

A. W. CASH.
HAT PACKING RING MACHINE.
APPLICATION FILED APR. 19, 1909.

1,060,740.

Patented May 6, 1913.

5 SHEETS—SHEET 1.

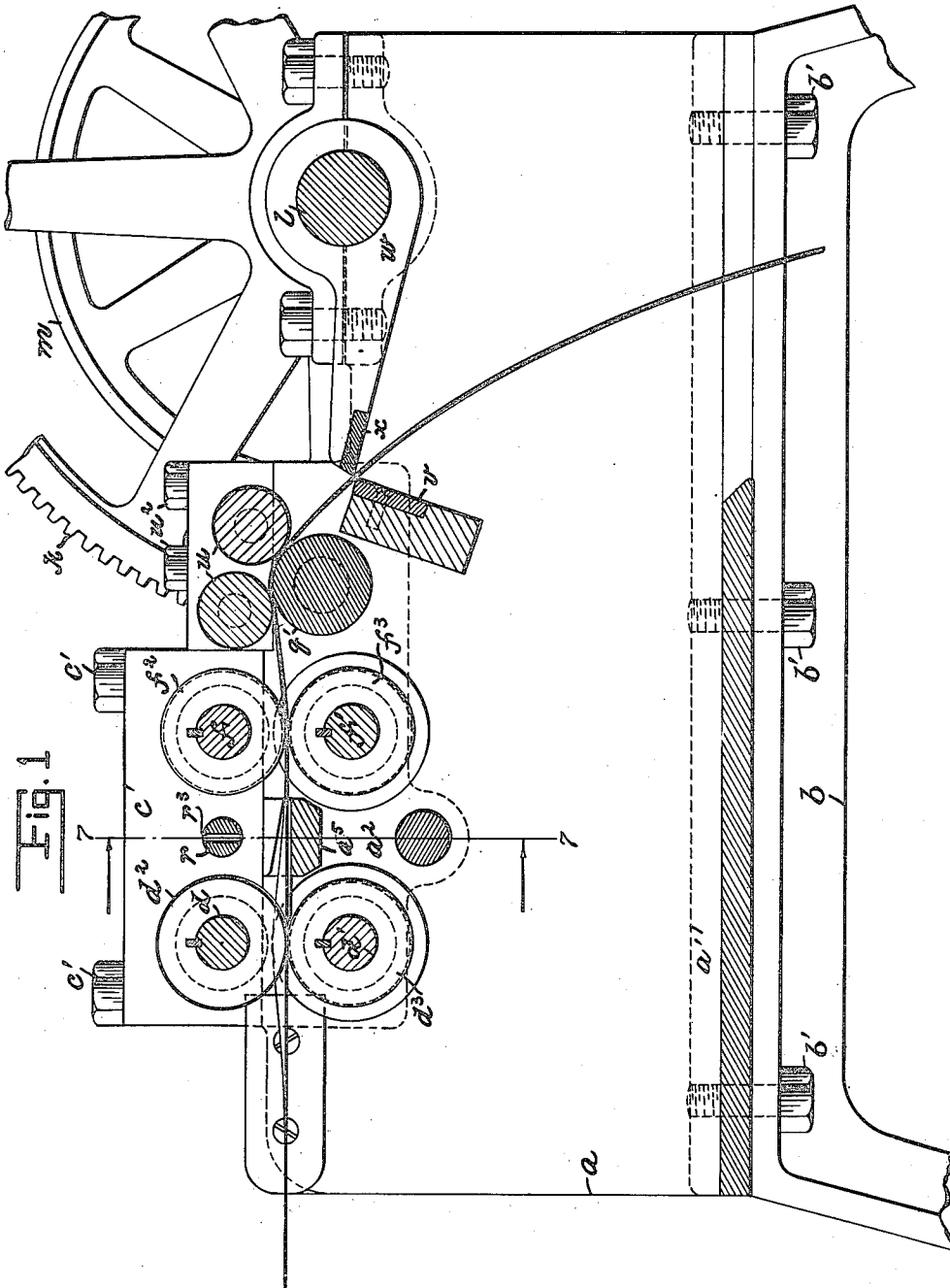


Fig. 1

WITNESSES:

W. B. Borden
Henry Berg

INVENTOR

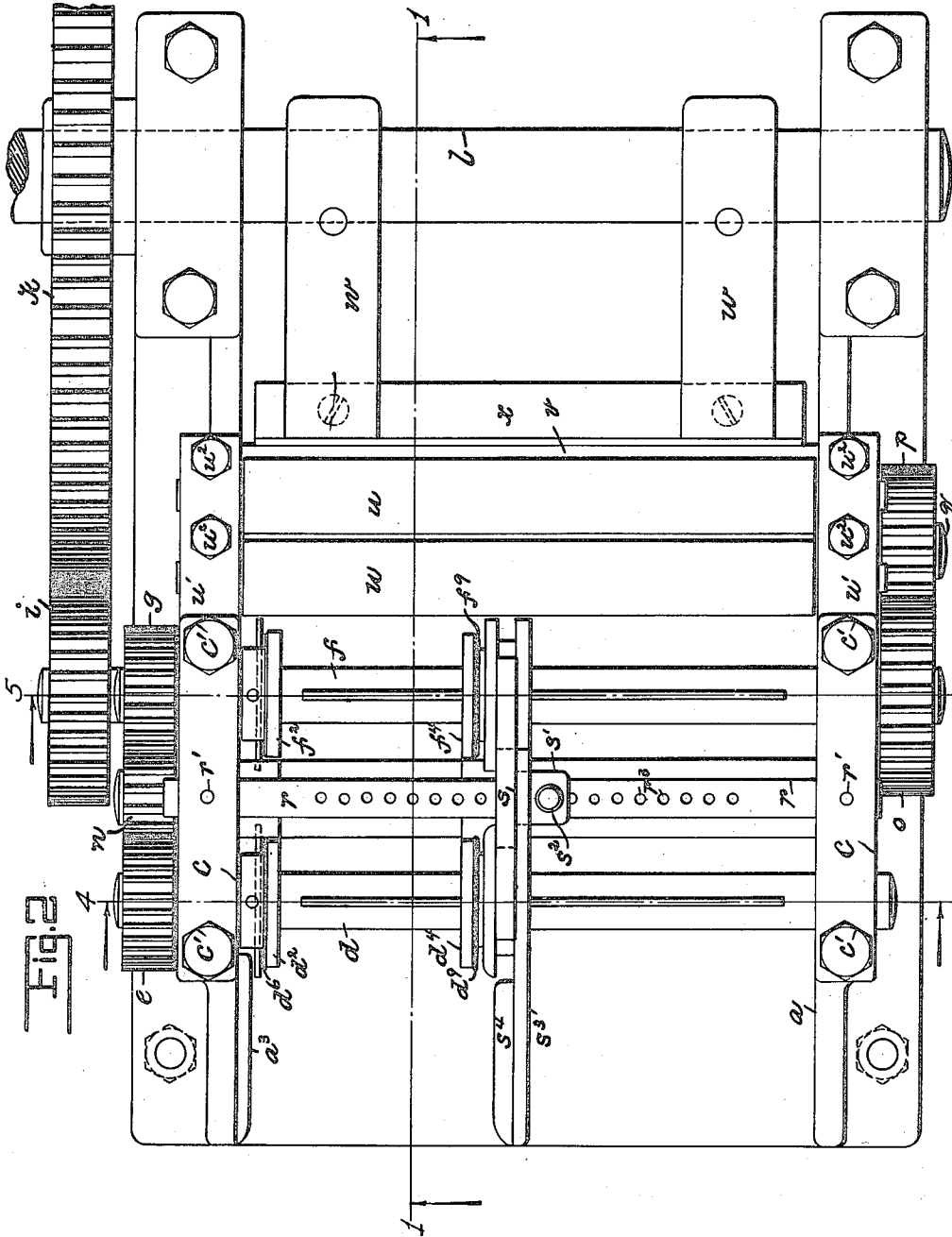
Arthur W. Cash
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WITNESSES:

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Henry Berg

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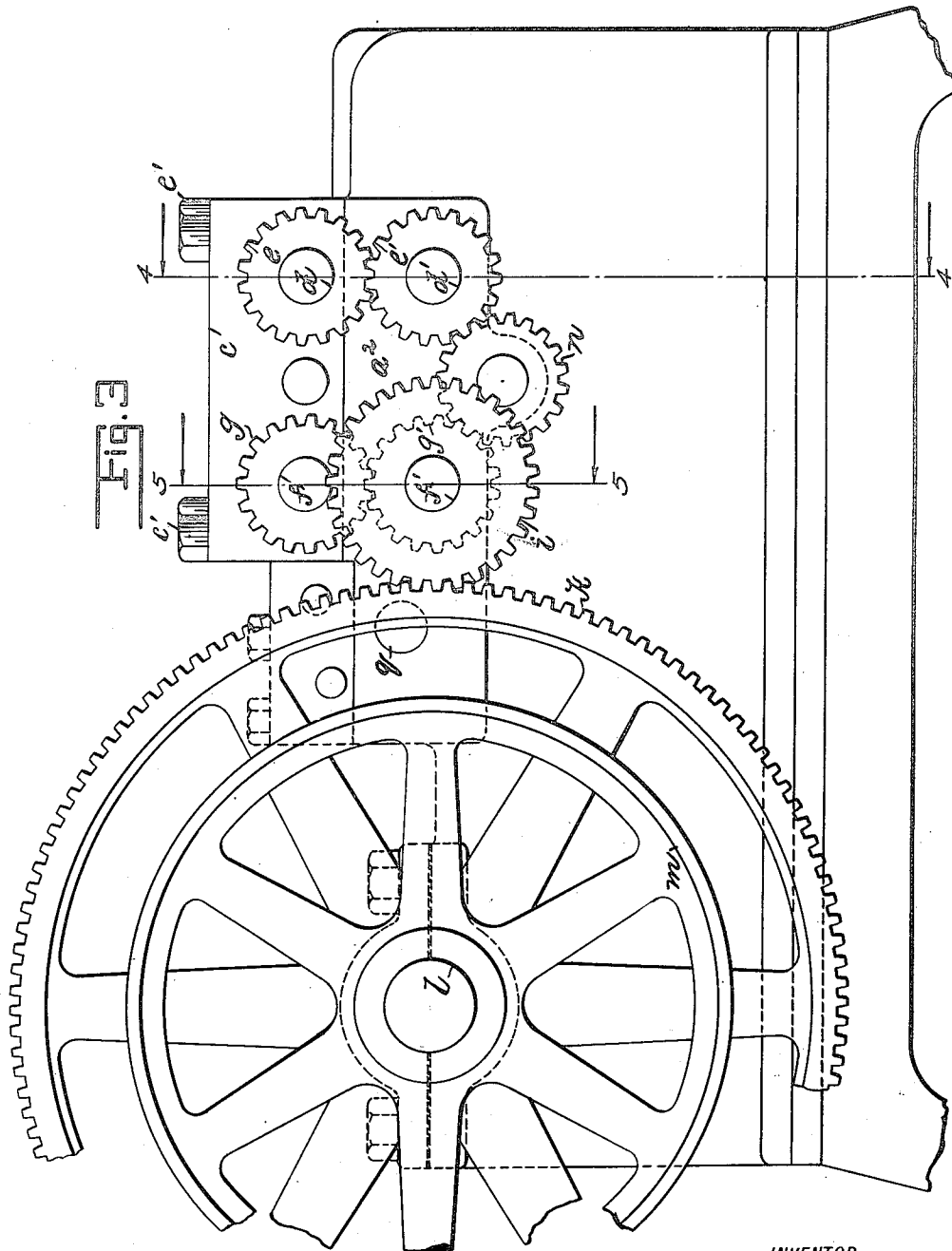
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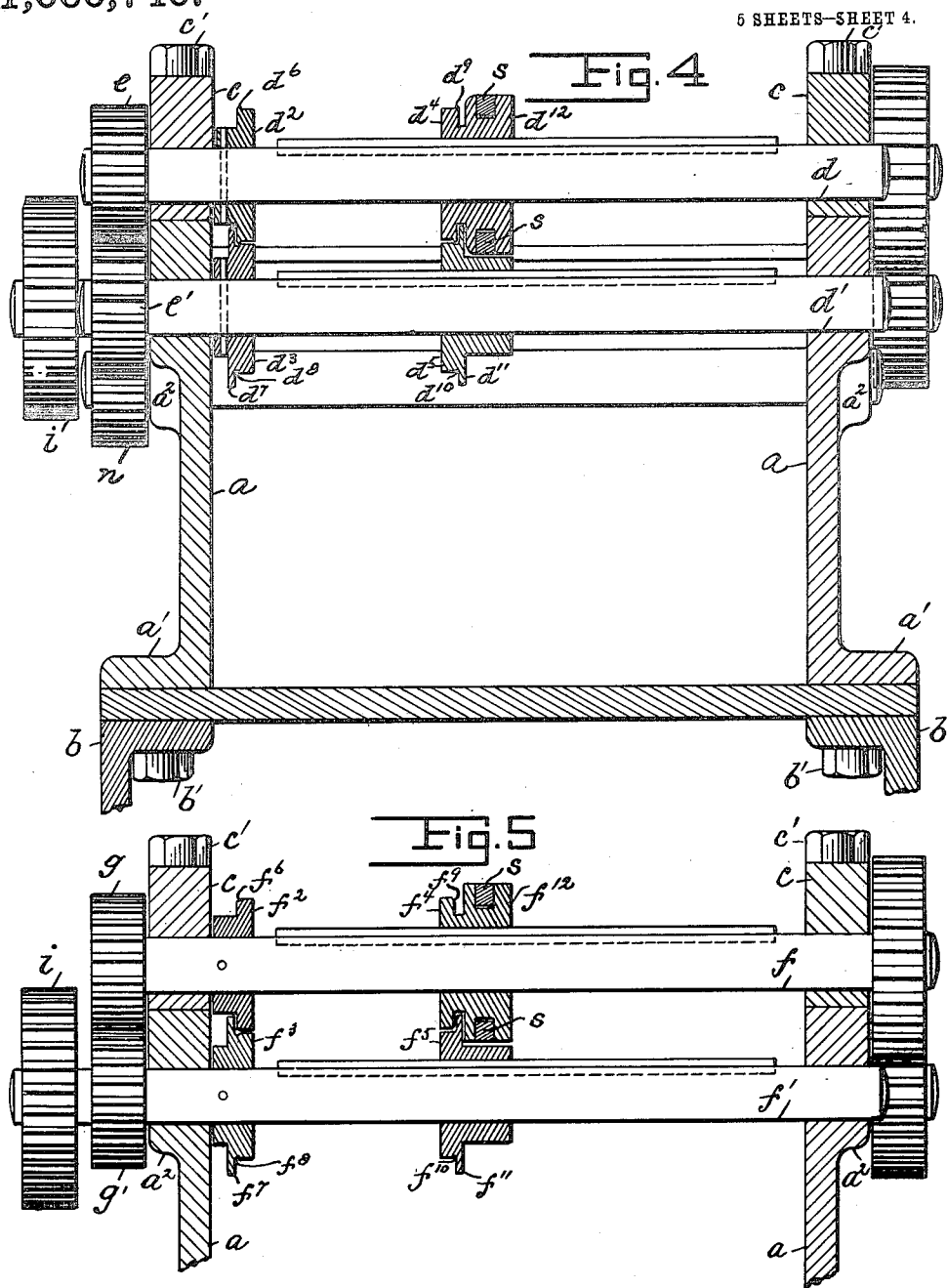
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6 SHEETS—SHEET 5.

