P. F. COHEN.

PAPER PLAITING MACHINE.

APPLICATION FILED SEPT. 6, 1913.

1,107,265.

Patented Aug. 18, 1914.

4 SHEETS—SHEET 1.

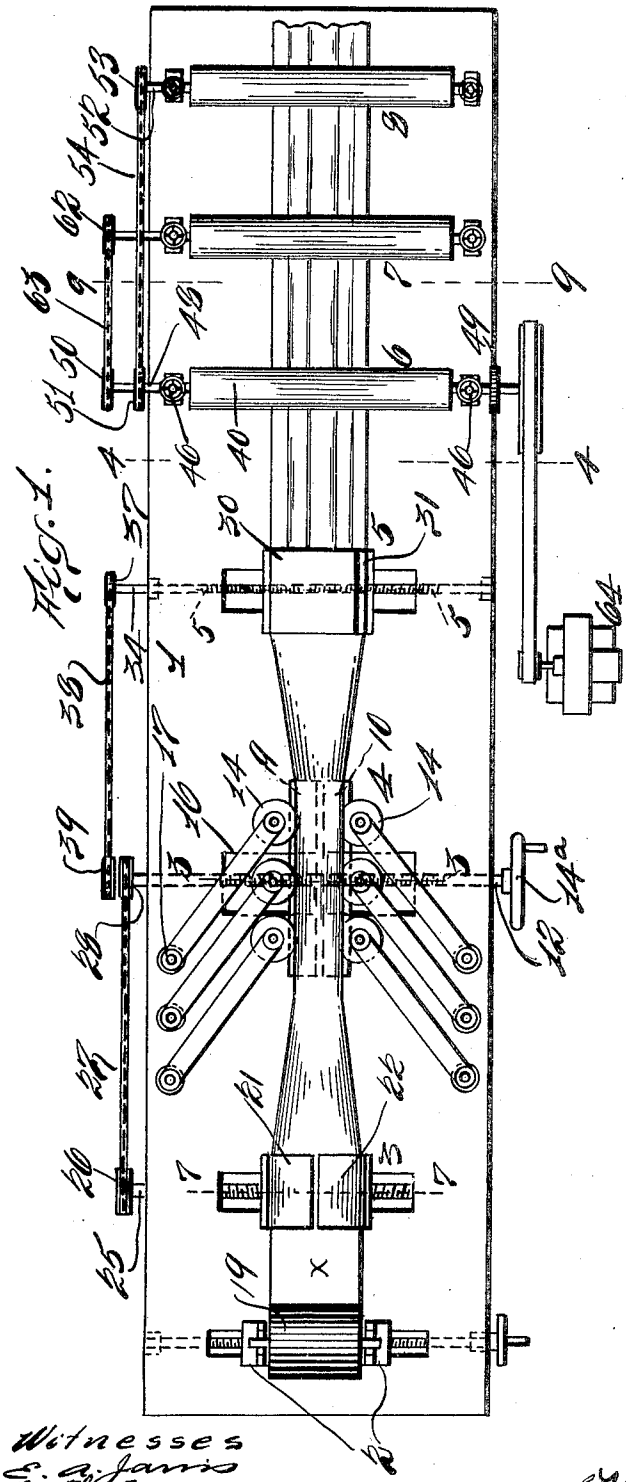


Fig. 1.

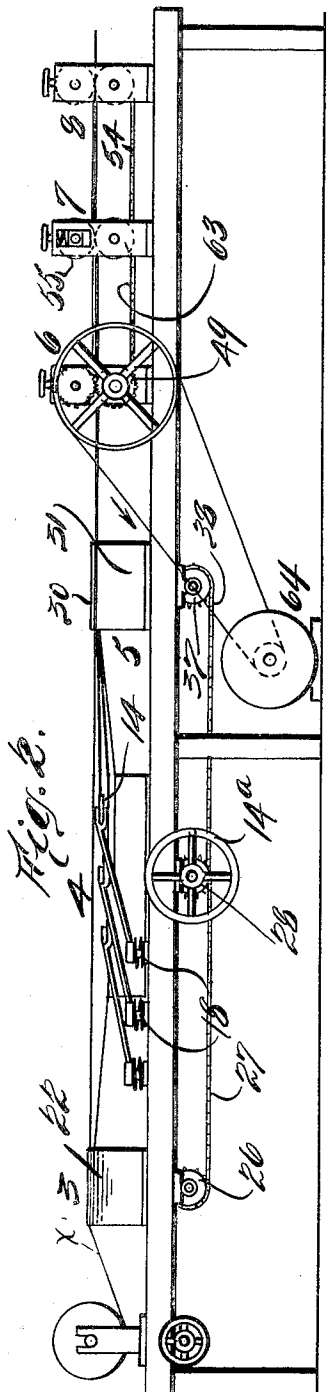


Fig. 2.

