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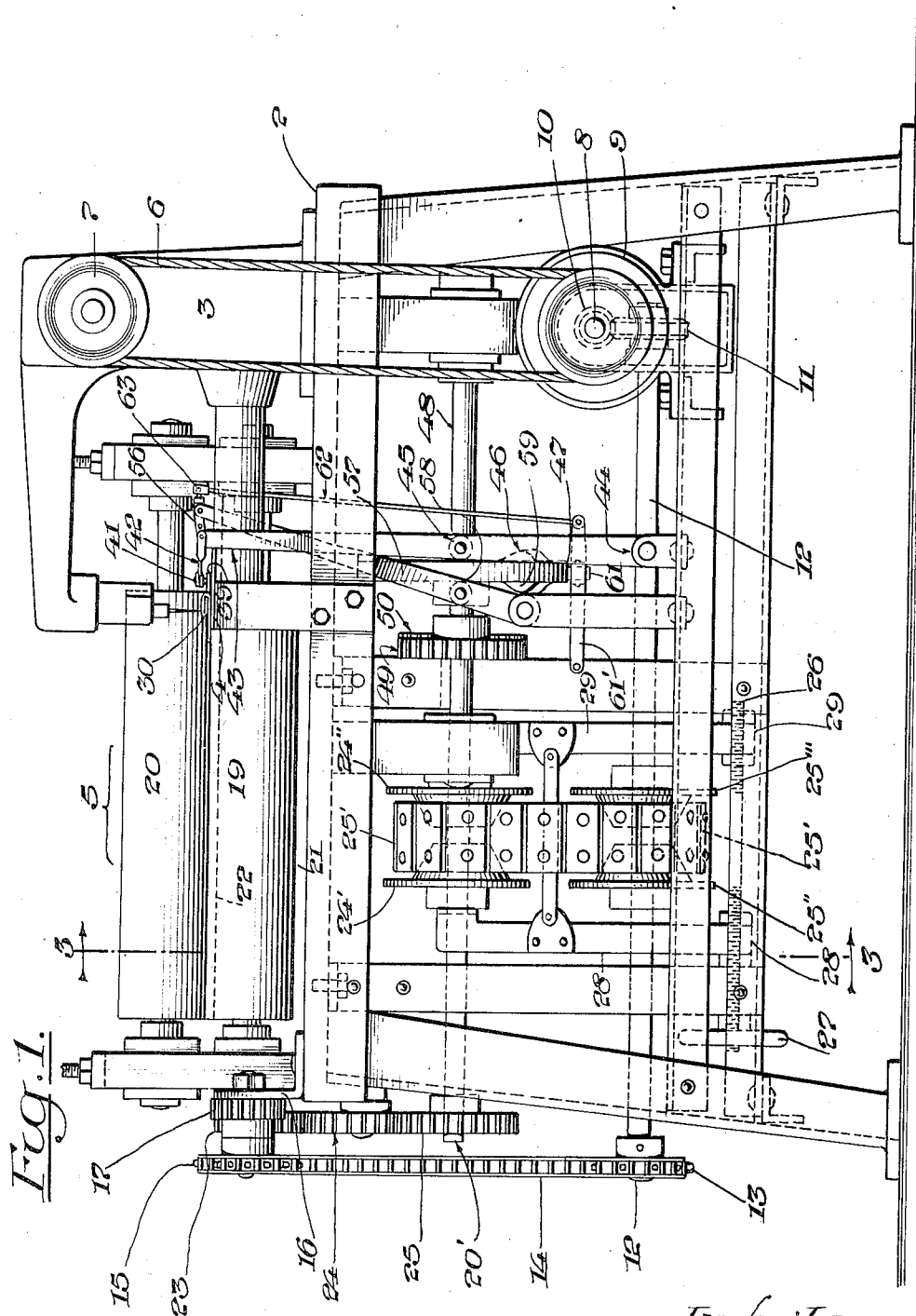
E. E. WEST

1,920,822

BAG STRINGING MACHINE

Filed May 27, 1930

5 Sheets-Sheet 1



Inventor
Edward E. West
by his Attorney
C. H. Reed

Aug. 1, 1933.

