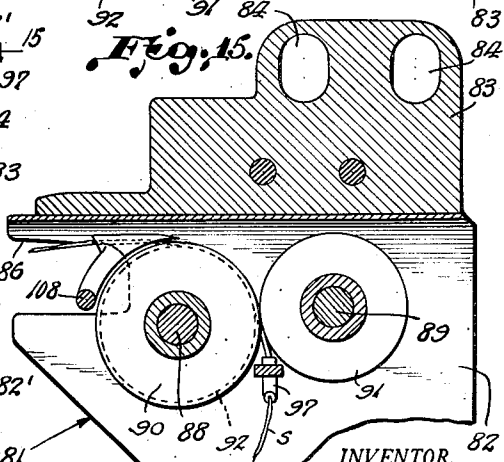


Fig. 15.



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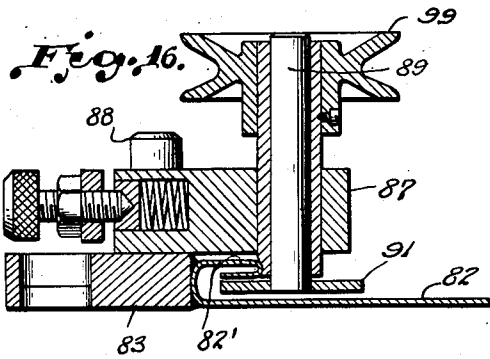


Fig. 23.

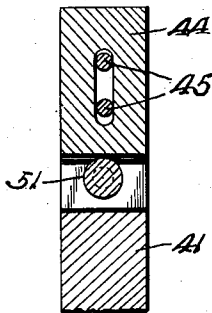
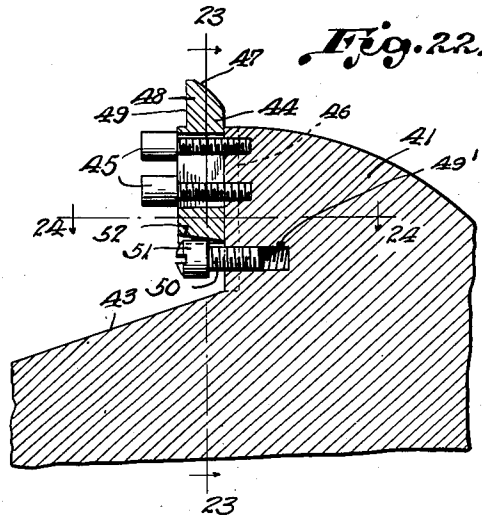
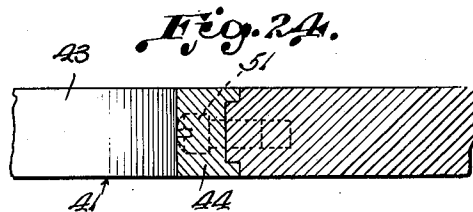


Fig. 25.

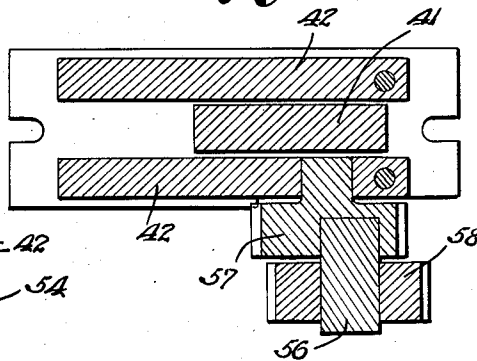
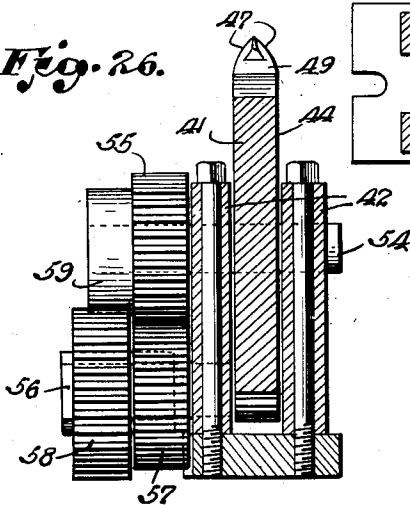


Fig. 26.



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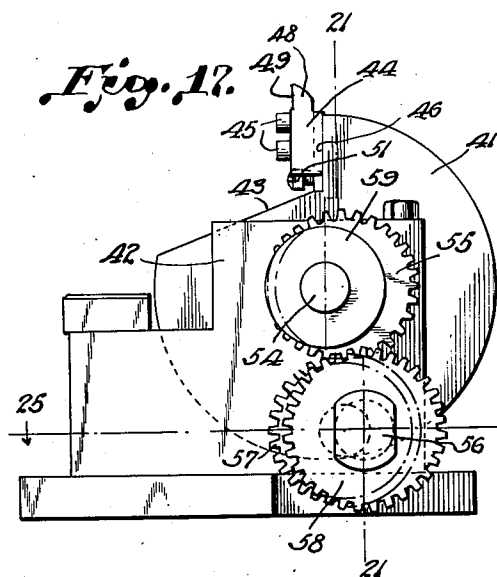
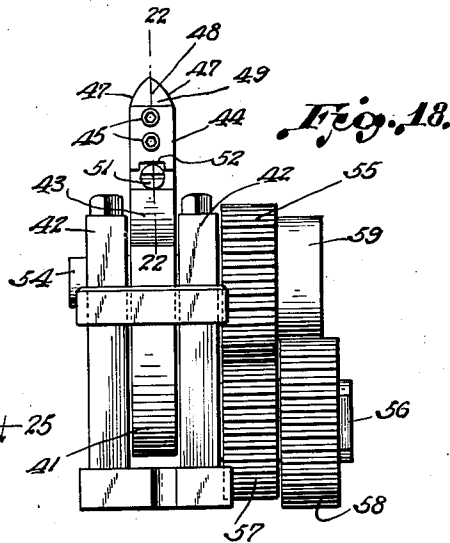
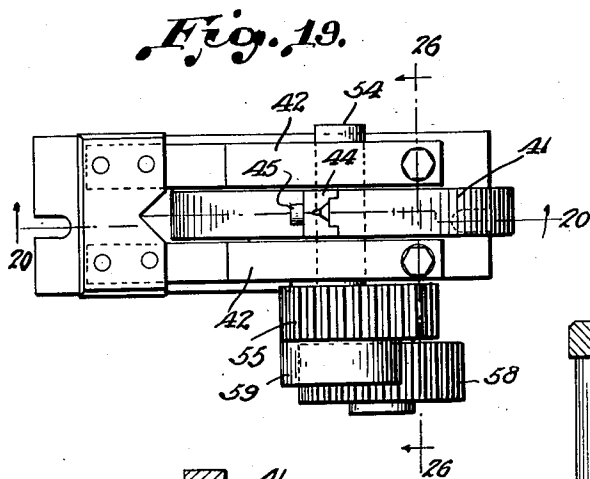
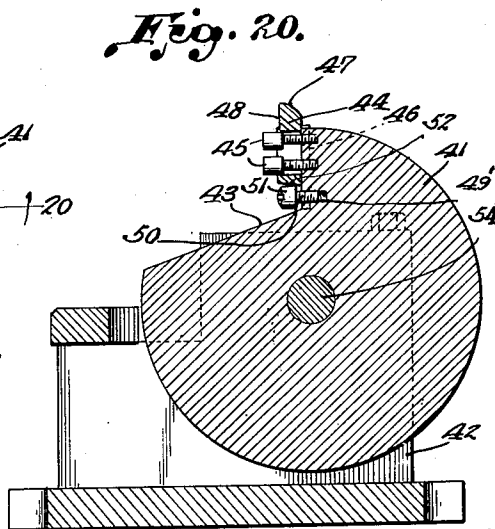
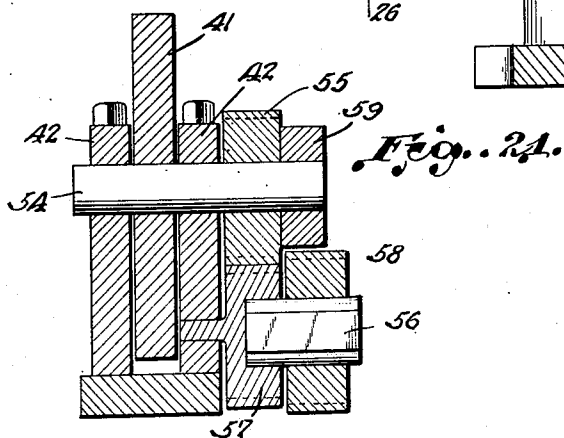
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INDUSTRIAL BAG STRINGING MACHINE