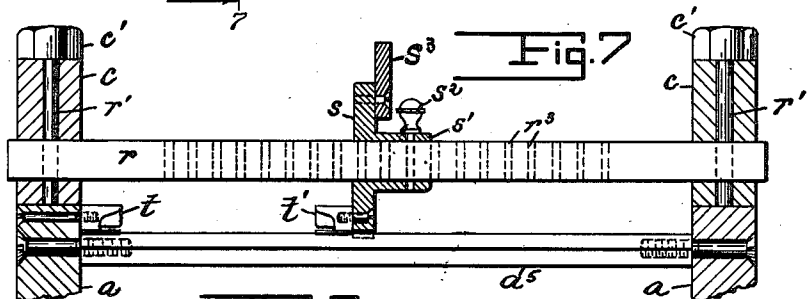
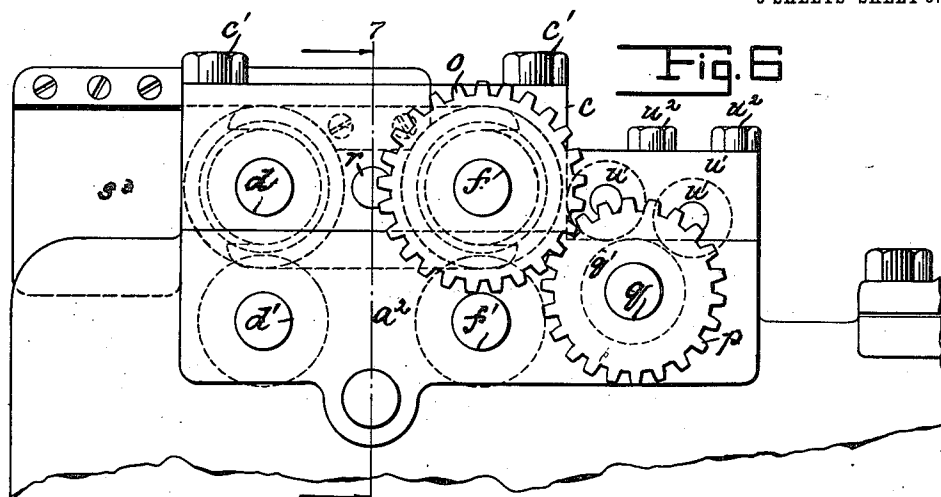