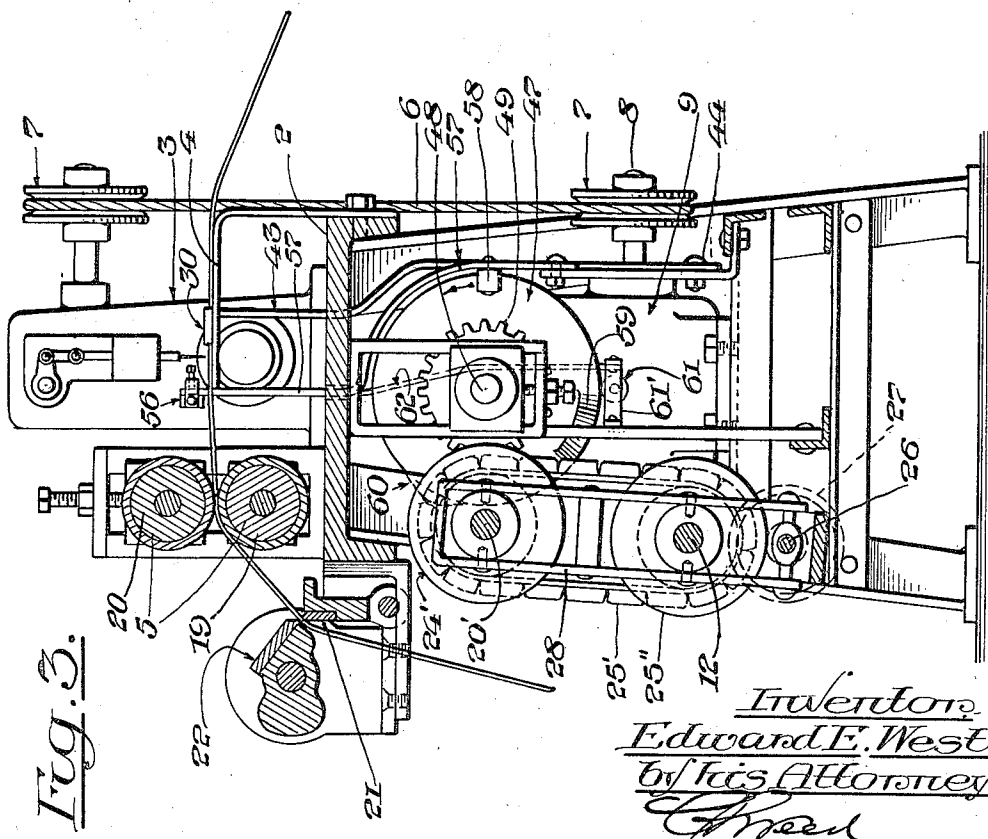
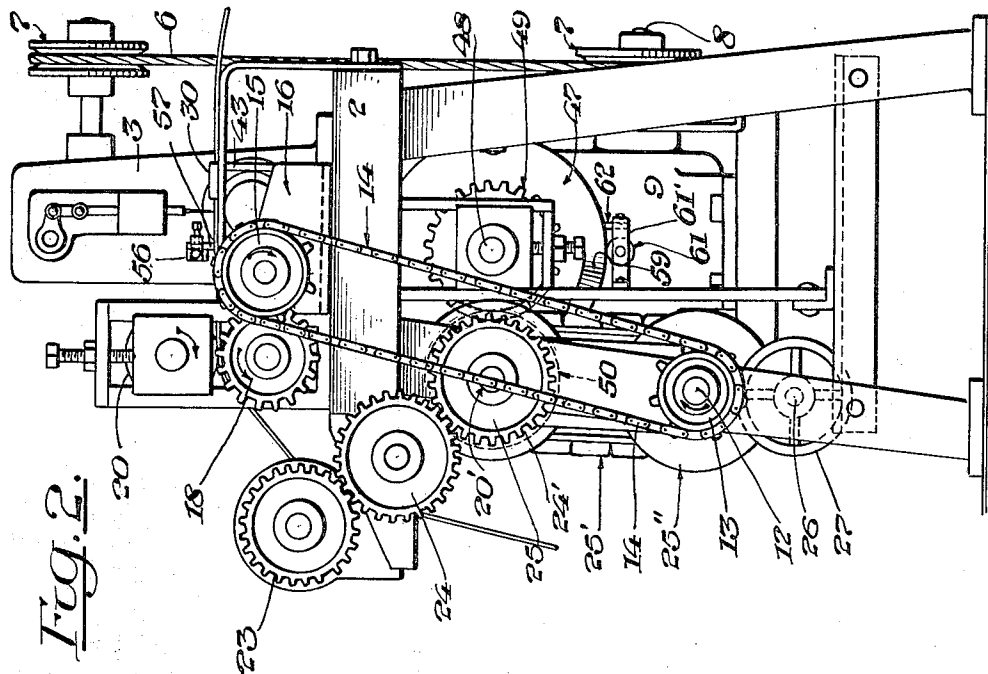
E. E. WEST

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5 Sheets-Sheet 2



Inventor
Edward E. West
by his Attorney
Chas. H. Reed

Aug. 1, 1933.

