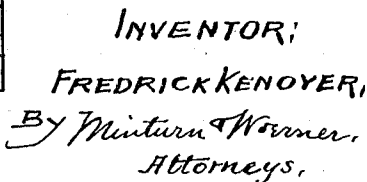


953,039.

4 SHEETS--SHEET 1.

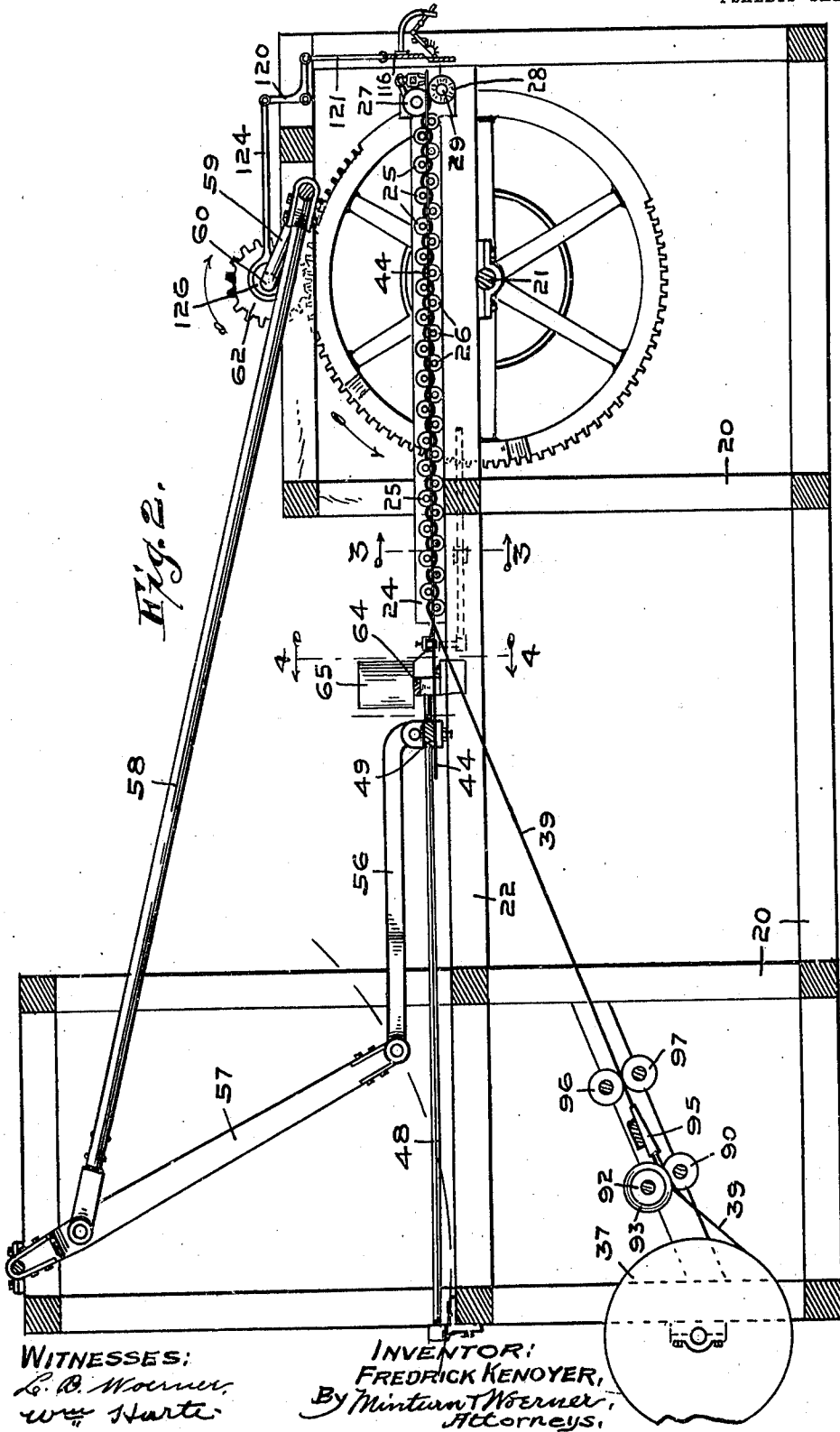


F. KENOYER.
MACHINE FOR MAKING BROOM COVERS.
APPLICATION FILED FEB. 18, 1908.

953,039.

Patented Mar. 29, 1910.