Fig. 8

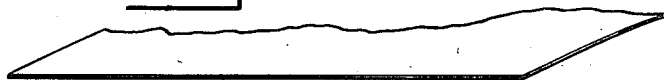


Fig. 9

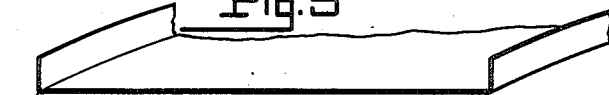


Fig. 10



Fig. 11

WITNESSES:

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UNITED STATES PATENT OFFICE.

ARTHUR W. CASH, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO ORANGE HAT BOX COMPANY, A CORPORATION OF NEW JERSEY.

HAT-PACKING-RING MACHINE.

1,060,740.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed April 19, 1909. Serial No. 490,888.

To all whom it may concern:

Re it known that I, ARTHUR W. CASH, a citizen of the United States, residing in the city of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Hat-Packing-Ring Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it pertains to make, construct, and use the same.

Hat rings for the purpose of economy, inasmuch as they are used in enormous quantities, are made of an inferior grade of coarse paper or straw-board of weak body and strengthened and rendered smooth by means of a very thin sheet of a better grade of pliable paper, pasted or cemented to one side of the straw-board only. The machine hereinafter described, is designed to receive from a roll or otherwise, long strips of this paper or straw-board, cut to a suitable or desired width, pass such material through a series of guides, bending and forming rollers, and finally cut the strips into suitable lengths for forming the completed hat rings. The completed hat ring is a well known article of manufacture, and need not be described further than to indicate its condition through the various steps in the process of its manufacture, and to say that the requisites of a good hat ring are that it shall be pliable and fulled or thickened at its edges, and left smooth and without a rupture on its edges, so that in use, it shall not chafe or abrade the outer surface of the hats in connection with which it is used.

As before stated, hat rings are used in enormous quantities for shipping purposes, and some means must be provided for their economical manufacture. This, I believe, I have accomplished in the structure set forth in the accompanying drawings, wherein--

Figure 1 is a longitudinal section of my improved machine, such section being taken on the line of the path of the strip of paper through the machine. Fig. 2 is a plan view illustrating the essential details of the machine. Fig. 3 is a left-hand side elevation of the machine, showing the gear plan. Figs. 4 and 5 are vertical cross-sections on lines 4 and 5 of Fig. 2. Fig. 6 is a right-hand fragmentary elevation of the machine showing the location of the various shafts,

and the means for driving one set of said shafts. Fig. 7 is a vertical sectional elevation on line 7--7 of Fig. 6; and Figs. 8, 9, 10 and 11 illustrate respectively, the various conditions of the strip of paper or straw-board during the several steps of formation as it passes through the bending and forming rolls of the machine.

Similar letters of reference refer to like parts through the specification and drawings.