E. E. WEST

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5 Sheets-Sheet 3

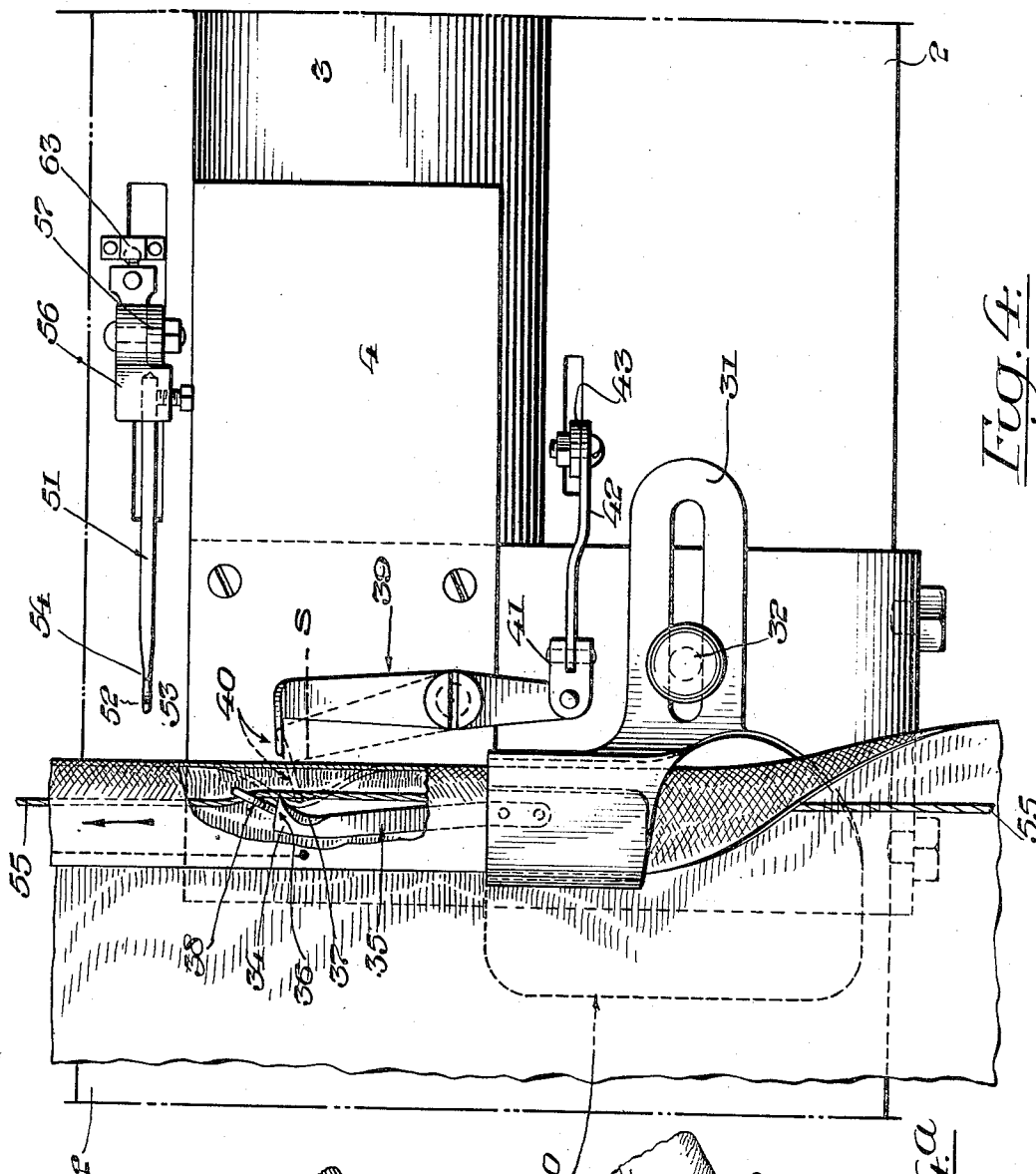


Fig. 4.

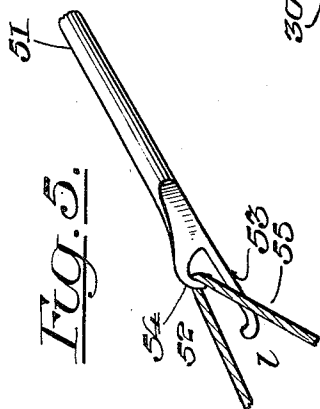


Fig. 5.

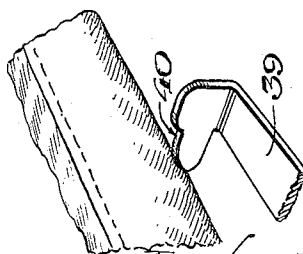


Fig. 4a.

Inventor
Edward E. West
by his Attorney
Chas. Reed

Aug. 1, 1933.