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INDUSTRIAL BAG STRINGING MACHINE

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Fig. 27.

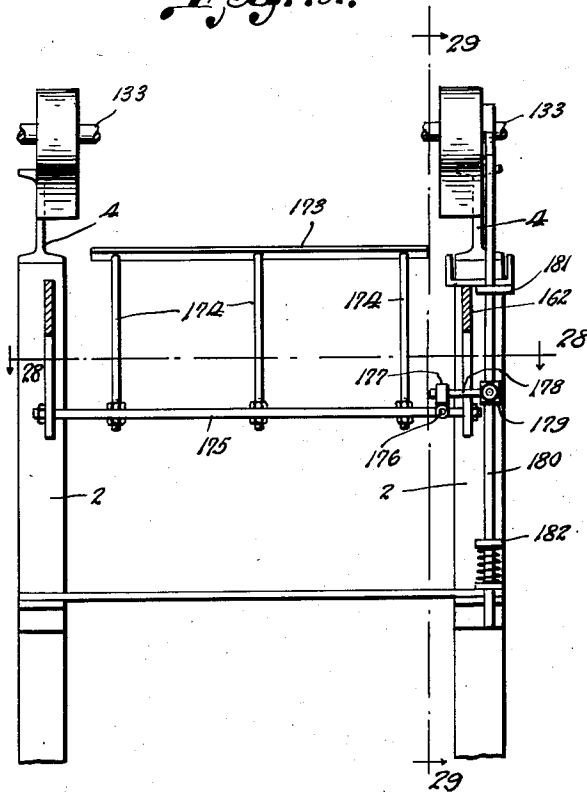


Fig. 29.

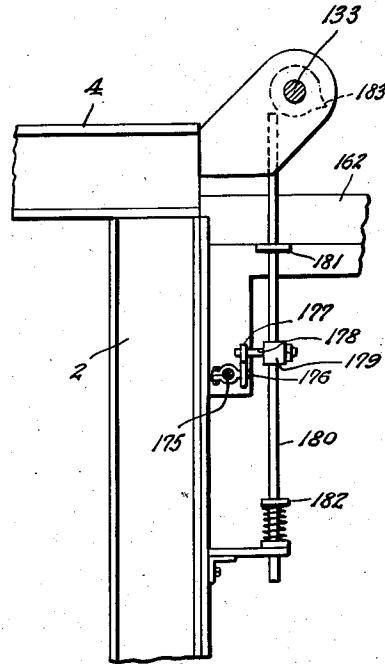


Fig. 28.

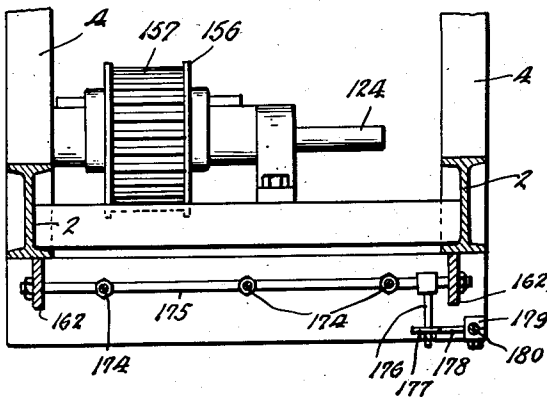
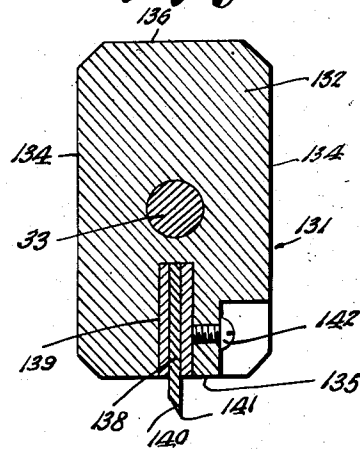


Fig. 33.



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2,610,595

INDUSTRIAL BAG STRINGING MACHINE

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Fig. 30.

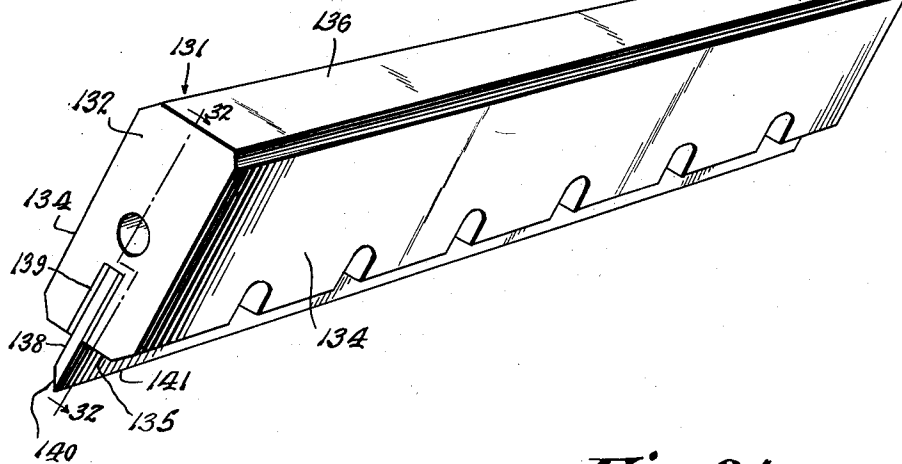


Fig. 31.