The machine comprises a pair of vertical flanged plates *a, a*, mounted upon a table *b*, and secured in position by means of the series of bolts *b'* passing upward through the table and screwed into the flanges *a'* of the plates *a*. The upper edges of the plates *a* are provided with bosses *a²* to serve as bearings for the various roller shafts hereinafter described. At the upper edge of the plates *a*, I provide upper bearings *c, c*, which carry the upper roller shafts, such bearings being vertically adjustable to provide for varying thicknesses of material, and held in position by means of the bolts *c'*, passing vertically through said bearings *c* and into the bosses *a²*. A pair of roller shafts *d, d'* is mounted in the bearings *c* and the bosses *a²*, as clearly illustrated in Figs. 1, 2 and 3, the outer left ends of shafts where they project beyond bearings *c* and the boss *a²*, being provided with intermeshing spur gears *e* and *e'* respectively. Forward of the two shafts *d* and *d'*, is another pair of shafts *f* and *f'*, respectively, journaled in the bearing blocks *c, c* and the bosses *a², a²*. On these two shafts *f* and *f'*, are also intermeshing gears *g* and *g'*. The shaft *f'* is further provided with a spur gear *i*, which engages the drive spur gear *k*, the latter being mounted upon the main drive shaft *l*, said drive shaft carrying any convenient means for communicating rotary motion to it, as for example, the belt wheel *m*. It will thus be seen that the rotation of the belt wheel *m* will communicate a rotary motion to the shafts *f* and *f'* through the intermediate gears *g, i* and *k*. Rotary motion in the same direction is communicated from the shaft *f* to the shafts *d* and *d'*, through the idle spur gear *n*, so that the four shafts *d, d'* and *f* and *f'* rotate together in unison. The gear plan just described, is clearly illustrated in Fig. 3. Turning now to the opposite side of the machine, as illus-

trated in Fig. 6, it will be noted that the shaft f projects beyond the upper bearing c and carries at its outer end a spur gear o , which meshes with the spur gear p , carried upon the outer end of a shaft q , said shaft q being mounted for rotation in the bosses a^2 , a^2 . The shafts d and d' are provided with forming rolls d^2 , d^3 , d^4 and d^5 respectively, the first pair of said rolls, namely, d^2 , d^3 being rigidly secured to the shafts d and d' adjacent to the left hand side of the machine, so as to rotate with said shafts. The two rollers d^4 and d^5 are splined respectively to the shafts d and d' , so as to rotate with said shafts, but permit said rollers to be adjusted longitudinally of said shafts. The roller d^2 is provided on its periphery with a small scoring bead d^6 and the roller d^3 is provided with a vertical flange d^7 , that is, a flange at right angles to the axis of the roller, and a small groove d^8 adjacent thereto, said flange and groove lying adjacent to the outer face of the roller d^3 , so that the bead d^6 will rotate substantially within the small groove d^8 . A corresponding scoring bead d^9 is located on the roller d^4 for rotation in connection with a corresponding groove d^{10} in the roller d^5 , said roller d^5 having also a vertical flange d^{11} to correspond with the flange d^7 and roller d^3 . The two shafts f and f' have the rolls f^2 , f^3 , f^4 and f^5 corresponding in every respect with the rolls d^2 , d^3 , d^4 and d^5 , heretofore referred to, with the exception that the scoring beads d^6 and d^9 are omitted, and slight grooves f^6 and f^9 are substituted therefor, for a purpose hereinafter to be described. The vertical flanges f^7 and f^{11} together with the grooves f^8 and f^{10} however, are present in substantially the same relation upon the two rollers f^3 and f^5 as heretofore described in connection with the corresponding flanges and grooves in the rolls d^3 and d^5 . The rolls f^4 and f^5 are also correspondingly splined to the shafts f and f' for longitudinal movement thereof. In order to provide for this longitudinal adjustment of the rollers d^4 and d^5 , f^4 and f^5 , I provide an adjusting bar r mounted rigidly in the two bearings c , c , heretofore described, such bar being held in rigid relation with said bearings by means of the pins r' , r' . The two rollers d^4 and f^4 are provided with grooved hubs d^{12} and f^{12} , to receive the yoke s , such yoke being carried on the adjusting bar r , said yoke being further provided with a lateral sleeved extension s' , through which said bar r extends. An adjusting pin s^2 passes through a perforation in this extension s' , for engagement with any one of a series of perforations r^3 in the bar r . It will now be seen that by removing the pin s^2 from the extension s' of the yoke s , said yoke and with it, the four rollers d^4 , d^5 and f^4 , f^5 , may be adjusted longitudinally of the

shafts d , d' and f , f' , so as to vary the distance between the series of rollers d^2 , d^4 and d^3 , d^5 , as well as the distance between the rollers f^2 , f^4 , and f^3 , f^5 .