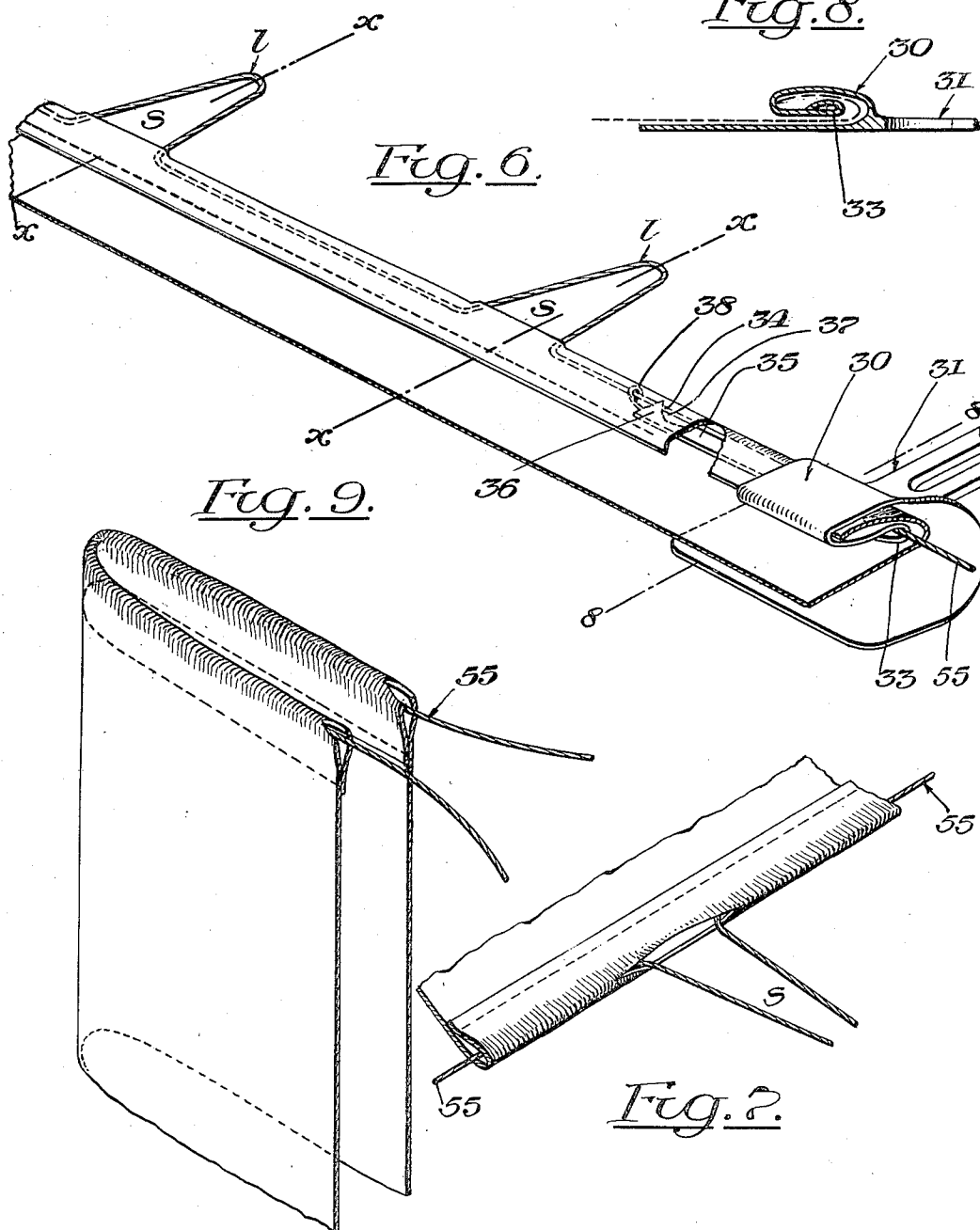
E. E. WEST

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BAG STRINGING MACHINE

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5 Sheets-Sheet 4



Inventor
Edward E. West
By His Attorneys
G. Reed

Aug. 1, 1933.

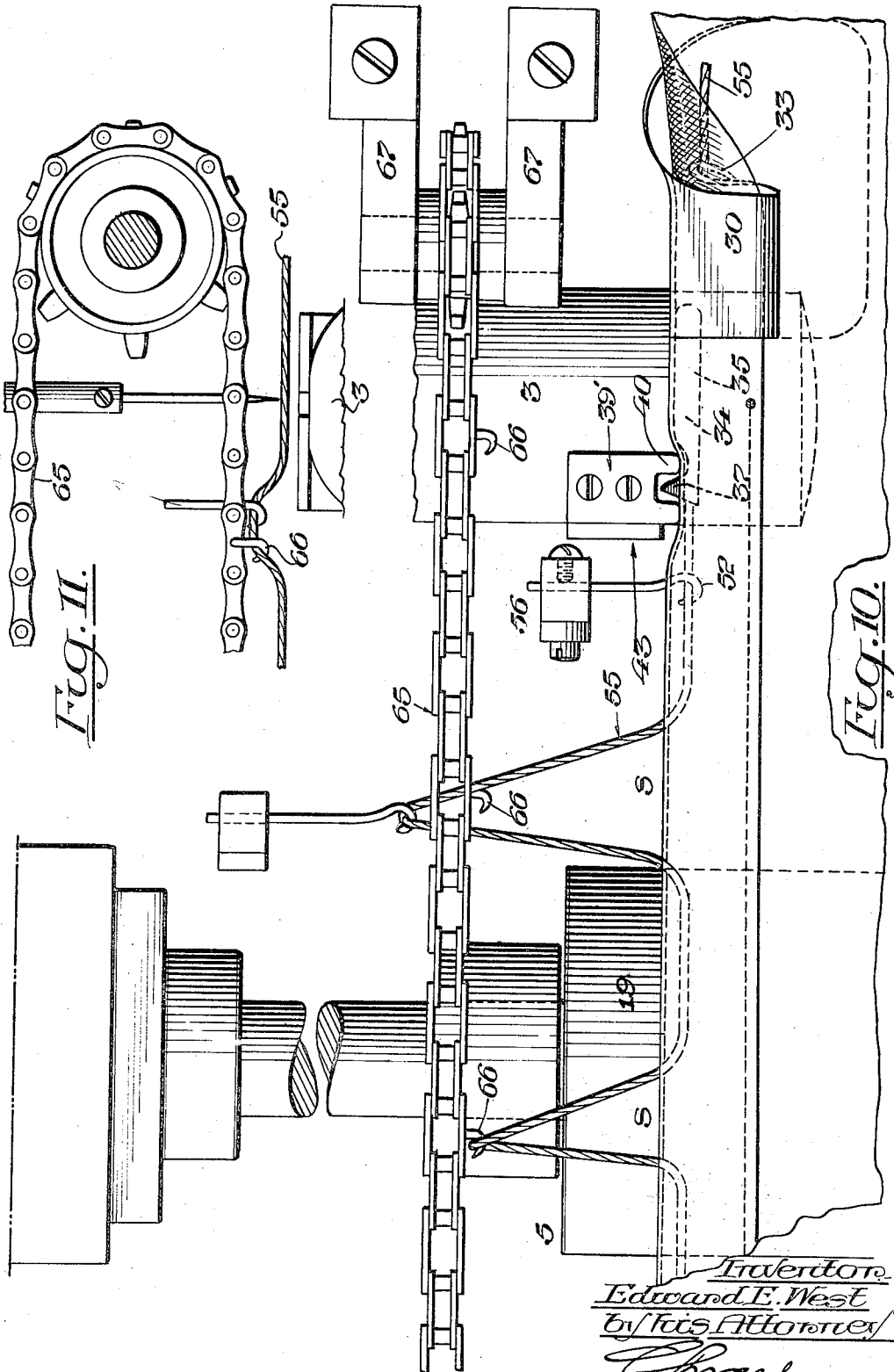
E. E. WEST

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BAG STRINGING MACHINE

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5 Sheets-Sheet 5



UNITED STATES PATENT OFFICE

1,920,822

BAG STRINGING MACHINE

Edward E. West, Richmond, Va.