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4 SHEETS—SHEET 2.



Fig. 11.

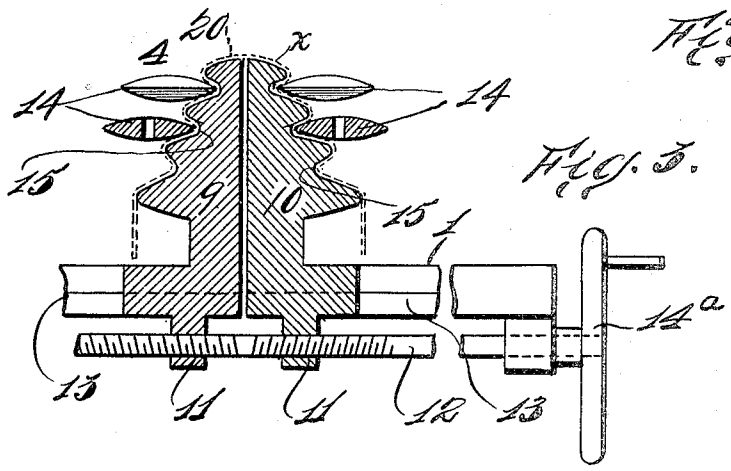


Fig. 3.

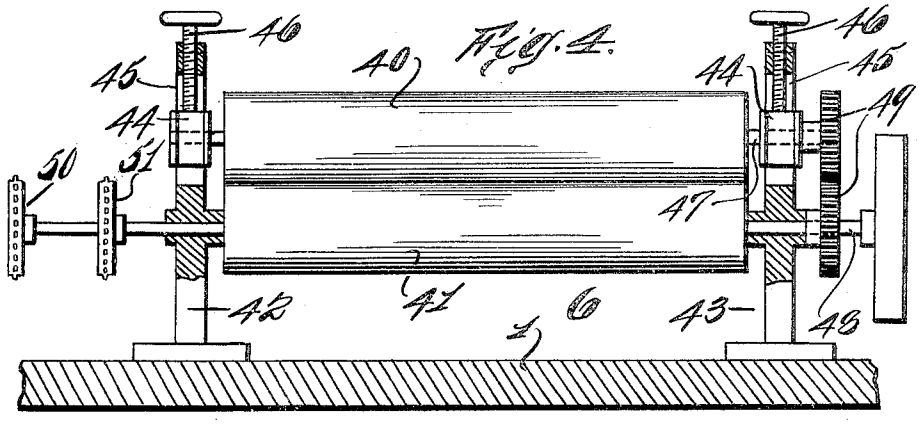


Fig. 4.

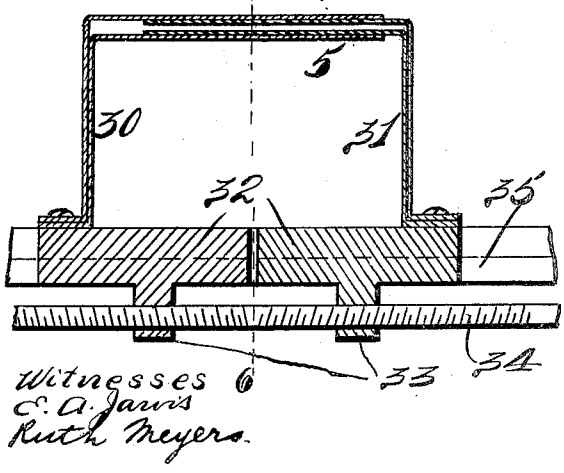


Fig. 5.