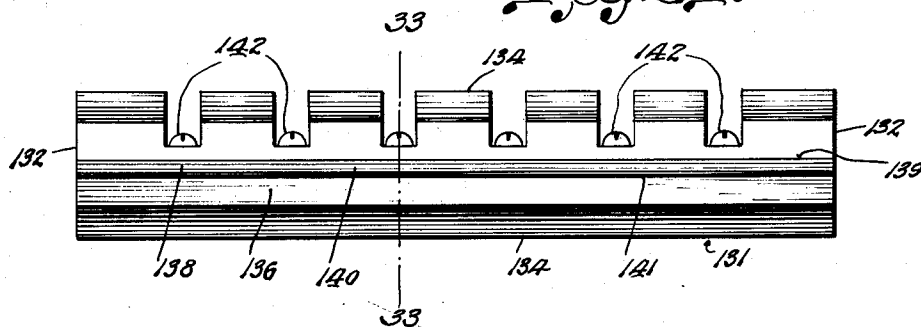
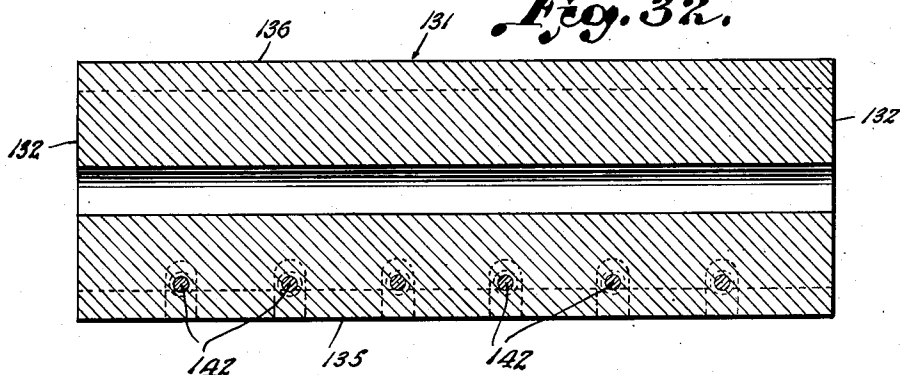


Fig. 32.



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2,610,595

INDUSTRIAL BAG STRINGING MACHINE

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Fig. 34.

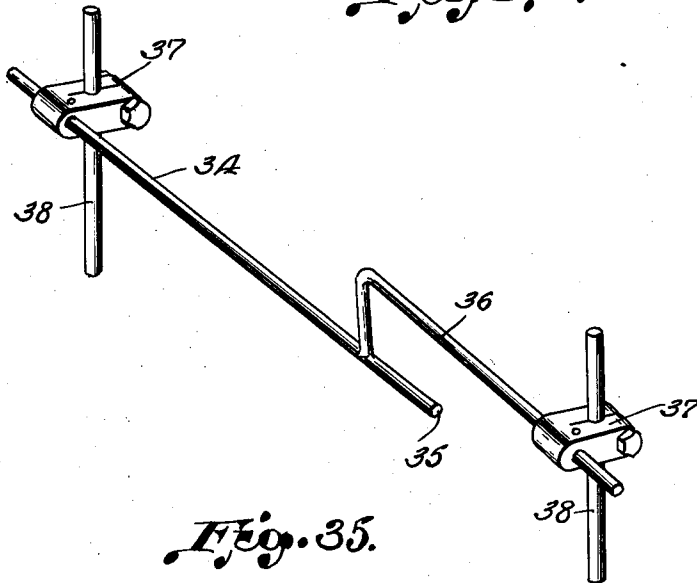


Fig. 35.

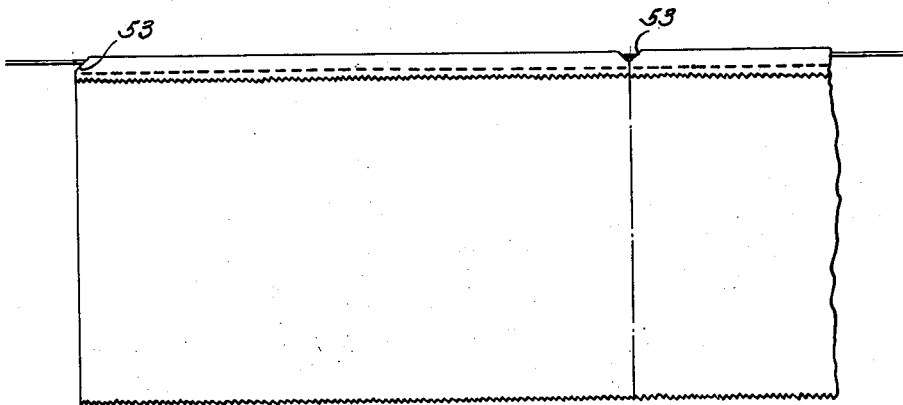
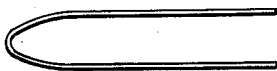


Fig. 36.



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UNITED STATES PATENT OFFICE

2,610,595

INDUSTRIAL BAG STRINGING MACHINE

Edward E. West, Richmond, Va.

Application May 13, 1948, Serial No. 26,861

24 Claims. (Cl. 112-2)

1

The present invention relates to an improved machine for making and stringing bags.

The principal object of the invention is the provision of an improved machine for printing and automatically hemming a continuous web of cloth, forming notches in the hemmed edge, feeding a string into the hem during the final hemming thereof, after which the notched and hemmed web is severed into bag lengths of a predetermined size, and folded into bag blanks which are positioned on a stacker preparatory to being stitched into a completed bag.

Another object is to provide a novel rotating notcher for forming V-shaped notches or openings in a continuous travelling web of cloth.

A further object is to provide a novel hemming and string inserting mechanism for simultaneously hemming and inserting a string in the hemmed edge of the travelling web of cloth either before or after the same has been notched.

Still another object is the provision of a novel cutter for transversely cutting the notched, hemmed and strung web of cloth into bag lengths and also cutting the string so that the ends of the latter will project through the notches or openings in the hem.

A still further object is to provide an improved means associated with the cutter and working in timed relation therewith for folding the bag lengths transversely into bag blanks and positioning the same on a conveyor.

Another object is the provision of a novel conveyor mechanism for delivering the folded bag blanks and depositing the same on a novel oscillating stacking device which moves at the same speed as the conveyor to assure of the bags being uniformly stacked thereon.

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

Figure 1 is a side elevation viewing one side of the machine;

Figure 2 is a side elevation viewing the other or opposite side of the machine;

Figure 3 is a plan view of the complete machine;

Figure 3a is a plan view of the complete machine, with the notching mechanism mounted intermediate the sewing machine and web cutting roll;

Figure 4 is a view of one end of the machine;

Figure 5 is a view of the opposite end of the machine to that shown in Figure 4;

Figure 6 is a section on the line 6-6 of Figure 3;

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Figure 6a is a section on the line 6a-6a of Figure 3;

Figure 7 is a section on the line 7-7 of Figure 1;

5 Figure 8 is a section on the line 8-8 of Figure 1;

Figure 9 is a section on the line 9-9 of Figure 1;

10 Figure 10 is a top plan view of the folder or hemmer;

Figure 11 is an end view of the hemmer;

Figure 12 is a front elevation of the hemmer;

Figure 13 is a view looking toward the opposite end of the hemmer shown in Figure 11;

15 Figure 14 is a section on the line 14-14 of Figure 12;

Figure 15 is a section on the line 15-15 of Figure 12;

20 Figure 16 is a section on the line 16-16 of Figure 10;

Figure 17 is a side view of the notcher mechanism;

Figure 18 is an end view of the notcher mechanism;