4 SHEETS—SHEET 2.

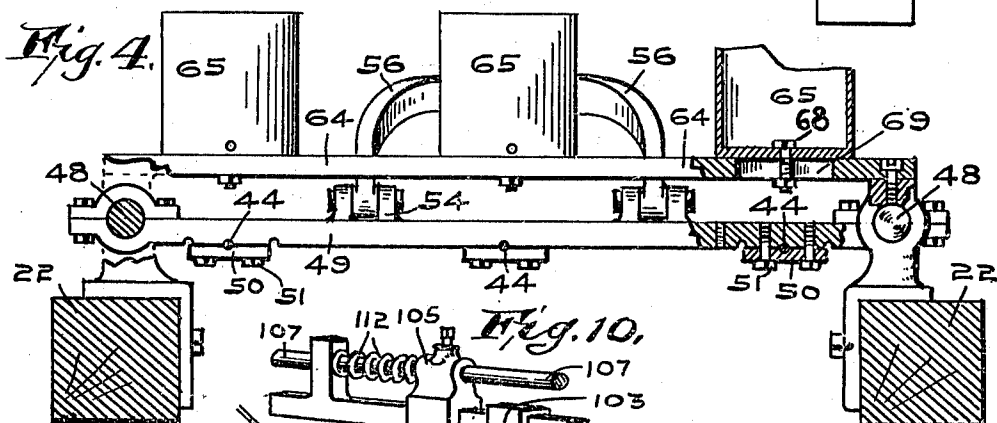
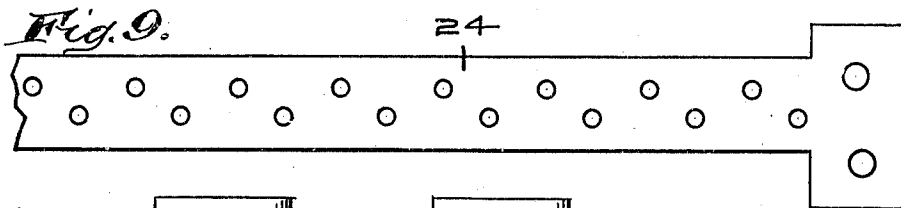
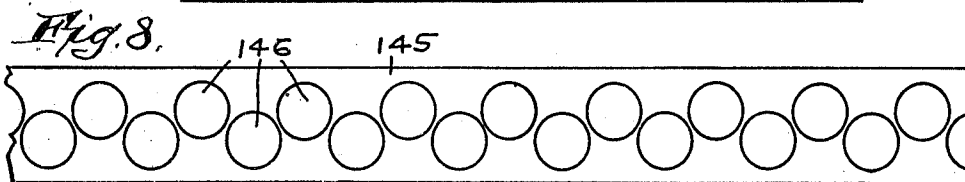
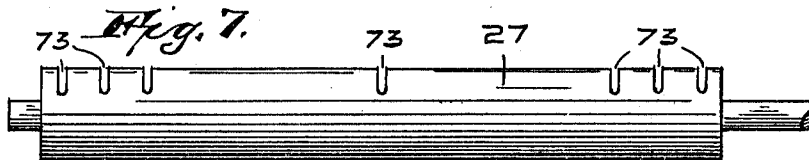
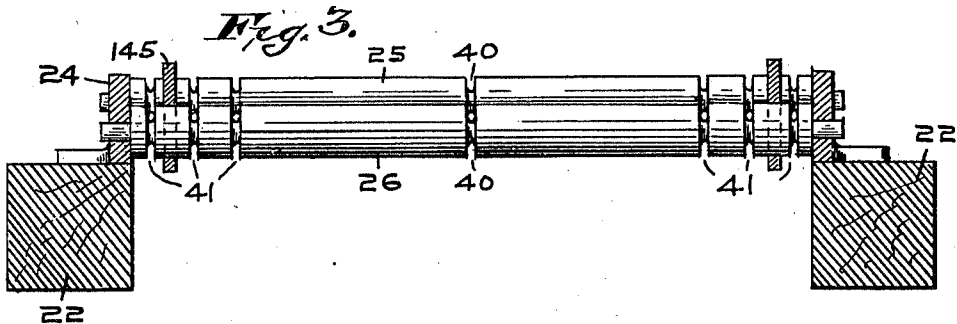


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4 SHEETS—SHEET 3.