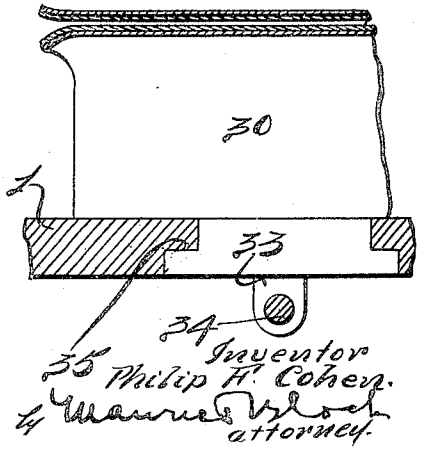


Fig. 6.

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4 SHEETS—SHEET 3.

Fig. 7.

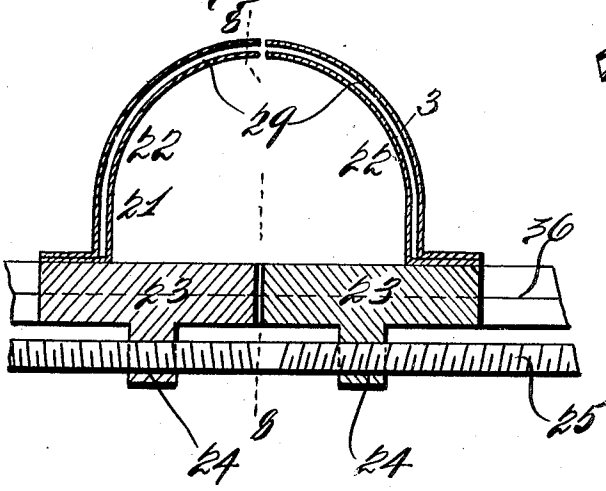


Fig. 8.

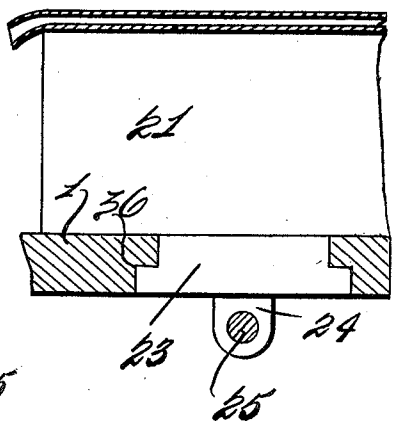


Fig. 9.

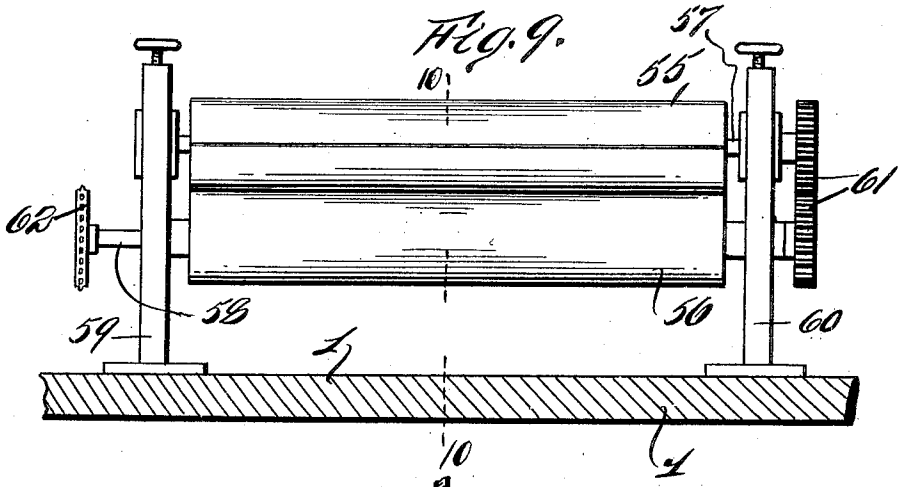
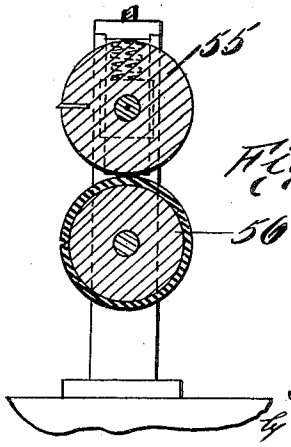


Fig. 10.