25 Figure 19 is a plan view of Figure 18;

Figure 20 is a section on the line 20-20 of Figure 19;

Figure 21 is a section on the line 21-21 of Figure 17;

30 Figure 22 is a fragmentary section on the line 22-22 of Figure 18;

Figure 23 is a section on the line 23-23 of Figure 22;

35 Figure 24 is a section on the line 24-24 of Figure 22;

Figure 25 is a section on the line 25-25 of Figure 17;

Figure 26 is a section on line 26-26 of Figure 19;

40 Figure 27 is a detail view of the bag length folding mechanism;

Figure 28 is a section on line 28-28 of Figure 27;

45 Figure 29 is a section on line 29-29 of Figure 27;

Figure 30 is a perspective view of the cutter roll;

Figure 31 is a bottom plan view of the cutter roll;

50 Figure 32 is a section on the line 32-32 of Figure 30;

Figure 33 is a section on line 33-33 of Figure 31;

55 Figure 34 is a perspective view of the folding bar;

Figure 35 is a fragmentary plan view of the bag blank;

Figure 36 is a view of one of the bags after it has been cut and folded; and

Figure 37 is a section on line 37—37 of Figure 5.

In order to better understand the many features, advantages and mode of operation of this machine, it is believed that it will be well to briefly describe how this machine functions. Thus, a web of cloth is drawn from a roll and successively passed through tensioning rollers and printing rolls for printing a suitable design on the cloth, after which the travelling web is passed over a folding bar for folding or rolling one edge thereof. A rotary cutter is then caused to act upon and form notches in the partially formed hem to provide openings through which the draw strings will project after the strip of cloth has been severed into bag blanks. The rolled edge of the web is next acted upon by a combined hem folder and string feeder whereby the side hem is completely and uniformly formed and a draw string laid longitudinally thereupon a sewing head stitches the hem. In the next operation, the hemmed and strung web is cut transversely, and folded into bag blanks which are delivered into a stacker where the same are uniformly stacked in bundles of a predetermined number of bag blanks preparatory to being sewed into completely formed bags by another sewing mechanism which does not form a part of the present invention.

Referring more particularly to the drawings wherein like reference characters designate like parts throughout the several views the numeral 1 represents a suitable main frame of metal or the like consisting of uprights 2, mounted on a base 3, and cross bars 4 on the upper end thereof. Cloth is drawn from a supply roll 5, suitably journaled in bracket arms 6 on the front of the frame 1, and is passed over an idler roll 8 journaled in the upper end of a feeding mechanism frame 7 mounted on the main frame 1 at the front end thereof. The cloth is then passed over a small driven feed and pressing roller 9 journaled in the ends of bracket arms 11 mounted on an idler roller shaft 10 mounted in the frame 7. After passing around the roller 9, the cloth is caused to pass over and under a larger feed and pressing roller 12, also journaled in feed frame 7, which roller 12 coacts with a conventional driven printing cylinder 13 forming a part of the first of two printing mechanisms 20 and 20'. The printing cylinder 13 is journaled in the frame which is supplied with ink in the usual manner by inking rolls 14 and 15 arranged in an ink trough 16 mounted on the frame. The printing cylinder 13 inking rolls 14 and 15, large and small feeding roller 12 and 9 are geared together by meshing gears 17 and, as the printing cylinder 13 is provided with a sprocket 18 which is driven by a chain 19 coupled with the main drive presently referred to, the feed rollers and printing mechanism are simultaneously driven for feeding and printing the web of cloth. The second printing mechanism 20', corresponding to the first mechanism, is also mounted in the frame 7 to enable the cloth to be printed in two colors, if so desired.

The cloth supply roll 5 is adapted to be raised and lowered to facilitate assembly and disassembly thereof by virtue of the supporting bracket arms 6 being pivotally mounted, as at 21, on the main frame 1. The outer ends of the arms

6 are connected by rods or straps 22 with chains 23 which travel over sprockets 24 carried by the idler roll 8, and the chains are connected by coil springs 25 anchored on the main frame 1. A pawl 26 engages with the teeth of a ratchet wheel 27 formed on the shaft of the idler roll 8 so that, upon disengagement of the pawl 26, the shaft and sprockets 24 and may be rotated in the appropriate direction by a crank arm 28 to raise and lower the supply roll in an obvious manner. Tension is applied to the supply roll 5 by any suitable means, such as a cloth strip 29 which is attached at its upper end to the feeding frame 7 and is provided at its free lower end with suitable weights 30. The supply roll is also adapted to be adjustable laterally to enable the side edge of the web of cloth which is folded to be correspondingly adjusted for regulating the width of the hem formed thereon. In the mechanism herein illustrated, such an adjustment may be effected by journalling one end of the supply roll shaft in a block 31 (Figures 3 and 7) which is slidably mounted on pins 32 arranged on the outer end of one of the bracket arms 6. A disc actuated rod 33 is journaled in the bracket arm 6 and threadedly engages with the block 31 so that rotation of the disc causes the block 31 and supply roll shaft to be moved relative to the bracket arm in an obvious manner to effect the adjustment hereinabove referred to. However, it will be understood that other means may be employed to bring about such an adjustment of the cloth.

After the web of cloth has passed through the feeding and printing rollers just described, one side edge thereof engages with one end 35 of a folding rod 34.

By reference to Figure 34 it will be noted that an upwardly and laterally extending offset 36 is formed on one end of the folding rod 34 adjacent the end 35 thereof. The outer end of the offset 36 and the opposing end of the folding rod 34 are fixed in blocks 37 which are adjustably mounted on vertical posts 38 on the main frame 1. It will thus be seen that the end 35 of the rod 34 is spaced below the offset 36 and in effect constitutes an extension of the folding rod. As the cloth passes beneath the folding rod 34, it will be smoothed to remove any wrinkles or folds therefrom and the extended end 35 thereof will cause the side edge of the cloth to be curled or rolled upwardly and inwardly, as best shown in Figure 3. Upon passing the end 35 of the rod 34, the rolled edge of the cloth passes through the bent end 40 of a wire 39 (Figure 3) suitably supported by the frame 7 which has a tendency to flatten or complete the curling or rolling of the edge thereof.

As the edge of the cloth has been rolled or formed into a hem, it is now necessary to form notches or openings in the hemmed edge, prior to the insertion of the string therein and the sewing or stitching operation, so that there will be a gap or opening through which the string will extend. Heretofore, hemming devices of this general type, for example, those shown in my Patents Nos. 1,920,822 and 1,920,823, issued August 1, 1933, have employed slotters or cutters which form longitudinal slots in the hemmed edge, but these devices have provided unsatisfactory due to the difficulties encountered by the machine operators in pulling the strings through such slots. For these and other reasons, it is desirable to employ a rotary cutter which will form a substantially V-shaped notch in the hem.