WITNESSES:
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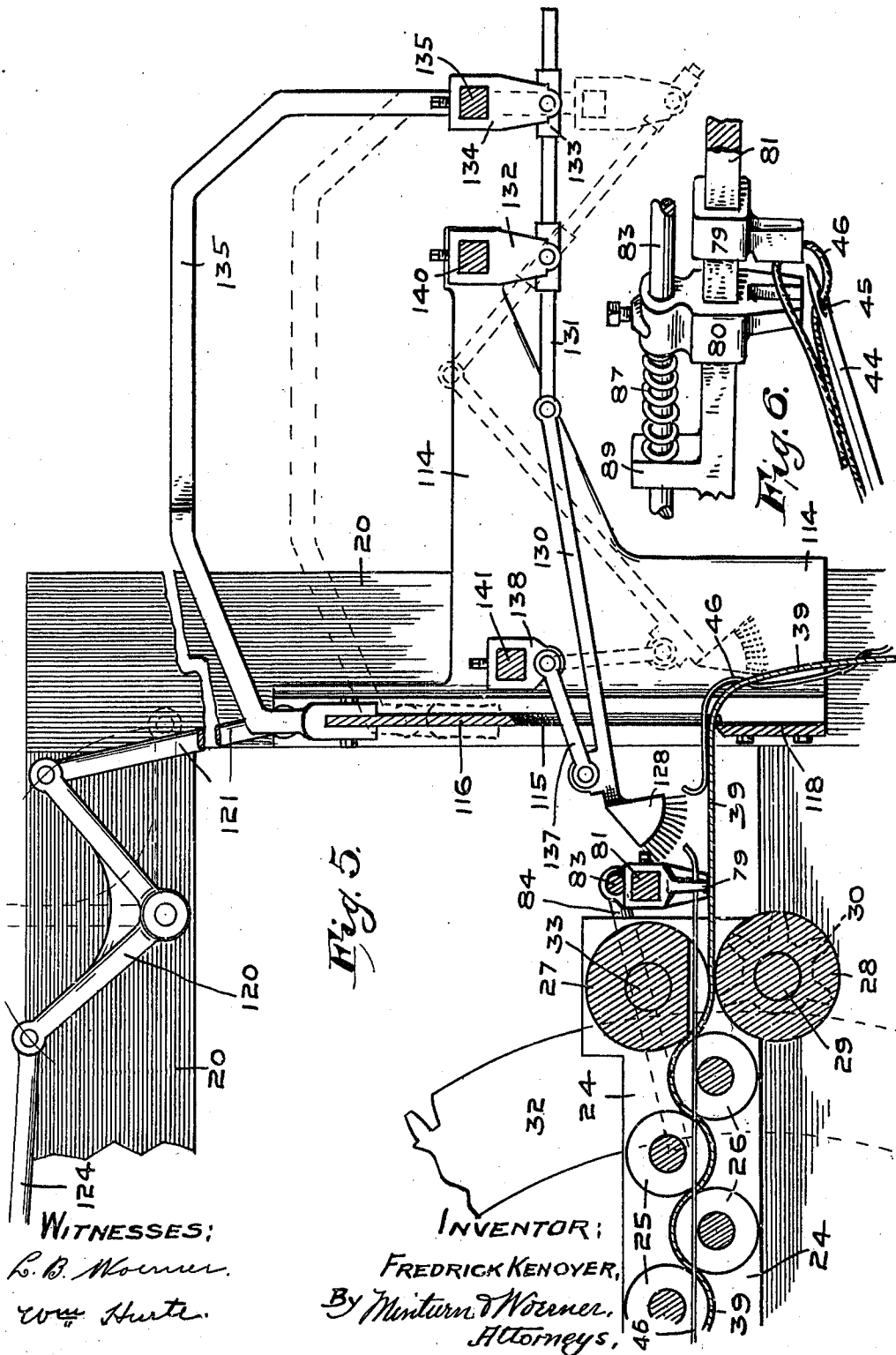
INVENTOR:
FREDRICK KENOYER
By Minton & Moenher
Attorneys.

F. KENOYER.
 MACHINE FOR MAKING BROOM COVERS.
 APPLICATION FILED FEB. 18, 1903.

953,039.

Patented Mar. 29, 1910.

4 SHEETS—SHEET 4.



UNITED STATES PATENT OFFICE.

FREDRICK KENOYER, OF INDIANAPOLIS, INDIANA.

MACHINE FOR MAKING BROOM-COVERS.

953,039.

Specification of Letters Patent.

Patented Mar. 29, 1910.

Application filed February 18, 1908. Serial No. 416,553.

To all whom it may concern:

Be it known that I, FREDRICK KENOYER, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Machines for Making Broom-Covers, of which the following is a specification.

The object of this invention is to provide a machine for the manufacture of paper covers for protecting the brush-portions of brooms, and to perform by machinery all of the operations which have heretofore been done by hand, including the folding of the longitudinal edges of the cover, the insertion of suitable draw-strings, the cutting off of the paper and the cutting off of the strings.