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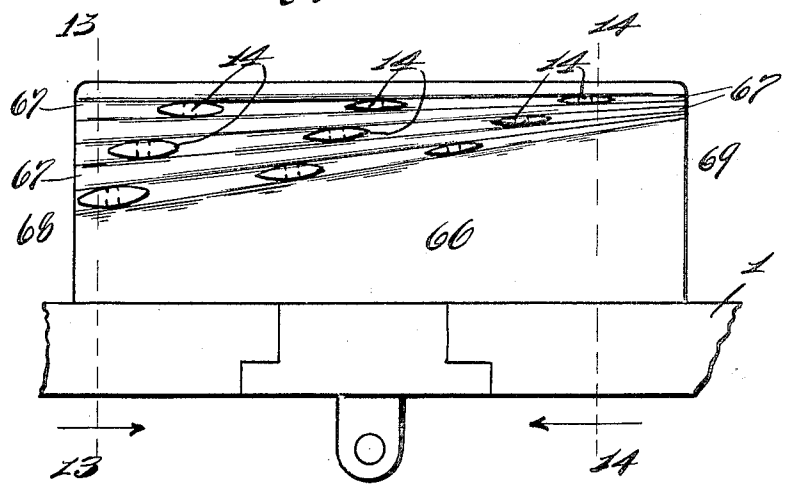
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4 SHEETS—SHEET 4.

Fig. 12.



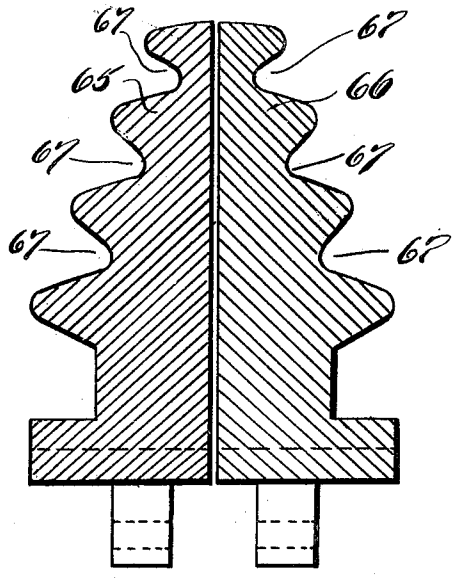


Fig. 13.

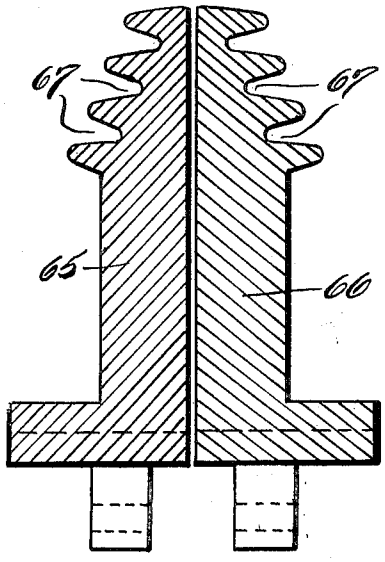


Fig. 14.

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UNITED STATES PATENT OFFICE.

PHILIP F. COHEN, OF NEW YORK, N. Y.

PAPER-PLAITING MACHINE.

1,107,265. Specification of Letters Patent. Patented Aug. 18, 1914.

Application filed September 6, 1913. Serial No. 788,383.

To all whom it may concern:

Be it known that I, PHILIP F. COHEN, a citizen of the United States of America, residing at New York city, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Paper-Plaiting Machines, of which the following is a full, clear, and exact description.

This invention relates to an improved paper-plaiting machine, the function of which is to plait or crimp paper which is afterward used for wrapping boxes of candy.

My improved machine is designed to plait or crimp a strip of paper as it comes from a roll and to cut the same, after plaiting, into the desired lengths for wrapping.

My improved machine is designed to take the place of hand work both as to speed and effectiveness, and is a simple and inexpensive structure, for the purpose intended.