Thus, a metal disc 41, best illustrated in Figures 17 to 26, is journaled in spaced blocks 42 mounted on the main frame 1, which disc is cut away, as at 43, to accommodate a cutter block 44 which is suitably attached by bolts or the like 45 to a flat wall 46 of the cut out 43. The outer or upper end of the cutter block 44 tapers to a point to provide a substantially inverted V-shaped cutter having two angularly disposed cutting edges 47 on the upper face 48 thereof. The underside of the cutting end of the block 44 is bevelled, as at 49 (Figure 26) to provide clearance for the cutting edges 47 which cutting edges project beyond the annulus of the disc 41. A screw 50 (Figure 20) having an enlarged head 51, is threadedly positioned in a bore 49' in the disc wall 46 and the head 51' thereof is adapted to bear against a tapered slot or channel 52 formed in the lower end of the cutter block 44 so that adjustment of the screw 50 enables the cutter block to be moved outwardly or inwardly to control the position of the cutter edges 47 and the depth of the notch formed thereby, in an obvious manner. As the cutting disc 41 is arranged at right angles to or transverse to the direction of feed of the web of cloth, it will be understood that, once in each rotation of the disc 41, the rolled or hemmed edge of the cloth web is provided with an inverted V-shaped notch 53, as best shown in Figure 35, for a purpose to be presently described. One end of the cutter disc shaft 54 carries a gear 55 which meshes with one of two gears 57 and 58 formed on a stub shaft 56 journaled in the blocks 42 below shaft 54. The other gear 58 meshes with a gear 59 journaled in the blocks 42 which gear 59 in turn meshes with a gear 61 (Figure 3) carried by a longitudinal driven shaft 60 journaled in the main frame 1, and a gear 144 (Figure 5) formed on the outer end of shaft 60 is drivingly connected, as hereinafter described, with the main machine drive so that the shaft 60 and chain of gearing just described is driven to actuate the cutter disc 41.

The hemmed edge of the cloth having been notched, the next operation is the insertion or laying of a draw string within the hem and the stitching or sewing of the latter. Thus a suitable cylinder sewing machine 63 for stitching the hem is supported on a bed plate 64 suitably mounted on the main frame. While the sewing machine is of conventional construction, suffice to say that it includes as best shown in Figures 1 to 4, a standard 65 and an overhanging bracket arm 66 terminating in a head 67. Journaled in the bed 64 is a main shaft 68 which is connected, by means not shown herein, to an upper rock shaft 69 journaled in the bracket arm 66. The outer end of the main shaft 68 is provided with the usual balance wheel 70 and pulley 71 which is drivingly connected by a belt 72 travelling over a pulley 73 carried by the outer end of the driven shaft 75 of a suitable electric motor 74 mounted on the main frame 1. The motor 74 is connected to a switch box 200 mounted on the main frame by a line 201 and the switch box is connected to a power line 202 with a source of power not shown. The rock shaft 69 actuates a needle 76 which is provided with sewing thread 78 from spools 77, in the usual manner. The sewing machine is also provided with the usual presser foot 79, associated with the needle 76 and spaced slightly above a cloth plate 80 over which the web of cloth passes.

Associated with the presser foot 79 and needle 76 of the sewing machine is a cloth hem folder

or hemmer 81 (best shown in Figures 10 to 16) consisting of a plate 82 secured to a block 83 having enlarged openings 84 extending therethrough to receive bolts 85 for adjustably attaching the block 83 and plate 82 to the cloth plate 80. One end of the plate 82 is cut away, as at 86, to enable the same to be snugly fitted around the presser foot 79, and the inner side edge of the plate 82 is bent or curled into a U-shape, as at 82', to fold the hem spaced above the main layer thereof. A block 87, attached to the upper face of the block 83 and projecting laterally therefrom and overhanging a portion of the plate 82, serves as a journal for two spaced vertical shafts 88 and 89 upon the lower ends of which are mounted knurled or toothed discs 90 and 91, respectively. The discs 90—91 meshingly engage one another and the disc 90 is provided with a groove 92 in the knurled periphery thereof to accommodate a string S which is fed between the discs. A substantially L-shaped arm 93, bolted, as at 94, to the side edge of the block 87 and provided with a string guide opening 96 in the bent upper end 95 thereof, extends downwardly between the discs 90—91 and is provided with an angularly disposed inwardly and downwardly extending string tube 97 on the lower end thereof. The string S, from a source of supply such as a spool 98, is passed through the guide opening 96 and thence downwardly and inwardly or laterally through the string tube 97 and directed against the discs 90—91 at their point of mesh. The shaft 89, carrying the disc 91, is provided with a pulley 99 on the extended upper end thereof which pulley is drivingly connected by a belt 100 (Figures 3 and 9) with a pulley 102 formed on the upper end of a vertical shaft 101 journaled in the frame 1. The shaft 101 is driven by means of a belt 103 which travels over a second pulley 104 on the shaft 101 and a pulley 105 on the extended end of a transverse shaft 105 carrying a smoothing roll 107, best shown in Figure 3. As the smoothing roll 107 is rotated, as presently described, the belts 103 and 100 are driven causing the disc shaft 89 to be rotated which in turn rotates the disc 91 in a clockwise direction, viewing Figure 12.

Due to the meshing engagement between discs 90—91, it will be noted that rotation of disc 91 causes the disc 90 to be rotated in an opposing or counter-clockwise direction, viewing Figure 12. During the rotation of the discs 90—91, the string S, in passing through the string tube 97, is frictionally engaged by the knurled peripheries of the rotating discs 90—91 and directed inwardly over the travelling web of cloth passing over the plate 82 and against the curled side hem portion of the web engaging with the curved wall 82' of the plate 82. Thus, the string S engages with the unsewed hemmed portion of the web of cloth so that the forward motion of the latter causes the string S to be laid or positioned in the cloth hem, before the hem is stitched by the sewing machine needle 76. In order to assure of the string S being positioned properly within the hemmed portion of the cloth web, the string S is engaged by the laterally bent lower end 109 of a vertically disposed pin 108 (Figures 11 to 15) fixedly supported in a bracket 110 suitably secured to the block 87 at a point above the outer edge of the knurled disc 90. As the web of cloth and string S pass through the folder or hemmer 81, the string frictionally engages the bent end 109 of pin 108 and is deflected against the inner face of the hem so that the same will be entirely arranged within the hem in position for the needle 76 to stitch the hem, as the

hemmed web passes beneath the head of the sewing machine, in an obvious manner. It will, of course, be understood that the string S, when positioned within the hem, will extend through the substantially V-shaped notches, formed in the side of the web by the cutter on the rotating cutting disc 41, previously described.

While I have described and illustrated the hem notching mechanism as being positioned at a point between the hem folding bar and the hemming and string inserting mechanism, it will be understood that the notching mechanism may also be mounted intermediate the sewing machine and web cutting roll, as illustrated in Figure 3a, so that the hemmed edge will be notched after the hemming, string inserting, and stitching operations have been completed. When the notcher is so rearranged, as shown in Figure 3a, to be positioned at some point intermediate the string feeder mechanism, sewing machine, and the web cutting roll, it follows that the string, having already been positioned within the hem, will be severed by the notcher so that the ends thereof will terminate and will be more or less coextensive with the edges of the notches. In other words, in this position of the notcher, the latter performs the dual function of notching the hemmed edge and severing the string. Thus, with the notcher so rearranged, the cutting roll 132 only serves the function of severing the web at the notches into bag blanks. When this occurs, it is necessary, after the folding into blanks, for the operator to manually strike one or a number of blanks against a table or the like which causes the ends of the string to pop out beyond the notched ends of the blanks.