I accomplish the objects of the invention by the mechanism illustrated in the accompanying drawings, in which—

Figure 1, is a top plan view of my invention; Fig. 2, a longitudinal vertical central section of same; Fig. 3, a vertical cross section on the line 3—3 of Fig. 2; Fig. 4, a cross section on the line 4—4 of Fig. 2; Fig. 5, a detail in vertical section of the discharge end of the machine on a larger scale than that shown in Fig. 2; Fig. 6, a detail in perspective of one of the devices for holding the end of a drawstring after the insertion of the string through the paper; Fig. 7, a view in side elevation of the upper feed-roll at the discharge end of the machine; Fig. 8 detail showing the major portion of one of the guide-plates for movement longitudinally of the rolls for adjustment to various widths of covers; Fig. 9, a detail showing the major portion of one of the bearing plates for all of the rolls; Fig. 10 a detail in perspective showing one of the twine cutters; Fig. 11 a view showing one of the side surfaces of a broom cover made by my machine. Fig. 12 a perspective view of the device which folds over the edges of the paper to form the cover; Fig. 13 a detail in longitudinal section of the rolls for starting the folds along the edges of the paper before reaching the device shown in Fig. 12, and Fig. 14 is a detail in vertical section of a modified device for forming the corrugations in the paper from which the cover is to be made, preparatory to the insertion of the draw string.

Like characters of reference indicate like parts throughout the several views of the drawings.

Referring to the drawings 20 represents the frame of my machine, here shown as formed out of wood, but which may be made of any suitable material arranged as here shown or in any convenient manner to afford the proper support to the operative parts of my invention.

21 represents the main shaft of my machine which is mounted transversely of the frame near the discharge end of the machine, in suitable bearings secured to the underside of the horizontal members 22. The members 22 extend longitudinally the entire length of the machine.

24 are bearing plates for a double series of horizontal rollers 25 and 26, and also for a pair of feed rolls 27 and 28 located at the discharge end of the machine. The roll 28 is mounted on the shaft 29, and this shaft has a mutilated pinion 30, see dotted lines in Fig. 5, on one end of said shaft. This mutilated pinion has cogs which engage with cogs on a large cog wheel 32 which is also mutilated to impart an intermittent movement to the pinion 30 and through its shaft to the roll 28. The roll 27 is mounted on shaft 33, and the shafts 29 and 33 are geared together by means of the cog wheels 34 and 35, respectively, on the opposite side of the machine from pinion 30.

37 represents a drum on which a roll of paper to be made up into broom covers is mounted. This paper 39 is fed first to mechanism which will be hereinafter described, for folding the edges of the paper in upon itself for the purpose of strengthening said edges when completed into a cover, and from these folders the paper 39 is fed to and between the double series of rollers 25 and 26, and between the last named rollers to and between the pair of feed rolls 27 and 28. The feed rolls will be set close enough together to engage the paper 39 by friction and draw it between them by the rotation of the rolls, and through the double series of rollers 25 and 26. The rollers 25 in that series will extend for a distance equal to about half of the diameter of the rollers between the rollers 26 of the series below whereby, the paper 39 passing between the two series will be corrugated in the manner shown in Figs. 2 and 5. The axes of the

rollers 25 and 26 are in two respective parallel planes approximately, or perhaps somewhat more than half of the diameter or radius of the rollers apart. The rollers 25 and 26 in both series are provided with annular grooves 40 which register throughout both series and are located at the centers of the rollers, and with the like grooves 41 located at the ends of the rollers, and as the same rollers will be used for the manufacture of broom covers of three different widths the grooves 41 will be made in triplicate on the ends of each roller at the required distances from the center grooves 40. These grooves, by registering, afford a passageway between all the rollers of the two series for needles 44 which will be inserted therethrough, and by such insertion will be passed through the corrugations in the paper 39 produced by said rollers. The outer or free end which is the sharp or pointed end of the needle is provided with an eye 45 through which a string 46 is threaded. This string is carried through the corrugations of the paper by the needle and is held after it has been passed through the rollers, while the needle is withdrawn, thus leaving the string sewed through the paper to be used as a draw string in the finished broom cover. 48 are guide rods supported on suitable standards above the horizontal frame member 22, and 49 is a transversely extending bar which is slidably mounted on the guide rods 48. To the underside of the bar 49 the short plates 50 are secured by means of bolts 51, there being two bolts to each plate, and between the bar 49 and each plate 50 one of the needles 44 is clamped. The bar 49 and clamp 50 are each provided with transverse grooves in which the needle 44 is held against lateral displacement. The bar 49 is provided on its upper face with a double pair of ears 54 to which the bifurcated ends of a pitman 56 are connected. The pitman 56 has its opposite end pivotally attached to the lower end of a swinging arm 57. The swinging arm 57 is connected by means of the rod 58 with crank 59 in the shaft 60. The shaft 60 is mounted above and parallel with the main driving shaft 21 of the machine and is intermittently driven by the engagement of the teeth of a mutilated pinion 62, mounted on shaft 60, with the properly placed teeth on the double faced mutilated wheel 32. By double faced, I mean that the wheel 32 has its periphery provided with two sets of teeth one of which, the outer one engages with the teeth on mutilated pinion 62 and the other or inner of which engages with the teeth on the mutilated pinion 30.

