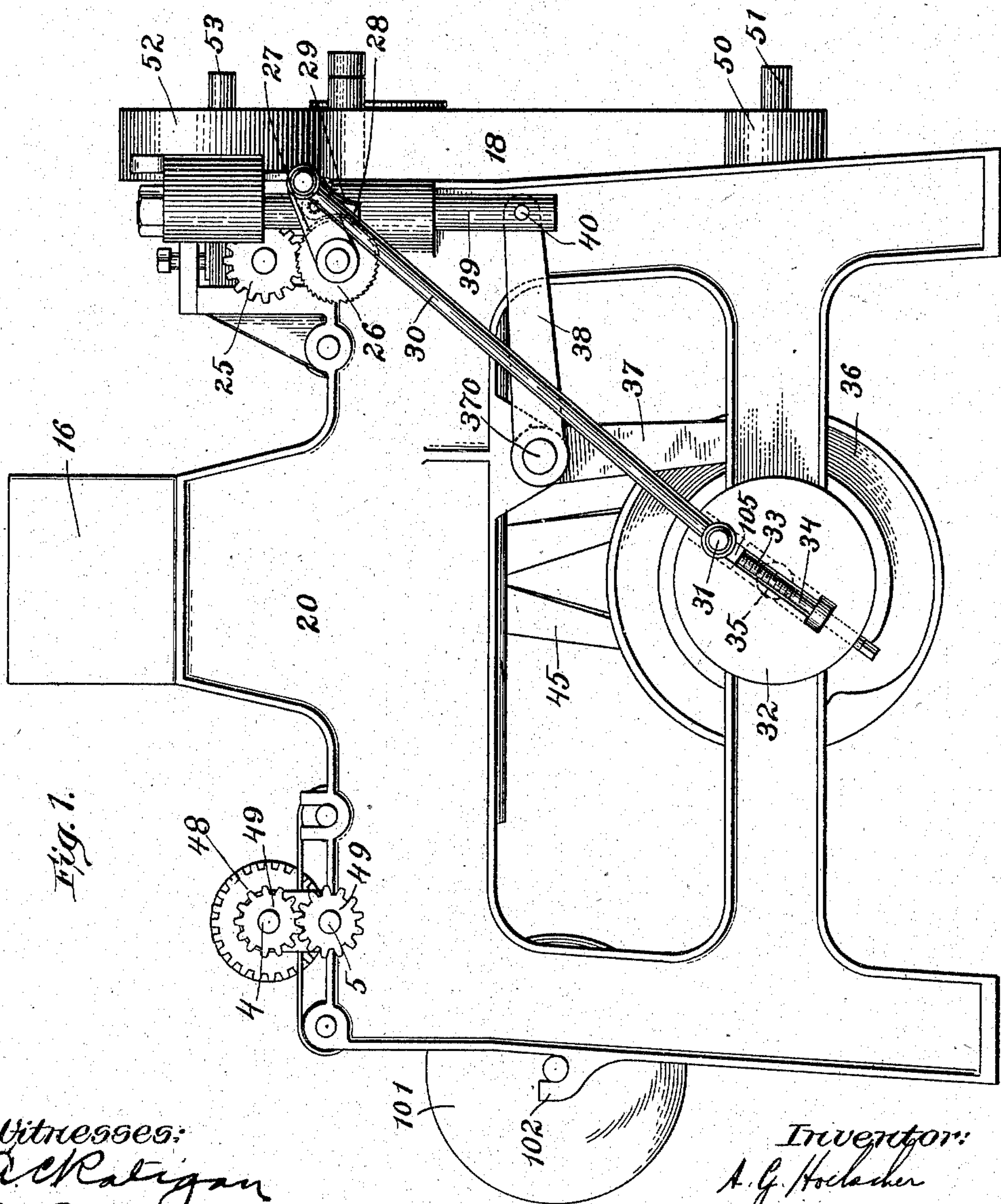


A. G. HOELSCHER.  
MACHINE FOR MAKING HEAD BANDS FOR BOOKS.  
APPLICATION FILED SEPT. 20, 1904.

965,901.