The hemmed and strung and stitched web of cloth passes over the smoothing roll 107 and is pressed thereagainst by a pressing roll 111 journaled in bracket arms 112 mounted in bearing blocks 113 (Figures 1 and 2) on the frame. The outer ends of the bracket arms 112 are connected to angle pieces 114 (Figure 2) on the frame by spring pressed threaded screws 115 having wing nuts 116 on the upper ends thereof which may be adjusted to control the amount of pressure the roll 111 applies to the web and smoothing roll 107. The smoothing roll is likewise journaled in the bearing blocks 113 and carries a large gear 117 on one end thereof which meshes with and is driven by a small gear 120 (Figure 3) formed on a stub shaft 119 journaled in a block 118 on the frame. A large sprocket 121 mounted on the end of stub shaft 119', is driven by a chain 122 which travels over a sprocket 123 (Figures 2 and 3) carried by a shaft 124 journaled in blocks 123' on the frame. The shaft 124, constituting part of a variable speed drive 156 (Figures 4, 6 and 8) suitably mounted on the underside of the frame, is drivingly connected by a chain or belt 157 with a shaft 75' also forming part of the speed drive. Shaft 75' is driven from the motor driven shaft 75 by means of a belt 300 which travels over pulleys 301 and 302 on the respective shafts 75 and 75'. Rotation is imparted to the shaft 119 for driving the chain of gearing 120—122 and smoothing roll 107 just described by a large sprocket 125 formed on the outer end of shaft 119 and drivingly connected by a chain 126 with a sprocket 127 carried by the shaft 75'.

As the web of cloth passes over the smoothing roll 107, it is directed downwardly over a flat metal deflecting plate 128 (Figure 6) pivotally mounted in bracket arms 129 on the frame, which

serves to deflect the cloth downwardly over a flat cutter block plate 130 bolted to the end of the frame and which coacts with a rotating cutter member 131 for cutting the travelling web of cloth into bag blanks. The cutter member 131 consists of an elongated somewhat rectangularly shaped roll 132 (Figures 6, 30 and 33) mounted on a shaft 133 and having flat side walls 134 and tapered and fattened top and bottom walls 135 and 136, which shaft is journaled in bearings 137 mounted on the end of the frame. A cutter blade 138, removably arranged in an elongated groove 139 in one wall 135 of the roll 132, is tapered on its outer edge, as at 140, so that rotation of the cutter roll 132, in a clockwise direction viewing Figure 6, causes the cutting edge 141 of the blade 138 to press the web of cloth against the cutter plate 130 and sever or cut the same transversely into a substantially rectangular bag blank length. The cutter blade 138 is removably positioned within the roll groove 139 by bolts or the like 142 so that various sizes and lengths of blades may be used. Rotation is imparted to the cutter roll 132 by means of a gear 145 on the end of shaft 133 meshing with a small gear 147 carried by a short stub shaft 146 journaled in a bracket arm 148 mounted on the side of the frame. The gear 147 meshes with a gear 151 keyed to stub shaft 119' journaled in the bracket arm 148. The small gear 120 formed on the outer end of shaft 119 is driven through the chain 126 by the sprocket 127 (Figure 4) carried on the outer end of the shaft 75' of the variable speed drive 156 (Figures 4, 6 and 8). As the variable speed drive shaft 75' is drivingly connected by the belt 300 with the motor driven shaft 75, it will be apparent that the cutter roll 132 is rotated, through the chain of gearing just described, to effect the cutting of the cloth into bag blank lengths. A worm gear 143 on shaft 133 meshes with a worm gear 144 (Figure 5) on the shaft 80 so that the latter is rotated and the cutter disc 41 actuated in timed relation with the cutter roll 132.

After the web of cloth has been cut into bag blank lengths, it is necessary to fold the bag lengths into bag blanks and stack the same in bundles of a predetermined number of bag blanks so that the latter may thereafter be completed into finished bags. These operations are performed in the present machine by arranging a conveyor 158 below the cutting roll 132 at the forward end of the machine. The conveyor 158 consists of a series of continuous strips or belts 159 mounted on and travelling over a pair of spaced rollers 160 and 161 journaled in the opposing ends of a horizontally disposed frame 162 suitably mounted on the forward end of the main frame. Movement is imparted to the conveyor strips 159 by means of the shaft 163 (Figure 6) carrying the roller 160, being extended, and having a small sprocket 164 (Figure 1) which is driven by a chain 165 which travels over idler sprockets 166 and 167, journaled in the side of the frame, and a larger sprocket 168 carried by one end of the smoothing roll shaft 105. Thus, as the smoothing roll 107 is rotated, the chain 165 simultaneously rotates the roller 160 and causes the continuous travel or rotation of conveyor strips 159 in a counterclockwise direction viewing Figure 1. A fluted feed roller 169 (Figures 6 and 37), journaled in the upper ends of bracket arms 170 connected to the sides of the frame 162 adjacent the inner end thereof, carries a gear 171 which meshes with a gear 172 on the

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conveyor roller shaft 163, so that rotation of the latter as just described also causes the feed roller 169 to be rotated in an opposing or clockwise direction viewing Figure 1.

The bag blank length, after having been severed from the web of cloth by the cutting roll 132, depends downwardly behind the feed roller 169 and conveyor strips 159 and means must be provided for folding the bag blank length and delivering it between the feed roller 169 and onto the conveyor strips 159. Thus, a flat metal pushing or folding blade 173 (Figures 6 and 27) is mounted on the upper ends of three uprights or rods 174 carried by a shaft 175 journaled in the lower portion of the frame 182. An offset arm 176 secured to shaft 175 loosely carries a collar 177 to which is connected a link 178 having its other end connected to a block 179 mounted on a vertical rod 180. The rod 180 is slidably extended through bearings 181—182 on the frame and the free upper end thereof is adapted to be contacted and depressed by a cam piece 183 carried by one end of the cutter roll shaft 133. During the rotation of the cutter roll 132, it will be noted that, after the cutting has been effected, the cam 183 will engage with the free upper end of the rod 180 and depress the same which will cause the pushing or folding blade 173, through the link 178 and arm 176, to be swung upwardly and forwardly, in a counterclockwise direction viewing Figure 6, so that the bag blank length is engaged substantially in the mid section thereof by the forward edge of the blade 173 and the bag length is pushed forwardly under the feeding roller 169 and disposed on the travelling conveyor strips 159 in a folded condition, in the form assumed in Figure 36.