The mechanism here described imparts a reciprocating movement to the bar 49 on the guide rods 48 which in turn imparts a longitudinal reciprocating movement to the

three needles 44 carried by said bar 49. Located at the inner ends of the bars 48 is the transverse bar 64 which forms a support for the twine holders 65, which are secured to the bar 64 by bolts 68. The bolts securing the two outer holders pass through longitudinal slots 69 in the bar 64 to permit said outer holders to be adjusted longitudinally of the bar to correspond with the position of the outer needles carried below by the bar 49. Twine or string carried in the holders 65 is carried through side openings near the bottom of the holder to their respective needles through the eyes of which the string is threaded and is carried through the paper corrugations formed by rollers 25 and 26, to and through the roll 27 at the discharge end of the machine. This roll 27 is provided with notches 73 to allow the passage of the threaded needles.

Located adjacent to roll 27 on the outside of the machine are holders for engaging and retaining the ends of the strings after the latter have been carried through by the needles. These holders are shown to the best advantage in Figs. 5 and 6. As shown in Fig. 6 when the needles start back after having carried the strings through the corrugated paper it will cause the formation of a loop or bend, and it is this bent portion which is engaged by the said holders. These holders comprise for each string a pair of jaws 79 and 80 operating on a stationary bar 81 fixed transversely of the machine. The jaw 79 is held in fixed position on bar 81 and the jaw 80 is slidably mounted on said bar. The jaw 80 is attached in a fixed manner to a longitudinally movable rod 83. The rod 83 has a bent end 84 which lies in the path of a cam-lug or extension 86 on the outer side of the wheel 32 whereby by the rotation of the wheel 32 the cam-lug will move the rod 83 in an outward direction thereby compressing spring 87 placed around the rod 83 between the head of jaw 80 and a lug 89 on bar 81. After the cam-lug on wheel 32 has passed the bent end 84 of rod 83 the spring 87 will return the jaw 80 to position in contact with jaw 79 thereby clamping the bend of the string between them. To make this engagement more positive I make the jaw 79 narrow and bifurcate the jaw 80 to receive the jaw 79 between its two forks, as clearly shown in Fig. 6.

The folding-over of the edges of the paper material to reinforce said edges before the outer draw strings are placed, is accomplished as a first step by passing the paper from roll 37 between two rolls, the under one of which is as much shorter than the width of the paper as it is desired to fold the edges of the paper, and the body of the upper roll 92 is of substantially the same length as the roll 90 but it has at each end an additional flange 93, the inner edges of

which flanges are made sloping as shown in Figs. 1 and 13, and act in conjunction with the roll 90 to bend the edges of the paper down in the direction of the ends of said roll 90 thereby forming initial portions of the folds. From these rolls, as shown in Fig. 2 the bent edges of the paper pass through plates 95 which bring the folded edges into loose contact with the body of the sheet, and then the folded edges are passed between pressure rollers 96 and 97 which press the loose edges tightly upon the face of the paper. The plates 95 each have a horizontal member and an integral member which is at right angles to the horizontal member at that end where the bent paper enters and is approximately parallel with said horizontal member at the opposite end of the latter, as shown in Fig. 12. The shaft on which the upper pressure roller 96 is mounted also carries a sprocket wheel 100 (see Fig. 1) which is connected by link belt 101 to sprocket wheel 102 mounted on shaft 21 whereby said roller 96 is positively driven.