Patented Aug. 2, 1910.

4 SHEETS—SHEET 1.



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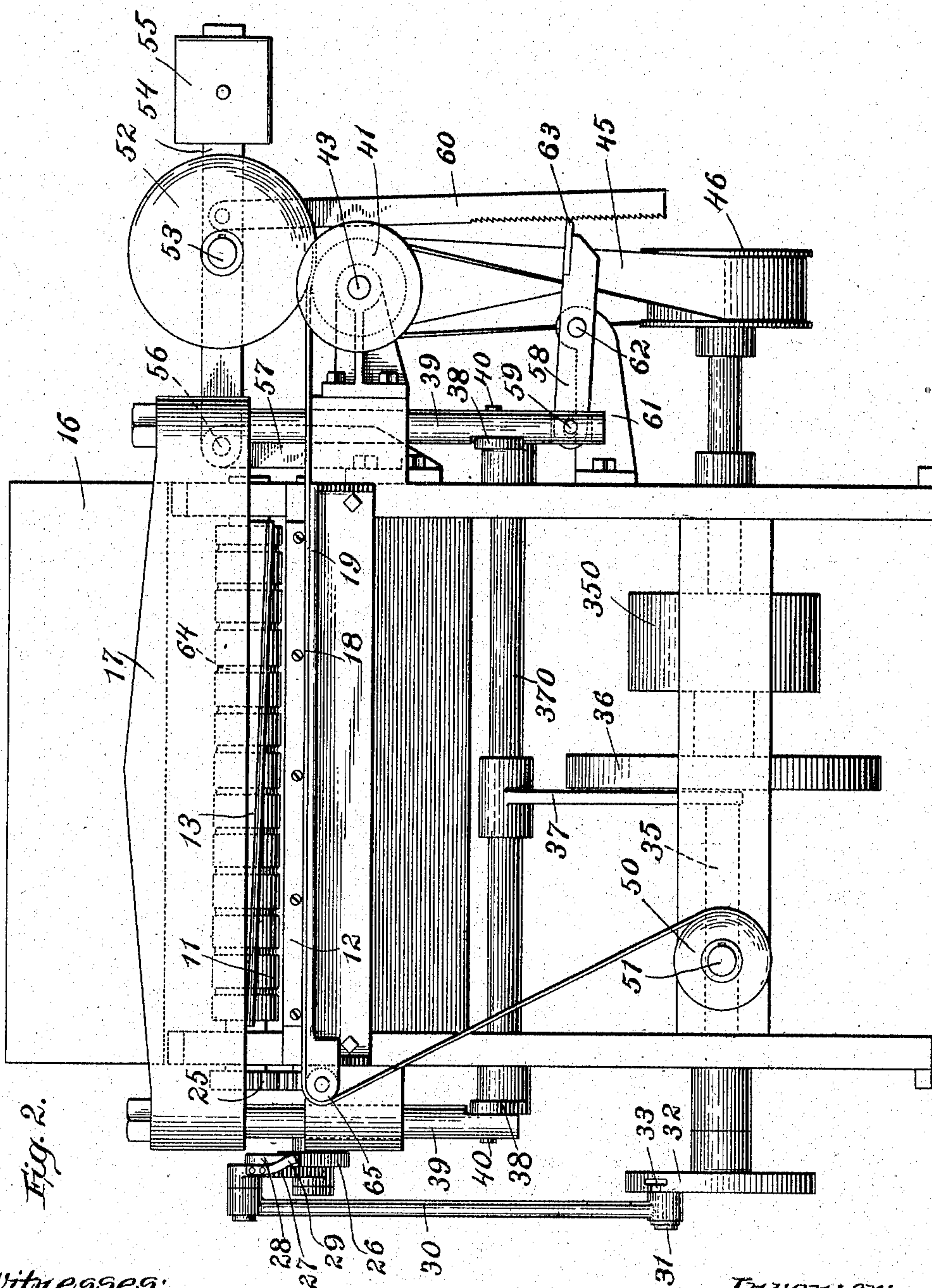


Fig. 2.