When the folded bag blank is positioned on the conveyor 158, the travelling strips 159 thereof carry the same forwardly until the blank drops by gravity onto an inwardly extending flat shelf 185 mounted adjacent the upper end of a vertically disposed relatively flat oscillating stacking member 184, the lower end of which is attached to arms 186 sleeved on a shaft 187 mounted in the main machine frame. The stacking member 184 is oscillated back and forth with respect to the conveyor 158 by means of a lever 188 connected, at one end, as at 189, to the upper end of the member 184 and at its other end to a slotted crank arm 190 carried by one end of the cutter roll shaft 133. Thus, during the rotation of the cutter roll 132, the stacking member 184 will be simultaneously oscillated so that the shelf 185 thereof will move rearwardly beneath the outer end of the conveyor 158 and the folded bag blank will drop thereonto, in an obvious manner. The shelf 185 is preferably provided with a transversely extending cloth or other friction strip 191 on the upper face thereof which serves to prevent the bag blank from sliding at too fast a rate over the shelf 185 and piling up against the stacking member with resulting wrinkling. So that a predetermined number of bag blanks may be stacked on the shelf in position for ready removal by the operator, it is desirable that the shelf 185 be slidably mounted on the stacking member 184 so that the shelf will move down under the weight of the bags disposed thereon. This may be effected by providing a vertical slot 192 (Figure 6) in the wall of the stacking member and having a bracket arm 193 on the shelf project therethrough with a block 194 thereon which is sleeved on vertical rod 195 mounted, as at 196, on the rear face of

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the stacking member. A downwardly depending flat adjustable tension spring 197 frictionally bears against the rod 195, so that the weight of the bags causes the shelf 185 to slide downwardly over the rod 195 until the lower end of the spring 197 abuts a stop, not shown, on the rod and further movement of the shelf is prevented. The operator may then remove the pile of bags stacked on top of each other, so that the hemmed, strung and folded bag blanks may thereafter be stitched, either automatically or by hand, into complete bags.

By reference to Figure 35, it will be noted that the ends of the string S project from the angularly cut ends of the folded bag blank a sufficient distance to enable the mouth of the bag to be gathered and closed when the folded blank is stitched into a bag.

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

Having thus described my invention what I claim is:

1. In a bag stringing machine, the combination of a rod for folding a hem in a continuously fed web of material, a disc having a cutter blade on the periphery thereof operative transversely of the direction of feed of the material, and means for rotating said disc to enable said cutter blade to form notches in the folded edge, means for completing the folded edge into a hem, and stringing means including a pair of members for conveying string under the folded and hemmed edge, means for stitching the hem with the string therein, a roller having cutting means thereon for severing the hemmed web at the notches and severing the string, and means for forming the severed portions of said web into bag blanks; and means for synchronizing and operating in timed relation all of said means.

2. In a bag stringing machine, the combination of a rod for folding a hem in a continuously fed web of material, a disc having a cutter blade on the periphery thereof operative transversely of the direction of feed of the material, and means for rotating said disc to enable said cutter blade to form notches in the folded edge, means for completing the folded edge into a hem, and stringing means including a pair of members for conveying string under the folded and hemmed edge, means for stitching the hem with the string therein, a roller having cutting means thereon, and means for rotating said roller for transversely severing the hemmed web at the notches and severing the string, and oscillating means for folding the severed portions of said web into bag blanks; and means for synchronizing and operating in timed relation all of said means.

3. In a bag stringing machine, the combination of a rod supported transversely of the direction of feed of a continuously fed web of material for folding a hem therein, a disc having a circumferentially disposed cutter blade, said blade having two angularly disposed cutting edges, and said disc being rotatable transversely of the direction of feed of the material whereby notches are formed in the folded edge thereof, means for completing the folded edge into a hem, and string inserting means for conveying string under the folded and hemmed edge, means for stitching the hem with the string therein, and means for severing the hemmed web at the notches and

severing the string of material and folding the severed portions into bag blanks; and means for synchronizing and operating in timed relation all of said means.

4. In a bag stringing machine, the combination of a rod supported transversely of the direction of feed of a continuously fed web of material for folding a hem therein, a disc having a circumferentially disposed cutter blade, said blade having two angularly disposed cutting edges, and said disc being rotatable transversely of the direction of feed of the material whereby notches are formed in the folded edge thereof, means for completing the folded edge into a hem, and string inserting means for conveying string under the folded and hemmed edge, means for stitching the hem with the string therein, rotatable cutting means for severing the hemmed web at the notches and severing the string of material and folding the severed portions into bag blanks, and means associated with the severing and folding means for stacking said folded bag blanks; and means for synchronizing and operating in timed relation all of said means.

5. In a bag stringing machine, the combination of means for folding a hem in a continuously fed web of material, a disc having a triangular cutter on the periphery thereof operative transversely of the direction of feed of the material, and means for rotating said disc to enable said cutter to form substantially V-shaped notches in the folded edge, means for completing the folded edge into a hem and stringing means including a pair of disc members for conveying string under the folded and hemmed edge, means for stitching the hem with the string therein, rotating cutting means for transversely severing the hemmed web at the notches into bag lengths and severing the string, conveying means associated with said cutting means, and an oscillating folding member engageable with the bag lengths folding and positioning the same on said conveying means; and means for synchronizing and operating in timed relation all of said means.

6. In a bag stringing machine, the combination of means for folding a hem in a continuously fed web of material, a disc having a triangular cutter on the periphery thereof operative transversely of the direction of feed of the material, and means for rotating said disc to enable said cutter to form substantially V-shaped notches in the folded edge, means for completing the folded edge into a hem and stringing means including a pair of disc members for conveying string under the folded and hemmed edge, means for stitching the hem with the string therein, a rotatable roll having a cutter blade therein for transversely severing the hemmed web at the notches into bag lengths and severing the string, continuous conveyor belts mounted on the machine and associated with said cutting means, and an oscillating folding member engageable with the bag lengths for folding and positioning the same on said conveying means, and an oscillating stacking member operable in timed relation with said folding member for receiving the folded bag blanks from said conveyor belts; and means for synchronizing and operating in timed relation all of said means.

7. In a machine for making and stringing bags from a continuously fed web of material, the combination of means for folding a hem in the web, means for notching the folded edge transversely, means for completing the folded edge into a hem, string inserting means com-

prising a pair of discs, means for rotating said discs in opposing directions, and guide means associated with said discs for feeding string to said discs whereby the string is positioned by said discs in the hemmed edge of the web, and means for stitching the hemmed web with the string therein, and means for synchronizing and operating in timed relation all of said means.

8. In a machine for making and stringing bags from a continuously fed web of material, the combination of means for folding a hem in the web, means for notching the folded edge transversely, means for completing the folded edge into a hem, string inserting means comprising a plate having a pair of discs mounted thereabove and parallel therewith, said discs being in the same horizontal plane with each other, and means for rotating said discs in opposing directions, and tubular string guiding means associated with said plate for feeding string between said discs whereby the string is frictionally engaged and positioned by said discs in the hemmed edge of the web, and means for stitching the hemmed web with the string therein, and means for synchronizing and operating in timed relation all of said means.

9. In a machine for making and stringing bags from a continuously fed web of material, the combination of means for folding a hem in the web, means for notching the folded edge transversely, means for completing the folded edge into a hem, string inserting means comprising a plate having a pair of discs mounted thereabove and parallel therewith, said discs being in the same horizontal plane with each other, and means for rotating said discs in opposing directions, and tubular string guiding means associated with said plate for feeding string between said discs whereby the string is frictionally engaged and positioned by said discs in the hemmed edge of the web, and means for stitching the hemmed web with the string therein, and means for synchronizing and operating in timed relation all of said means.

10. In a machine for making and stringing bags from a continuously fed web of material, the combination of means for folding a hem in the web, means for notching the folded edge transversely, means for completing the folded edge into a hem, string inserting means comprising a block having a plate secured thereto, a pair of discs mounted in said block and spaced above said plate, said disc being in the same horizontal plane and being in mesh with each other, and means for rotating said discs in opposing directions, and angularly disposed tubular string guide means mounted on said block for feeding string between said discs at their point of mesh whereby the string is frictionally engaged and positioned by said discs in the hemmed edge of the web, and means for stitching the hemmed web with the string therein, and means for synchronizing and operating in timed relation all of said means.