After the needle has returned from carrying the string through the corrugated paper, the string is cut off between the eye of the needle and the twine holder by means of cutting knives such as are illustrated in Fig. 10 and which are very similar both in construction and operation to the twine holders illustrated in Fig. 6. Instead of the holding members depending from the heads, as in the case of the heads 79 and 80 of the twine holders the head 103 of my cutting device has the depending blade 104, and the movable head 105 has the depending blade 106 which is made by the movement of the head 105 to act in cutting conjunction with the blade 104 by longitudinal movement of rod 107 to which the head 105 is secured in a fixed manner. The rod 107 is attached at one end to lever 108 (see Fig. 1), which lever is pivoted at 109 to the frame of the machine and has its free end terminating in the path of cam-lug 110 on the inner side of the main wheel 32. By contact of cam-lug 110 with lever 109 the rod 107 is moved out longitudinally in the direction of lever 108 thereby opening the cutters, and when the lever is released after passing the cam-lug 110 springs 112 will move rod 107 in direction to bring the blades 104 and 106 together so as to cut off the twine. As shown in Fig. 10 the needle 44 has been withdrawn through the cutting blades from the corrugated paper through which it has just sewed the draw string. After the twine or string has been cut off its end remains threaded through the eye of the needle and upon the separating of the blades 104 and 106 after severing the string the needle will be moved forward between the blades in the next operation of sewing the draw string through

the paper. It will thus be seen that the needle 44 always remains threaded.

Secured to the frame 20 of the machine at the delivery end of the latter are a pair of guide plates 114 having vertical grooves 115 in which the ends of a paper cutting knife 116 are mounted, and by which said knife will be compelled to move in a vertical direction. The knife 116 works in conjunction with the stationary knife 118 which is bolted to the plates 114, see Fig. 5. Supported by frame 20 are the bell cranks 120 having their lower arms connected by link bars 121 with the knife 116 and the upper arms of the bell cranks are pivotally connected with the eccentric rod 124. The rod 124 is operated by the eccentric 126 mounted on the shaft 60. See Fig. 2. The above described mechanism will reciprocate the knife 116 so as to cut off the paper in required lengths to form broom covers. This severance of the paper occurs between those stitches where the cuts have been made in the draw strings and to prevent the cutting off of the ends of the draw strings by the paper cutting knives I provide brushes 128 for brushing the string-ends forward out of the path of the knife 116. The brush handle 130 is connected by means of a hinge joint with an extension 131. The handle extension 131 is pivoted to the hanger 132 and has a sliding sleeve 133 on its outer end. This sleeve 133 is connected pivotally with hanger 134, which hanger is supported by the horizontal portion of a bracket-bar 135 which is attached to and moves up and down with the knife 116. The brush handle 130 is pivotally connected to the link-bar 137 and the latter is pivotally connected with hanger 138. By the above described mechanism the upward movement of knife 116 will cause the brush handle 130 and extension 131 to approach longitudinal alinement with each other thereby forcing brush 128 back between the knives 116 and 118 to the position shown in Fig. 5, and the lowering of the knife 116 will cause the handle 130 and extension 131 to assume the position shown by the dotted lines in Fig. 5 which will cause the brush 128 to move forward with a sweeping movement to its position shown by dotted lines in Fig. 5 which will sweep the ends of the strings forward out of the path of knife 116.

The hangers 132 are mounted on a bar 140, the hangers 138 on bar 141. The bars 140 and 141 are supported by plate 114, said plate being suitably extended to receive the bar 140. The hangers 132, 134 and 138 are adjustable longitudinally on their respective supporting bars for the purpose of changing the positions of the brushes to suit the changed positions of the strings when the machine is correspondingly changed to manufacture narrower or wider broom covers.

Attention has been previously called to the triplicate grooves in the ends of rollers 25 and 26 and of the feed roll 27 for the purpose of adjusting the machine to make broom covers of different widths. In order to properly guide the paper between the rollers 25 and 26 I provide the two plates 145 (see Figs. 3 and 8) which will be set so as to contact with the side edges of the paper passing between the rollers and their positions will depend, of course, upon the width of cover to be made. The plates have circular openings 146 through which the rollers will loosely pass.

In adjusting the machine to manufacture broom covers of different widths it is necessary to change the positions of the needles, also of the twine holders at the delivery end of the machine, of the twine cutters and the twine holders and also to change the lengths of the rollers 90 and 92 which assist in folding the edges of the paper. The variations of the lengths of rollers 90 and 92 is secured by constructing said rollers in telescoping sections as shown in Fig. 13 which permits said rollers to be made longer or shorter as circumstances may require.