Application May 27, 1930. Serial No. 456,138

32 Claims. (Cl. 112—2)

This invention is a bag stringing machine, the object thereof being to provide an improved method of stringing bags and mechanism which will automatically supply or feed a string to a continuous web of bag forming material during the hemming thereof, then slitting or cutting openings in the material during the continuous feeding thereof at intervals adjacent to the string, and then draw out the string into loops to be subsequently severed whereby when each blank severed from the web is formed into a bag the string will have projecting ends which may be used to gather the top of the bag, thus obviating the necessity of subsequently stringing the bag and thereby very much facilitating the expeditious manufacture of the bags and decreasing the expense of such manufacture.

A further object of the invention is the provision of means for receiving and conveying the so drawn out loops into position to be severed.

A further object of the invention is the provision of means for simultaneously severing the string loops and the web of material into bag blanks.

As is well known, bag material in the form of a continuous web is passed through a sewing machine and during its passage one edge of the material passes through a folder to form a hem, this hem being stitched by the sewing machine. The web is subsequently cut into bag blanks, each of a size to form the desired size of bag and then the string is passed through the folded hem portion for the purpose of gathering the neck of the bag, a common form of such bag being a mailing bag.

This method of stringing the bags, however, is slow and expensive and the object therefore, of the present invention is to automatically string the bag material simultaneously with the hemming thereof and then draw out loops of string at intervals so that when these loops and the bag material are severed into bag blanks sufficient string will project from the cut ends of the blank to enable the mouth of the bag to be gathered and closed when the blank is stitched into a bag, and to do this by a simple and efficient and inexpensive mechanism applicable to the ordinary hem folding and stitching mechanism heretofore used for the formation of the hem of bag material.

In the drawings accompanying and forming a part of this specification—

Figure 1 is a front view of a bag hemming and stitching machine having this improved stringing mechanism applied thereto;

Fig. 2 is a left hand end view of Fig. 1;

Fig. 3 is a vertical cross sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a plan view of the stringing mechanism;

Fig. 4a is a detail view of the means for engaging the fold of the hem and shifting it into engagement with the knife;

Fig. 5 is a perspective view of the means for drawing out the loops of string;

Fig. 6 is a perspective view illustrating the manner in which the bag material is hemmed and the string drawn into loops. This view illustrates in section the hemmer and string guiding means and the fold severing knife;

Fig. 7 is a perspective view illustrating the manner in which the string loop is severed either prior to or at the time that the bag web is severed into blanks;

Fig. 8 is a cross sectional view of the hem folding and string guiding means taken on line 8—8 Fig. 6 except that the bent portion 33 is shown reversed to that of Fig. 6;

Fig. 9 is a bag blank severed from the web and ready to be stitched to form a bag;

Fig. 10 is a plan view illustrating a loop carrying conveyor for supporting the string loops in the proper position to be severed and also illustrating a somewhat modified form of knife co-operating member; and

Fig. 11 is a side view of a portion of this loop conveyor.

Similar characters of reference indicate corresponding parts in the several views.

Before explaining in detail the present improvement and mode of operation thereof, I desire to have it understood that the invention is not limited to the details of construction and arrangement of parts which are illustrated in the accompanying drawings, since the invention is capable of other embodiments, and that the phraseology which I employ is for the purpose of description and not of limitation.

As the machine for stitching the web hem of bag material is of well known form, it is not deemed necessary to describe in detail the construction of this machine except in so far as it has to do with the stringing mechanism and therefore, it is believed that a brief description will suffice.

The machine comprises a suitable supporting means or table 2 upon which is mounted a suitable cylinder sewing machine 3 for stitching the hem, the mechanism being provided with what may be designated as a cloth plate 4 secured to

the support for the passage of the web of material thereover.

In the rear of the stitching mechanism is a pair of feed rollers 5 provided for drawing the material past the stitching mechanism. The sewing machine is operated by means of a belt 6 and belt wheels 7, the lower one being mounted on a shaft 8 of a suitable electric motor 9 provided with a worm gear 10 in mesh with a worm wheel 11 mounted on the longitudinally extending main driving shaft 12, the opposite end of which is provided with a sprocket gear 13 carrying a sprocket chain 14 leading to another sprocket gear 15, mounted on a bracket 16 carrying a gear 17 in mesh with a gear 18 carried by the lower feed roll 19 for rotating it, the upper feed roll 20 being adjustably held in frictional contact with the lower roll 19.

For the purpose of severing the web of material into bag blanks, I have provided the machine at the rear of these feed rolls with a bag severing means comprising a fixed knife 21 extending transversely across the web of material, and a rotary knife 22 timed to sever the web into the required size of bag blanks. The shaft of the knife roll is provided with a gear 23 driven by means of a pair of gears 24 and 25, the latter mounted on a stub shaft 20' carrying a pair of cone clutches 24' and 24'' driven by means of a belt 25' from a similar pair of cone clutches 25'' and 25''' mounted on the main driving shaft 12. These cone clutches are adjustable toward and from each other by a suitable mechanism including a screw 26 and hand wheel 27 controlling a pair of levers 28 and 29 connected with the clutches whereby the shifting of one pair, as for instance toward each other, will shift the other pair of clutches away from each other thus regulating the speed of the belt as desired thereby to control the length of bag blanks severed from the web. This particular clutch mechanism is of well known construction and therefore, a further detailed description thereof is deemed unnecessary.