I will now proceed to describe my invention in detail, the novel features of which will be pointed out in the appended claims, reference being had to the accompanying drawings, forming part hereof, wherein:—

Figure 1 is a top plan view of an embodiment of my invention; Fig. 2 is a side elevation thereof; Fig. 3 is an enlarged cross section, taken on a line 3—3 in Fig. 1; Fig. 4 is an enlarged cross section, taken on a line 4—4 in Fig. 1; Fig. 5 is an enlarged cross-section, taken on a line 5—5 in Fig. 1; Fig. 6 is a fragmentary longitudinal view, taken on a line 6—6 in Fig. 5; Fig. 7 is an enlarged cross-section taken on a line 7—7 in Fig. 1; Fig. 8 is a fragmentary longitudinal sectional view taken on a line 8—8 in Fig. 7; Fig. 9 is an enlarged cross-section, taken on a line 9—9 in Fig. 1; Fig. 10 is a cross-sectional view taken on a line 10—10 in Fig. 9; Fig. 11 is a diagrammatic view of a section of the paper when completely plaited; Fig. 12 is a side elevation of another form of plaiting block which may be used in my machine; Fig. 13 is an enlarged cross section thereof, the section being taken on line 13—13, Fig. 12; and Fig. 14 is a similar view, taken on line 14—14, Fig. 12.

As herein constructed, my improved plaiting machine comprises a table or bed 1, upon which is mounted, from left to right, a paper-roll support 2, a curved framing device 3, a plaiting mechanism 4, a straight or flat framing device 5, a feeding device 6, a cutting device 7 and a take-up 8. A portion of the plaiting device 4 consists (in this instance) of a plurality of blocks or formers 9 and 10 which are fixed in the operation of the machine, but are adjustable transversely of the bed 1 (see Fig. 3). Each former 9 and 10 is provided with a threaded lug 11. Through the threaded opening of each lug a threaded spindle 12 passes, said spindle being provided with a right and left hand thread engaging similar threads in the lugs 11. The formers 9 and 10 travel in a guideway 13 in the bed 1. The spindle 12 is rotated by means of a hand-wheel 14^a. Each of these blocks or formers extends longitudinally of the machine and in line with the travel of the material to be acted on, and is provided in its outer side with longitudinal grooves, channels or continuous recesses 15 in different horizontal planes. These formers collectively constitute a forming device arched transversely, elongated longitudinally of the machine and grooved as above stated in its sides, which are of course the outer sides of its two constituent formers. Further elements of the plaiting device, consist of a plurality of rollers 14 formed to take into the channels 15 of the formers 9 and 10. I have herein illustrated six rollers 14, but more or less may be used if desirable. Each roller 14 is carried at one end of an arm 16 pivoted as at 17 to the bed 1. Springs 18 keep the rollers 14 in position in the channels 15 of the formers 9 and 10. While the formers 9 and 10 are herein illustrated as being provided with three channels each, more or less may be used, according to the number of plaits desired in the wrappers.

The function of the curved framer 3 is to curve the paper x as it leaves the roll 19 and thus prepare it to enter between the rollers 14 and formers 9 and 10, by causing it to assume a shape that will partly envelop the formers therefor; the rollers will press the paper x into the channels 15 and crimp same (see dotted lines 20, Fig. 3). Each of these rollers on each side of the forming device is in a different transverse plane, as well as in a different horizontal plane, from those of the other rollers on said side, that the strain may be distributed to the best advantage.

The arched framing device 3 consists of a plurality of separable sections 21 and 22 (see Fig. 7), mounted upon blocks 23, 23 carry-

ing threaded lugs 24 through which a threaded spindle 25 passes. The spindle 25 is provided with a right and left-hand thread engaging similar threads in the lugs 24. One end of the spindle 25 carries a sprocket gear 26 (Fig. 1) which, by means of a chain 27, is driven by a sprocket gear 28 (Fig. 1) on the spindle 12 of the forming blocks 9 and 10. The framing members 21 and 22 provide between them a channel or guideway 29 which is arched transversely of the line of travel of the material. This channel extends longitudinally of said line and will permit the paper to pass therethrough.

The straightening framer 5 consists of the separable members 30 and 31 (Fig. 5) carried by blocks 32, 32 having threaded lugs 33 through which a spindle 34 having a right and left-hand thread passes. The blocks 32 travel in a guide 35 in the bed 1. The blocks 23 of the curved framers 21 and 22 travel in a guide 36 in said bed 1. The outer end of the spindle 34 carries a sprocket-gear 37 which by means of a chain 38 is driven by a sprocket-gear 39 on the spindle 12 for the formers 9 and 10. The function of the framer 5 is to straighten the plaited paper, or rather flatten it, to prepare it to enter the feeding device 6.