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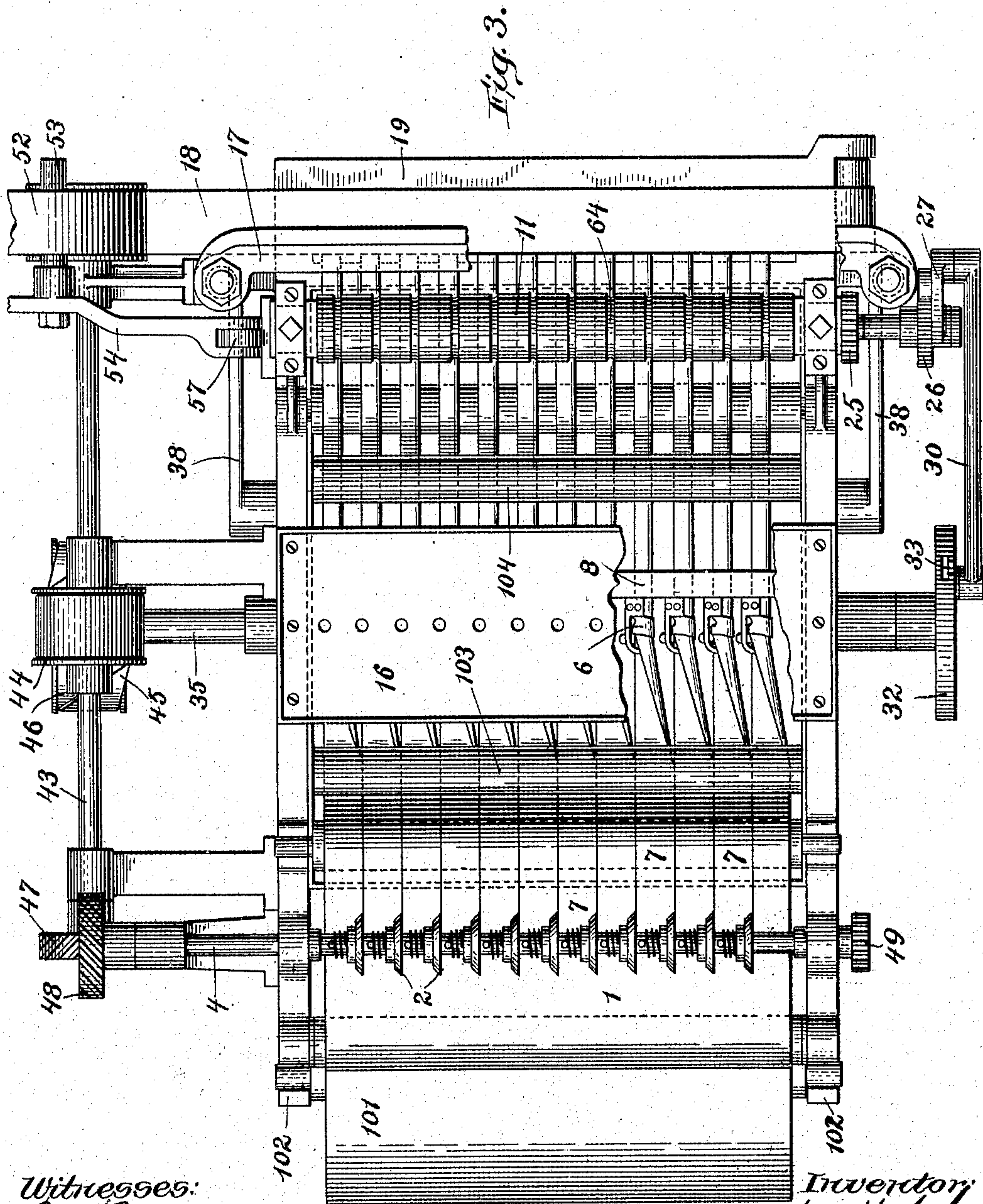


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4 SHEETS—SHEET 3.