Mounted on the cloth plate 4 above the sewing machine cylinder carrying the usual looper mechanism is located an improved hem folder 30 adjustably supported on this cloth plate, for which purpose the folder is provided with a slotted arm 31 secured to the cloth plate by a thumb screw 32. This improved folder is of U-shaped form to fold the hem of the web. The end or leg of the hem folding portion, however, is bent upon itself to form a tube 33 (see Fig. 6) for guiding the string to the hem so that the folder not only folds the hem but also carries and guides the string into position within the hem. In Fig. 8, this bend is shown reversed from that shown in Fig. 6.

Secured to the front end of the folder is a cutter 34 comprising a shank 35 having its end formed of a V-shaped form or pointed as at 36, the inner edge 37 of which forms the cutting surface or knife and at the end of this knife or blade is located an eye 38 for guiding the string below the knife edge so that the hem of the web is folded over this knife and its shank and string guiding eye and stitched by the stitching mechanism.

Pivottally supported on the cloth plate is a horizontally located pivoted member 39 (see Figs. 4 and 4a) having a nose 40 for engaging the fold of the material or hem and pushing it into position to be cut by the knife 34. This member operates at intervals during the con-

tinuous feeding of the web of material so that whenever it pushes in the folded hem or web of material into engagement with the knife, the knife will sever or slit the fold of the hem for a predetermined distance along the same since at this time the continuous feeding of the web draws the fold along the edge of the knife thus cutting or slitting the material, as long as the fold engaging member keeps the fold of material into engagement with the knife. This fold engaging member is timed to accomplish this result at intervals as at s along the web of material and these intervals will occur at those portions where the two bag blanks will be severed (see dotted lines x-x Fig. 6). For operating this member its other end is pivottally connected to a link 41 which in turn is connected with a link 42 pivottally connected to a depending lever 43 pivottally connected at its lower end to a strap or bracket 44 secured to the frame and provided with a cam roll 45 in position to be engaged by a cam 46 carried on a rotary cam carrying disc 47 secured to a shaft 48 having a gear 49 in mesh with a gear 50 mounted on the end of the shaft 20' carrying the upper pair of cone clutches, whereby the cam disc is also rotated from the main driving shaft to operate the knife co-operating member.

It will be understood that when the swinging member 39 is away from the knife, the fold of the hem is not severed but is merely drawn along with the string over the knife.

When the severed portion s of the fold has passed away from the knife a string engaging member 51 is shifted into position to project into the severed portion and hook onto the string and draw a sufficient amount of the string through the severed portion to form a loop l to provide the necessary ends projecting from the bag blank when severed from the web and for this purpose a hook member 52 having substantially the shape shown in Fig. 5 is provided. The lower end 53 of this member projects upward so as to engage the lower severed portion or layer of the web and spread and hold it open while the hook portion 54 is so shaped as to engage the upper edge or layer of the severed material and assist in spreading it to enable the hook to enter the hem and hook over the cord or string 55 after which this string engaging hook 52 is shifted away from the hem and for this purpose it is carried by a pivoted holder 56 pivottally connected to a lever 57 pivottally supported at its lower end on the frame and provided with a cam roll 58 in position to be engaged by a cam 59 carried by the cam disc 47 thereby to shift this hook toward and from the hem. This hook has a slight rising and falling movement to insure its hooking over the string and means is provided for this purpose which consists in providing the cam disc 47 with a cam 60 (see Fig. 3) for engaging a roll 61 secured to one end of a pivoted lever 61'. The other end of this lever is connected to a rod 62, the upper end of which has a universal joint connection 63 with the hook holder 56 (see Fig. 4). Thus the outer end of the holder 56 is raised by the cam 60 at the proper time thereby to depress the hook over the string.

In the operation of this bag stringing mechanism the string and the continuously fed web of material are drawn through the hem folder which folds the hem over the string thereby to infold it. As the folded edge of the web is drawn along over the knife (see Fig. 4) the co-operating knife member 39 is shifted to press the

edge of the web into engagement with the knife, the string being below the knife due to the fact that the eye at the end of the knife holds the string away from the cutting edge of the knife. At this time the knife severs or slits a certain amount of the web at the folded portion of the hem. Thereafter the string hook is shifted forward, spreads this severed portion and hooks over the string and draws out a surplus amount of string to form a loop, which loop and web are subsequently cut transversely of the width of the web by the rotary cutting roller into bag blanks, so that when the bag blanks are thus formed a free end of the string will project at each cut end of the blank (see Fig. 9) and consequently when the bag blank is sewed to form a bag the strings may be readily used to gather the mouth and close the same. The loops may be cut by hand or by the web cutting roller which when used for this purpose will be elongated sufficiently to accomplish this.