The feeding device 6 (Fig. 4) consists of rollers 40 and 41 mounted in standards 42 and 43. The roller 40 is rotatably mounted in boxes 44, slidably mounted in guides 45 in the standards. Pressure screws 46 keep the rollers 40 and 41 in contact. One end of each shaft 47 and 48 for the rollers carries a gear 49 which mesh one with the other. The opposite end of the shaft 48 is provided with a sprocket-gear 50 and adjacent thereto is mounted a second sprocket-gear 51. The take-up 8 is identical with the feeding device 6. The lower shaft 52 of the take-up device is provided with a gear 53. The function of the take-up device is to keep the paper taut to facilitate the cutting thereof by the cutting device 7. The sprocket-gears 51 and 53 are connected by a chain 54; hence the feeding device and take-up operate in unison.

As can be seen in Fig. 1, the cutting device 7 is positioned intermediate the feeding device and take-up.

By referring to Fig. 9, it will be seen that the cutting device 7 consists of a cutting roll 55 and a die-roll 56. The rolls 55 and 56 are carried by shafts 57 and 58, respectively, which in turn are mounted in standards 59 and 60. The shafts 57 and 58 are each provided at one end thereof, with intermeshing gears 61. The free end of the shaft 58 is adapted to removably support a sprocket-gear 62 which is connected to the sprocket-gear 50 by a chain 63 (Fig. 1). The cutting device operates in unison with the feeding device 6, provided the gears 50 and 62 are of the same diameter. To change the speed of the cutting device relative to the feed of the feeding device, I change the sprockets 50 and 62. Should the sprockets 50 and 62 be of the same diameter, the paper would be cut in lengths equal to the circumference of the feed rollers 40 and 41, which I will suppose is twelve inches; consequently the paper will be cut in one foot lengths. To cut the paper in six inch lengths, the sprockets 50 and 62 would be two to one, sprocket 50 being the larger. To obtain different lengths of wrappers, it will be seen that I have but to change the sprockets 50 and 62. It will be evident that I can simultaneously adjust the framers 5 and 7 and plaiting blocks 9 and 10 by rotating the hand-wheel 14^a. The object of making the above elements adjustable is to provide for plaiting paper of various widths. To accommodate paper of various widths, I move the standards 2 toward or away from each other. After the plaited paper has passed through the feed rolls, it will be (as shown in Fig. 11) flattened, as the rolls 40 and 41 flatten the plaits x' as well as feed the strip of paper.

The object of locating the rollers 14 out of alinement on each side of the formers is to distribute the strain upon the paper, as the pressure upon the paper will not be applied to a restricted locality; therefore the paper will not be so liable to tear. A motor 64 may be used to actuate the feeding device, cutter and take-up.

In Figs. 12, 13 and 14, I have illustrated another form of plaiting block or former, consisting of the members 65 and 66 provided with channels 67. By referring to Fig. 12 it will be seen that the channels 67 are considerably wider at the end 68 of the block than at the end 69, and it will also be seen that the said channels are placed at an angle or inclined relative to the top surface of the block. The object of forming the blocks in this manner is to provide for the gradual plaiting of the paper, to prevent tearing thereof, as the channels at that end of the blocks which the paper is fed on are sufficiently wide to produce an easy creasing of the paper, and as the said crease is fed toward the opposite end of the block the channels gradually decrease in width. The gradual decreasing of the width of the channels permits the material to be gradually plaited. With this form of block I may employ rollers 14 located adjacent each end of the block and centrally thereof, in order to gradually form the plaits.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

1. In plaiting mechanism, a fixed, arched, forming device, having grooves in its sides, in line with the travel of the material to be

acted on, in combination with a device provided with an arched guideway for receiving such material and directing it to said forming device in arched form adapted to fit thereon, means for forcing the material into said grooves as it travels over said forming device, means for feeding said material, and devices for flattening out the latter after the action of said forming device and forcing means for the purpose set forth.