The paper from which the broom covers are to be made is fed first from drum 37 through the device for folding the edges of the paper under, and then the paper with its edges thus folded is fed between the rollers 25 and 26 which corrugates the paper for the purpose of enabling stitches to be formed by passing the needle through the paper from one end of the horizontal set of rollers to the other. Then after the draw-string or twine has been stitched through the paper in this manner the ends of the strings are caught by the twine holders and are held by them while the needles are withdrawn from the paper. The strings are cut off after the needles have moved back of the knives for that purpose, and the previously sewed cover, still intact with the paper of the roll, is cut off. The several parts of the machine are timed by wheel 32 to operate at their proper intervals.

While I have shown a double series of rollers 25 and 26 for the purpose of corrugating the paper preparatory to inserting of the draw-strings by the aid of the needles, there are other means for securing the same conditions of the paper, such, for example, as by the use of a pair of corrugated plates 160 and 162, as shown in the modification illustrated in Fig. 14, and I therefore do not wish to limit my invention to the mechanism shown.

Having thus fully described my invention what I claim as new and wish to secure by Letters Patent, is—

1. In a machine for making broom covers, longitudinally reciprocating needles for inserting the draw strings, a double series of rollers with their axes in two parallel planes

which are approximately the radius of the rollers apart, the axis of each alternate roller being in opposite planes whereby paper fed between them will be bent or corrugated to bring the points to be perforated at the ends of the stitches in alinement with the needles, said rollers having circumferential grooves for the free passage of the needles.

2. In a machine for making broom covers, longitudinally reciprocating needles for inserting the draw strings, a double series of rollers with their axes in two parallel planes which are approximately the radius of the rollers apart, the axis of each alternate roller being in opposite planes whereby paper fed between them will be bent or corrugated to bring the points to be perforated at the ends of the stitches in alinement with the needles, said rollers having circumferential grooves for the free passage of the needles, and means for releasing strings introduced through the paper by the needles while permitting the needles to be withdrawn.

3. In a machine for making broom-covers, longitudinally reciprocating needles carrying strings, means for feeding paper from a roll to positions in front of said needles, means for bending the paper back and forth across the paths of said needles in front of the latter, means for forcing the needles through the bent paper, means for retaining the strings while permitting the needles to be withdrawn from the paper folds, means for cutting the strings without unthreading the needles after the needles have been withdrawn from the paper, means for discharging the sewed paper from the machine and means for severing it from the unfinished covers.

4. In a machine for making broom-covers, longitudinally reciprocating needles carrying strings, means for feeding paper from a roll to position in front of said needles, means for bending the paper back and forth across the paths of said needles in front of the latter, means for folding over the edges of the paper before it is thus folded across the paths of the needles, means for forcing the needles through the bent paper, and means for retaining the strings while permitting the needles to be withdrawn from the paper.

5. In a machine for making paper broom-covers in which the paper is supplied to the machine in rolls, longitudinally reciprocating needles having an eye near the point of each through which the end of a string from a ball or spool of string is threaded, means for drawing the paper from the roll and bending it in back-and-forth bends in front of the needles, means for forcing the string-carrying needles through the bent paper, means for holding the strings to prevent their withdrawal while permitting the removal of the needles, and means after the

paper leaves the roll and before the strings are inserted, for folding the longitudinal edges of the paper.

6. In a machine for making paper broom-covers in which the paper is supplied to the machine in rolls, longitudinally reciprocating needles having an eye near the point of each through which the end of a string from a ball or spool of string is threaded, means for drawing the paper from the roll and bending it in back-and-forth bends in front of the needles, means for forcing the string-carrying needles through the bent paper, means for holding the strings to prevent their withdrawal while permitting the removal of the needles, means after the paper leaves the roll and before the strings are inserted, for folding the longitudinal edges of the paper, means for severing the strings and means for cutting off the finished covers.

7. In a machine for making broom-covers from paper, longitudinally reciprocating needles carrying strings, rollers for disposing the paper in back-and-forth bends across the paths of said needles, and means for folding the edges of the paper over before the paper is disposed in the paths of said needles.

8. In a machine for making broom-covers from paper, longitudinally reciprocating needles carrying strings, means for disposing the paper in back-and-forth bends across the paths of said needles, and means for folding the edges of the paper over before the paper is disposed in the paths of said needles, said means comprising a pair of rolls one of which has end flanges overlapping the other roll to form an initial bend near the edges of the paper, and additional means for folding and pressing the bent edges against the body of the paper.

9. In a machine for making broom covers from paper, longitudinally reciprocating needles carrying strings, means for disposing the paper in back-and-forth bends across the paths of said needles, rolls for folding and pressing the edges of the paper sheet, said rolls being in a plurality of telescoping sections whereby they may be adjusted in their lengths.