In practice I have found it desirable to provide what I have termed a loop conveyer consisting of a belt or chain 65 carrying hooks 66 located at intervals so that when the loops are drawn out by the hooks 52 they will be in position to be caught by the conveyer hooks 66 and then carried along by the conveyer to be severed so that they are thus prevented from falling and interfering with the mechanism of the machine. This means also preserves the same uniform length of loops in that it prevents a previously formed loop from being drawn back as a succeeding loop is drawn out and thus holds the loops taut. This conveyer is shown in Fig. 10 and consists of a suitable sprocket operated chain 65 suitably supported at its opposite ends by brackets 67, the chain being driven by a suitable connection with the main driving shaft. In Fig. 10 the fold engaging member 39' co-operating with the knife is shown as of U-shaped form, otherwise it operates in substantially the same manner as the member 39 shown in Fig. 4.

When the cut edges of the bag blank are seamed to form the bag, the severed portions of the fold permit the string to be held back therebetween and thus out of the way during the seaming of the edges and thus stitching of the string where it projects from the hem is prevented.

From the foregoing it will be seen that each bag blank when severed from the web has a materially greater length of string than the length of the hem.

It is to be understood that by describing in detail herein any particular form, structure or arrangement, it is not intended to limit the invention beyond the terms of the several claims or the requirements of the prior art.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the modes of its use, I claim:

1. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for feeding a string into position to be infolded by the hem of such continuously fed web of material, means for folding the hem over the string, means for stitching the hem, and means operative in the rear of the folding means for cutting the web at intervals after the folding of the hem and during the

feeding thereof adjacent to the infolded string to permit access to the string.

2. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for feeding a string into position to be infolded by the hem of such continuously fed web of material, means for folding the hem over the string, means for stitching the hem, means operative in the rear of the folding means for cutting the web at intervals after the folding of the hem and during the feeding thereof adjacent to the infolded string to permit access to the string and means for drawing loops of string out of the hem at the cut portions thereof.

3. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for feeding a string into position to be infolded by the hem of such continuously fed web of material, means for folding the hem over the string, means for stitching the hem, means operative in the rear of the folding means for cutting the web at intervals after the folding of the hem and during the feeding thereof adjacent to the infolded string to permit access to the string, means for drawing loops of string out of the hem at the cut portions thereof and means for severing the web in line with the cut portions thereof to form bag blanks.

4. In a bag stringing machine, the combination of means for feeding a string into position to be infolded by the hem of a continuously fed web of material, means for folding the hem over the string, means for stitching the hem, means for cutting the web at intervals during the feeding thereof adjacent to the infolded string to permit access to the string, means for drawing loops of string out of the hem at the cut portions thereof and means for severing the material into bag blanks transversely of the string loops at the bight thereof.

5. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for folding a hem in such continuously fed web of material, means in the stitched hem for guiding a string therein during the folding of the hem, means for stitching the hem with the string therein, and means in the rear of the folding means for guiding the string.

6. In a bag stringing machine, the combination of means for feeding a string into position to be infolded by the hem of a continuously fed web of material, means for folding the hem over the string, means for stitching the hem, means for cutting the web at intervals during the feeding thereof adjacent to the infolded string to permit access to the string, means for drawing loops of string out of the hem at the cut portions thereof and means for severing the web transversely of the hem and midway of the cut portions thereof and transversely of the string loops at the bight thereof.

7. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for guiding a string to be infolded by the hem of such continuously fed web of material, means for simultaneously folding the hem over the string, means for stitching the hem, and means operative in the rear of the folding means for cutting the web at intervals after the folding of the hem and during the feeding thereof adjacent to the string to permit access to the string.

8. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for guiding a string to be infolded by the hem of such continuously fed web of material, means for simultaneously folding the hem over the string, means for stitching the hem, means operative in the rear of the folding means for cutting the web at intervals after the folding of the hem and during the feeding thereof adjacent to the string to permit access to the string and means for drawing loops of the string out of the hem at the cut portions thereof.
9. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for guiding a string to be infolded by the hem of such continuously fed web of material, means for simultaneously folding the hem over the string, means for stitching the hem, means operative in the rear of the folding means for cutting the web at intervals after the folding of the hem and during the feeding thereof adjacent to the string to permit access to the string, means for drawing loops of the string out of the hem at the cut portions thereof and means for severing the web transversely of the hem and adjacent to the cut portions thereof to form bag blanks.
10. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for folding a hem in such continuous web of material, means for inserting a string into the hem, means operative after the folding means for drawing out loops of string during the feeding of the web and hem stitching means for stitching the hem with the string therein.
11. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for folding a hem in such continuously fed web of material, means for stringing the hem, means operative after the folding means for insuring more string fed through the hem during the feeding of the web than the length of the hem and means for stitching the hem with the string therein.
12. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for guiding a string to be infolded by the hem of such continuously fed web of material, means for folding the hem over the string, means for stitching the hem, means operative in the rear of the folding means for slitting the web at intervals after the folding of the hem and during the feeding thereof at the folded edge of the hem to permit access to the string, means for drawing loops of the string out of the hem at the cut portions thereof and conveying means for receiving the loops and conveying them into position to be severed.
13. In a bag stringing machine, the combination of means for guiding a string to be infolded by the hem of a continuously fed web of material, means for folding the hem over the string, means for stitching the hem, means for slitting the web at intervals during the feeding thereof at the folded edge of the hem to permit access to the string, means for drawing loops of the string out of the hem at the cut portions thereof and means for severing the web and string loops to form bag blanks.
14. In a bag stringing machine, the combination of means for guiding a string into position to be infolded by the hem of a continuously fed web of material, means for folding the hem over the string, means for stitching the hem, means for pushing the folded edge of the web inward, and means for slitting the folded edge of the hem to permit access to the string.
15. In a bag stringing machine, the combination of means for guiding a string into position to be infolded by the hem of a continuously fed web of material, means for folding the hem over the string, means for stitching the hem, means for pushing the folded edge of the web inward, means for slitting the folded edge of the hem to permit access to the string and means for successively drawing loops of the string from the slitted portions of the hem into position to be severed.
16. In a bag stringing machine, the combination of means for guiding a string into position to be infolded by the hem of a continuously fed web of material, means for folding the hem over the string, means for stitching the hem, means for pushing the folded edge of the web inward, means for slitting the folded edge of the hem to permit access to the string, means for successively drawing loops of the string from the slitted portions of the hem into position to be severed and conveying means for receiving the loops and carrying the same into position to be severed.
17. In a bag stringing machine, the combination of hem folding means, string positioning means, string loop drawing out means operative after the folding means, means for maintaining the loops taut after they are drawn out and hem stitching means for stitching the hem with the runs of string between the loops.
18. In a bag stringing machine, the combination of means for continuously feeding a web of fabric, means for folding a hem along an edge thereof, means for conveying a string to the hem, means operative after the folding of the hem for drawing out loops of string and means for stitching the hem with the runs of string loose between the loops.
19. In a bag stringing machine having a combined hem folder and string guiding means having a knife projecting therefrom to cut a folded part of the hem and string guiding means carried by the end of the knife blade.
20. A bag stringing machine having a hem folder comprising a member having an inwardly bent portion terminating at its inner edge in a string carrying loop said folder having a knife carried thereby for cutting portions of a web hem.
21. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for folding and sewing down the edge of the web of material to form a hem with a string therein, and means operative after the folding means for slitting the hem at spaced portions thereof and drawing loops of the string through the slits in the hem while the web of material is moving.
22. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for folding and sewing down the edge of the web of material to form a hem, means for locating a string therein, and means operative after the folding means for slitting the hem at spaced portions thereof and drawing loops of string through the slits in the hem while the web of material is being continuously fed.
23. In a bag stringing machine, the combination of means for forming and sewing down the

edge of a web of material to form a hem, means for locating a string therein, means for slitting the hem at spaced portions thereof and drawing loops of string through the slits in the hem while the web of material is being continuously fed, and means for cutting the web transversely of the string loops at the bights thereof.

24. In a bag stringing machine, the combination of means for folding and sewing down the edge of a web of material to form a hem, means for locating a string therein, means operative after the folding means for slitting the hem at spaced portions thereof and drawing loops of string through the slits in the hem while the web of material is being continuously fed, and means for maintaining the loops in a taut position during the feeding of the web and after they are drawn out.

25. In a bag stringing machine, the combination of means for folding and sewing down the edge of a web of material to form a hem, means for locating a string therein, means operative after the folding means for slitting the hem at spaced portions thereof and drawing loops of string through the slits in the hem while the web of material is being continuously fed, means for maintaining the loops in a taut position during the feeding of the material and after they are drawn out, and means for cutting the web transversely of loops of thread at the bights thereof.

26. In a bag stringing machine, the combination of means for folding and sewing down the edge of a web of material to form a hem, means for locating a string therein, means operative after the folding means for slitting the hem at spaced portions thereof and drawing loops of string through the slits in the hem while the web of material is being continuously fed, means for maintaining the loops in a taut position during the feeding of the material and after they are drawn out, means for cutting loops of thread at the bights thereof, and means for severing the web transversely of the hem and adjacent to the slit portions thereof to form bag blanks.

27. In a bag stringing machine, the combination of means for continuously feeding a web of material, means for folding and sewing down the edge of a web of material into hem formation with a string therein during the continuous feeding of the web, means for slitting the hem after the formation thereof at spaced portions thereof

during the continuous feeding of the web and simultaneously with such feeding of the web drawing loops of the string through the slits in the hem.

28. The method of stringing bags which consists in continuously feeding a web of material and during the feeding thereof forming a hem and sewing the edge thereof with a string loosely infolded in the hem and after the formation of the hem and during the feeding of such material slitting the hem lengthwise thereof at spaced intervals and simultaneously with such feeding of the material drawing out the string to form loops.

29. The method of stringing bags which consists in continuously feeding a web of material and during the feeding thereof forming a hem and sewing the edge thereof with a string loosely infolded in the hem and after the formation of the hem during the feeding of such material slitting the hem lengthwise thereof at spaced intervals and simultaneously with such feeding of the material drawing out the string to form loops, and then severing the material and the loops at the bights thereof to form bag blanks.

30. The method of stringing bags which consists of sewing down the edge of a web of material into a hem formation with a string loose therein during the continuous feeding thereof and then after such hem formation cutting the hem at spaced portions thereof and drawing loops of string through the openings in the hem during the feeding of the web of material.

31. The method of stringing a bag which consists in folding a hem in a web of material, then sewing the edge thereof and after the formation of such hem then slitting the hem lengthwise thereof at spaced intervals and drawing out loops of string through the slit portions thereof with the string loops projecting beyond the hem.

32. The method of stringing a bag which consists in continuously feeding a web of material, folding a hem in such web of material, then sewing the edge thereof and after the formation of such hem then slitting the hem lengthwise thereof at spaced intervals and drawing out loops of string through the slit portions thereof with the string loops projecting beyond the hem, said slitting and loop drawing taking place during the feeding of the web continuously.

EDWARD E. WEST.

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