2. In plaiting mechanism, a fixed, arched, forming device consisting of two formers adjustable toward and from each other, each of said formers having grooves in its outer side in line with the travel of the material to be acted on, a framing device provided with an arched guideway for receiving said material and directing it to said former in arched form adapted to fit thereon, means for forcing the material into said grooves, means for feeding the material and means for flattening the material, including the plaits formed by the said forcing devices and grooves.

3. In plaiting mechanism, a fixed, arched, forming device, consisting of two formers adjustable toward and from each other, each of said formers having grooves in its outer side in line with the travel of the material, in combination with spring pressed rollers arranged to force the material into said grooves, feeding devices for the material, means for guiding it to the former and arching it to fit thereon and means for flattening out the material after it is operated on by the said rollers and grooved formers, the said rollers being arranged out of line with each other transversely of the former for the purpose set forth.

4. In combination with feed rollers for the material acted on, a fixed device adapted to give said material a fixed transversely arched form as it passes through the same, a fixed arched forming device fitting such material and provided with grooves in its sides in line with the travel of the material, a series of spring-pressed rollers for forcing the material into said grooves and rollers for flattening the material after it has been acted on by the said forming device.

5. A plaiting device, consisting of a forming device provided with recesses in the sides thereof, means to force the material to be plaited into said recesses, means to feed the material, a take-up for said material adjacent to said feeding means, and a cutting device located intermediate the feeding device and take-up.

6. In plaiting mechanism, a fixed arched elongated forming device having longitudinal grooves in its sides, in combination with means for feeding a strip of flexible material, arched to fit said device, longitudinally over the exterior of the latter in contact therewith and means exterior to said device and spring-pressed toward the same for forcing the material of said strip into said grooves during such passage.

7. A plaiting device consisting of a plurality of channeled formers, means to move said formers toward or away from each other, resiliently mounted plaiting elements adapted to force the material to be plaited into said channels, means to cause the material to assume the approximate shape of said formers, said means consisting of a plurality of guides or framers, and means to cause said guides to move toward or away from each other.

8. A plaiting device consisting of a plurality of channeled formers, means to move said formers toward or away from each other, resiliently mounted plaiting elements adapted to force the material to be plaited into said channels, means to cause the material to assume the approximate shape of said formers, said means consisting of a plurality of guides or framers, means to cause said guides to move toward or away from each other, means to straighten the plaited material after it leaves the formers, said means consisting of a plurality of guides or formers, and means to cause said formers to move toward or away from each other.

9. A plaiting device consisting of a plurality of channeled formers, resiliently mounted plaiting elements adapted to force the material to be plaited into said channels, means to cause the material to assume the approximate shape of the formers, consisting of a plurality of framers or guides, and means to straighten the material after it has passed through the formers, consisting of a plurality of framers or guides, said shaping formers and straightening formers being adapted to move toward or away from each other simultaneously.

10. In plaiting mechanism, a fixed, arched, elongated forming device having longitudinal grooves in its sides, in combination with means for feeding a strip of flexible material, arched to fit said device, longitudinally over the latter in contact therewith, a plurality of rotary disks arranged opposite said grooves and means for causing said disks to force said material into said grooves during the passage of said strip over said device for the purpose set forth.

11. A plaiting device consisting of a plurality of channeled formers extending longitudinally of the line of travel of the material to be acted on, provided with longitudinal grooves in their outer faces and together constituting a raised arched forming device substantially as set forth, a support therefor, means to adjust said formers transversely of said support, and coöperating plaiting elements adapted to enter the channels of said formers.

12. A plaiting device consisting of a chan-

neled arched forming device extending longitudinally of the line of travel of the material and longitudinally channeled in its sides in different horizontal planes and a plurality of rollers adapted to force the material to be plaited into said channels, said rollers being resiliently supported and located in different horizontal planes.

13. In combination with means for feeding material adapted to be folded into plaits, a transversely arched forming device extending longitudinally of the machine and grooved in its sides longitudinally in different horizontal planes, in combination with rollers and means for pressing said rollers into said grooves, each roller on each side of said device being in a different horizontal plane and also in a different transverse vertical plane from any of the other rollers on that side.

Signed at New York city, N. Y., this 26th day of August, 1913.

PHILIP F. COHEN.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."