10. In a machine for making broom-covers from paper, longitudinally reciprocating needles carrying strings, means for disposing the paper in back-and-forth bends across the paths of said needles, and means for folding the edges of the paper over before the paper is disposed in the paths of said needles, said means comprising means for forming an initial bend near the edges of the paper, plates each comprising a horizontal member and a member at right angles at the entering end and approximately parallel at the discharge end to additionally fold the edges of the paper, and means for pressing the folded parts together.

11. In a machine for making broom-covers from paper, longitudinally reciprocating needles carrying strings, means for disposing the paper in back-and-forth bends across the paths of said needles, and means for folding the edges of the paper over before the paper is disposed in the paths of said needles, said means comprising a pair of rolls one of which has end flanges overlapping the other roll to form an initial bend near the edges of the paper, plates each comprising a horizontal member and a member at right angles at the entering end and approximately parallel at the discharge end to additionally fold the edges of the paper, and rollers for pressing the folded parts together.

12. In a machine for making broom-covers from paper, a double series of rollers disposed with approximately half of the diameters of the rollers of each series between the rollers of the other series, said rollers having registering grooves, means for feeding the paper between the two series of rollers, needles carrying strings, and means for reciprocating the needles longitudinally in and out of the grooves of said rollers.

13. In a machine for making broom-covers from paper, a double series of rollers disposed with approximately half of the diameters of the rollers of each series between the rollers of the other series, said rollers having registering grooves, means for feeding the paper between the two series of rollers, needles carrying strings, means for reciprocating the needles longitudinally in and out of the grooves of said rollers, means for holding the strings in the paper while permitting the withdrawal of the needles, means for cutting the strings and means for cutting off the finished broom cover.

14. In a machine for making broom-covers from paper, a double series of rollers disposed with approximately half of the diameters of the rollers of each series between the rollers of the other series said rollers having registering annular grooves, means for holding the strings in the paper while permitting the withdrawal of the needles, means for cutting the strings, means for cutting off the finished broom-cover and means for removing the string-ends from the path of the paper cutting knife.

15. In a machine for making broom-covers from paper, a double series of rollers disposed with approximately half of the diameters of the rollers of each series between the rollers of the other series said rollers having registering annular grooves, a pair of feed rolls at the end of said double series of rollers to draw the paper through said series, one of said rollers having grooves in alinement with the grooves of said double series of rollers, needles carrying strings, and means for reciprocating the needles lon-

itudinally in and out of the grooves of said rollers and feed rolls.

16. In a machine for making paper broom-covers, needles having eyes through which strings are threaded, means for disposing paper in back-and-forth bends and for perforating the bent paper with the needles, and for removing the needles from the bent paper while retaining the strings, means for cutting off the finished broom-covers and means for removing the string-ends from the path of the knife.

17. In a machine for making paper broom-covers, needles having eyes through which strings are threaded, means for disposing paper in back-and-forth bends and for perforating the bent paper with the needles, and for removing the needles from the bent paper while retaining the strings, means for cutting off the finished broom-covers and brushes for removing the string-ends from the path of the knife.

18. In a machine for making paper broom-covers, needles having eyes through which strings are threaded, means for depositing paper in back-and-forth bends and for perforating the bent paper with the needles, and for removing the needles from the bent paper while retaining the strings, a knife for cutting off the finished covers, brushes for removing the string-ends from the path of the knife and means operated by connection with the knife for working the brushes.

19. In a machine for making paper broom covers, a double series of rollers disposed with approximately half of the diameters of

the rollers of one series between the rollers of the other series, said rollers having registering grooves at their mid-lengths, and a plurality of series of registering grooves at each of their ends, means for feeding paper between the two series of rollers, needles carrying strings, means for imparting a reciprocating travel to a needle in said middle grooves and also in one of the series of grooves at each end of said rollers, and gages extending the entire length of the series of rollers and adjustable transversely of said rollers.

20. In a machine for making paper broom covers, a double series of rollers disposed with approximately half of the diameters of the rollers of one series between the rollers of the other series, said rollers having registering grooves at their mid-lengths, and a plurality of series of registering grooves at each of their ends, means for feeding paper between the two series of rollers, needles carrying strings, means for imparting a reciprocating travel to a needle in said middle grooves and also in one of the series of grooves at each end of said rollers and gage plates adjustable longitudinally of the rollers and having openings formed therein for the reception of said rollers.

In witness whereof, I, have hereunto set my hand and seal at Indianapolis, Indiana, this, 15th day of February, A. D. one thousand nine hundred and eight.

FREDRICK KENOYER. [L. S.]

Witnesses:

F. W. WOERNER,
L. B. WOERNER.