Secured directly beneath the left hand end of the bar r , is a folding cam t , said folding cam having a peculiarly shaped under surface, which is in substantial alinement with the grooves d^8 and f^8 of the rolls d^3 and f^3 . Directly opposite said folding cam t and mounted upon a downward extension from the yoke s , is a corresponding but reversed folding cam t' , the latter being mounted so that the cam surface is in substantial alinement with the grooves d^{10} and f^{10} of the rollers d^5 and f^5 . It will thus be seen that any lateral movement given to the rollers d^5 and f^5 will maintain the alinement of the grooves d^{10} and f^{10} with the cam folder t' .

In order to give the hat ring material, the proper curve in the direction of its length, I provide above the roll q' , a pair of bending rolls u , u , such rolls being mounted in bearings u' , u' , which are mounted upon the upper edge of the boss a^2 of the side plates a , and adjustably held in position by means of two bolts u^2 , u^2 . The centers of these rolls are located in the arc of a circle of which the center of the shaft q is the center.

In order to cut the hat ring material into proper lengths, I provide the following construction: Extending in advance of the bending rolls q' , and u , u , completely across from one side plate a to the other, is a cutting or shearing knife v , as clearly shown in Fig. 1. For cooperation with this shearing knife v , I mounted upon the arms w , w , a shearing knife x , the arms w , w being rigidly secured to the main drive shaft l as clearly shown in Fig. 2, so that said arms w , w together with the shearing knife x , rotate with the shaft l .

In order to provide suitable guides for directing the hat ring material between the rollers, I provide a ledge a^3 upon the inner side of the plate a , the upper face of such ledge being in alinement with the adjacent portions of the rolls d^2 and d^3 , and as a means for supporting the opposite edge of the paper and directing it into place, I provide an extension s^3 upon the yoke s , said extension projecting forwardly and having its lower edge provided with a ledge s^4 , which lies in substantially the same horizontal plane as the ledge a^3 above referred to. It will thus be seen that when the rollers f^4 and f^5 are adjusted to take different widths of paper, the supporting ledge s^4 will be correspondingly adjusted to support the edges of the paper or straw-board, which is being fed into the machine. It sometimes happens when the rings are of extra width, that there will be a tendency for the center

of the ribbon of paper to sag downwardly as it passes through the machine. In order to overcome this tendency, I provide the plate a^5 , extending between the two side plates a and connected therewith, the upper face of said plate a^5 being in substantial alignment with the path of the paper, as it passes through the rolls. In this manner, a substantial support is formed for the paper which effectually prevents such sagging and the consequent drawing of the margins of the paper away from the rollers.

I will now proceed to describe the operation of the machine.

The hat ring material of proper width, is usually manufactured in large rolls or ribbons, and in order to properly prepare it for use, it is usually passed through a steaming box in order to render the paper soft and pliable. The ribbon is then inserted between the rolls d^2 , d^3 , with the margins of the paper resting upon the ledges a^3 , s^4 . The machine being in operation, the rotation of the rolls will draw the paper between them, so that the first operation results in bending up the margins of the paper as illustrated in Fig. 9, so as to form a slight groove z between the body of the paper and the turned-up edge, as clearly shown, this groove being produced by means of the beads d^6 , d^9 , in conjunction with the grooves d^8 and d^{10} of the corresponding rolls. As the paper emerges from between the first pair of rolls d^2 , d^3 , it is directed through the bending or turning-over cams t , t' , whence the bent up margins of the strip are laid over the body of the paper and pressed upon it. Thence the ends of the paper are passed between the rollers f^2 , f^3 and f^4 , f^5 , from which it emerges with the margins of the paper pressed down firmly upon the body. As heretofore referred to, the rolls f^2 and f^4 are provided with the small grooves f^6 and f^9 , which come adjacent to the corresponding grooves f^8 and f^{10} in the rollers f^3 and f^5 , and by this means, the thickened or fullled edge of the paper after folding is preserved without rupture. After emerging from the second set of rollers, the paper is directed between the curling rolls u , u and q' , whence the turned over edges are pressed down firmly upon the body, thereby completing the formation of the thickened or fullled edges. The tendency of this set of rolls is to give the ribbon of paper with its turned-over edges, a permanent curve. After emerging from the curving rolls, the end of the material is directed forwardly and downwardly by its own weight, and inasmuch as the shaft l is constantly rotating, the arms w with the cutting shear x cooperating periodically with the cutting shear v , serves to cut off the material as it emerges from the curving rolls into predetermined lengths suitable for making the complete hat ring. The