11. In a machine for making and stringing bags from a continuously fed web of material, the combination of means for folding a hem in said web, means for notching the folded edge transversely, means for completing the folded edge into a hem, hem stitching means, hemming and string inserting means, said last mentioned means comprising a block mounted on the machine frame, a plate secured to said block, a pair of toothed discs mounted in said block and spaced above said plate, said discs being in the same

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horizontal plane and meshingly engaging with each other, an angularly disposed tubular string guide means mounted on said block for feeding string between said discs at their point of mesh, and flexible means for rotating said discs in opposing directions whereby the string is frictionally engaged and positioned by said discs in the hemmed edge of the web before the stitching thereof, and means for synchronizing and operating in timed relation all of said means.

12. In a machine for making and stringing bags from a continuously fed web of material, the combination of means for folding a hem in said web, means for notching the folded edge transversely, means for completing the folded edge into a hem, hem stitching means, hemming and string inserting means, said last mentioned means comprising a block mounted on the machine frame, a plate secured to said block, a pair of serrated discs mounted on shafts journaled in said block and spaced above said plate, said discs being in the same horizontal plane and meshingly engaging with each other, an angularly disposed tubular string guiding means mounted on said block for feeding string between said discs at their point of mesh, and flexible means for rotating one of said shafts and discs whereby the discs are rotated in opposing directions and the string is frictionally engaged and positioned by said discs in the hemmed edge of the web before the stitching thereof, and means for synchronizing and operating in timed relation all of said means.

13. In a machine for making and stringing bags from a continuously fed web of material, the combination of means for folding a hem in said web, means for notching the folded edge transversely, means for completing the folded edge into a hem, hem stitching means, hemming and string inserting means, said last mentioned means comprising a block mounted on the machine frame, a plate secured to said block and having a curved hemming edge, a pair of vertical shafts journaled in said block, a serrated disc mounted on the lower end of each of said shafts and spaced above said plate, said discs being in the same horizontal plane and meshingly engaging with each other, a tubular string guide mounted on said block for feeding string between said discs at their point of mesh, flexible means engageable with one of said shafts for rotating said discs in opposing directions whereby the string is frictionally engaged and positioned by said discs in the hemmed edge of the web before the stitching thereof, and means for synchronizing and operating in timed relation all of said means.

14. In a machine for making and stringing bags from a continuously fed web of material, the combination of means for folding a hem in said web, means for notching the folded edge transversely, means for completing the folded edge into a hem, hem stitching means, hemming and string inserting means, said last mentioned means comprising a block mounted on the machine frame, a plate secured to said block, a pair of toothed discs mounted in said block and spaced above said plate, said discs being in the same horizontal plane and meshingly engaging with each other, one of said discs having a circumferential groove in the toothed portion thereof, an angularly disposed tubular string guide means mounted on said block for feeding string between said discs at their point of mesh and into the groove in one of the discs, and flexible means for

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rotating said discs in opposing directions whereby the string is frictionally engaged and positioned by said discs in the hemmed edge of the web before the stitching thereof, and means for synchronizing and operating in timed relation all of said means.

15. In a bag stringing machine, the combination of means for folding a hem in a continuously fed web of material, means for notching the folded edge transversely of the web, means for completing the folded edge into a hem and conveying a string thereunder, means for stitching the hem with the string therein, and means for severing the web at the notches into bag lengths and severing the string whereby the string projects beyond the notched ends, and means for synchronizing and operating in timed relation all of said means.

16. In a bag stringing machine, the combination of means for folding a hem in a continuously fed web of material, rotating means for notching the folded edge transversely of the web, means for completing the folded edge into a hem and conveying a string thereunder, means for stitching the hem with the string therein, and means for severing the web at the notched areas into bag lengths and severing the string whereby the string projects beyond the notched ends and means for synchronizing and operating in timed relation all of said means.

17. In a bag stringing machine, the combination of means for folding a hem in a continuously fed web of material, means for notching the folded edge transversely of the web, means for completing the folded edge into a hem and conveying a string thereunder, means for stitching the hem with the string therein and means for severing the web at the notches into bag lengths and severing the string whereby the string projects beyond the notched ends and means for folding the bag lengths into blanks and delivering the same into a stacking means, and means for synchronizing and operating in timed relation all of said means.

18. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for folding a hem in the web, means operative transversely of the direction of feed of the material for notching the folded edge transversely of the web, means for completing the folded edge into a hem and conveying a string thereunder, means for stitching the hem with the string therein, and means for transversely severing the hemmed web at the notches into bag lengths and severing the string and folding the lengths into blanks whereby the string projects beyond the notched ends thereof, and means for synchronizing and operating in timed relation all of said means.

19. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for printing the web, means for folding a hem in the web, rotary cutting means operative transversely of the direction of feed of the material for notching the folded edge transversely of the web, rotating means for completing the folded edge into a hem and conveying a string thereunder, means for stitching the hem with the string therein, and means for transversely severing the hemmed web at the notches into bag lengths and severing the string and folding the lengths into blanks whereby the string projects beyond the notched ends thereof, and means for synchronizing and operating in timed relation all of said means.

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20. In a bag stringing machine, the combination of means for folding a hem in a continuously fed web of material, a plate having cutting means thereon operative transversely of the direction of feed of the material, and means for rotating said plate to enable said cutting means to form notches into the folded edge, means for completing the folded edge into a hem, and stringing means including a pair of members for conveying string under the folded and hemmed edge, means for stitching the hem with the string therein, and means for severing the hemmed web at the notches and severing the string and forming the severed portions into bag blanks, and means for synchronizing and operating in timed relation all of said means.

21. In a bag stringing machine, the combination of means for folding a hem in a continuously fed web of material, means for completing the folded edge into a hem and conveying a string thereunder, means for stitching the hem with the string therein, means for notching the folded edge transversely of the web, and means substantially as wide as the hemmed web for severing the web at the notches into bag lengths, and means for synchronizing and operating in timed relation all of said means.

22. In a bag stringing machine, the combination of means for folding a hem in a continuously fed web of material, means for completing the folded edge into a hem and conveying a string thereunder, means for stitching the hem with the string therein, means for notching the folded edge transversely of the web, and a roller having cutting means thereon substantially as wide as the hemmed web for severing the web at the notches into bag lengths, and means for synchronizing and operating in timed relation all of said means.

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23. In a bag stringing machine, the combination of means for folding a hem in a continuously fed web of material, means for completing the folded edge into a hem and conveying a string thereunder, means for stitching the hem with the string therein, means for notching the folded edge transversely of the web and severing the string, and means for severing the web at the notches into bag lengths, and means for synchronizing and operating in timed relation all of said means.

24. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for printing the web, means for folding a hem in the web, rotating means for completing the folded edge into a hem and conveying a string thereunder, means for stitching the string therein, rotary cutting means operative transversely of the direction of feed of the material for notching the folded edge transversely of the web and severing the string, and means for transversely severing the hemmed web at the notches into bag lengths and folding the lengths into blanks, and means for synchronizing and operating in timed relation all of said means.

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