end of the strip of pasteboard before it is inserted between the first set of rollers will appear as illustrated in Fig. 8. After passing the first set of rollers it will appear with its edges turned up as shown in Fig. 9 with the slight score line as shown at Z. After emerging from the turning cams and through the second set of rolls the end of the strip will appear as shown in Fig. 10, and finally after emerging from the curving or curling rolls, the completed structure will appear as shown in Fig. 11. It should be stated in this connection, that the paper or material from which the hat rings are made, comes in different thicknesses for different styles of hats. In order to provide for these various thicknesses, the distance between the rolls of each pair, must be made adjustable, and in order to provide for their adjustment, I have as heretofore stated, provided the bearings c , c with the adjusting screws c' , c' , so that the bearings may be raised and lowered by unscrewing or screwing down these bolts. In a like manner, the bearing u' for the curving rolls u , u is made adjustable through the bolts u^2 , u^2 which screw down into the bosses of the side plates a .

It will thus be seen that I have provided a complete machine whereby the hat ring material may be continuously fed between the forming and curling rolls for turning over and fulling the edges, giving the material a set "curl" and finally cutting said material into predetermined lengths from which hat rings are eventually formed. Inasmuch as the hat ring itself forms no part of my invention, I have not more fully described or illustrated the same, but it may be stated that the hat rings are eventually completed by bringing the ends of the same together and securing them in any convenient manner, as for example, by gluing or riveting them together.

I claim:

1. In a hat ring forming machine, the combination of a pair of rotating shafts, a pair of pressing rolls mounted for rotation upon each of said shafts, one pair of said rolls each being provided with a peripheral groove and a vertical peripheral flange, and the other pair of said rolls each being provided with a peripheral groove for cooperation with the grooves upon the first named pair of rolls.

2. In a hat ring forming machine, the combination of a pair of rotating shafts, a pair of pressing rolls mounted for rotation upon each of said shafts, one pair of said rolls each being provided with a peripheral groove and a vertical peripheral flange, and the other pair of said rolls each being provided with a peripheral groove for cooperation with the grooves upon the first named pair of rolls, and means for adjusting one

roll upon each of said shafts toward and away from the other roll of the same shaft.

3. In a hat ring forming machine, the combination of a pair of rotating shafts, a pair of pressing rolls mounted for rotation upon each of said shafts, one pair of said rolls each being provided with a peripheral groove and a vertical peripheral flange, and the other pair of said rolls each being provided with a peripheral groove for coöperation with the grooves upon the first named pair of rolls and means for adjusting the distance between said shafts.

4. In a hat ring forming machine, the combination of a pair of rotating shafts, a pair of scoring rolls mounted upon each of said shafts, one pair of said rolls being provided with a peripheral groove, and a vertical flange and the other pair each being provided with a peripheral bead for coöperation with the grooves upon the first named pair of rolls, a pair of turning cams in advance of said shafts, a second pair of shafts having pressing rolls mounted thereon, means for adjusting the sets of rolls on

one end of said shafts toward and away from the corresponding rolls on the other ends of said shafts.

5. In a hat ring forming machine, the combination of a set of vertically flanged turning rolls each having a groove adjacent to the flange thereof, with a set of beaded rolls for coöperation therewith, a pair of turning cams in advance of said set of turning rolls, a set of flanged pressing rolls each having a groove adjacent to the flange thereof of a set of grooved rolls for coöperation therewith, and a set of curving rolls, said sets of rolls and cams being arranged in tandem, whereby a strip of paper may be drawn therethrough to produce a hat ring having its margins turned down flat upon the body thereof.

This specification signed and witnessed this 17th day of April, 1909.

ARTHUR W. CASH.

Witnesses:

M. H. LOCKWOOD,
C. A. ALLISTON.