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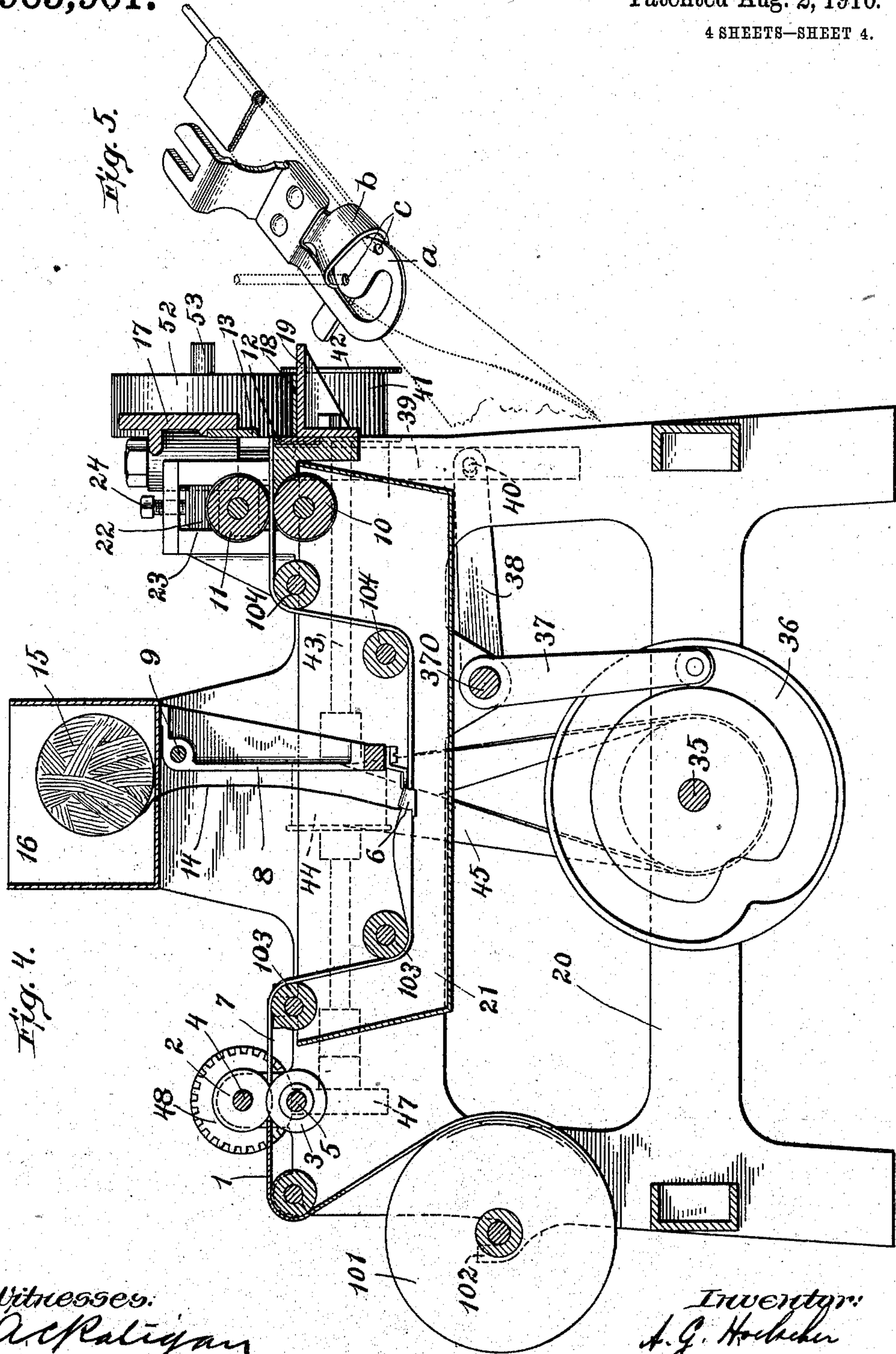


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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

ADOLPH G. HOELSCHER, OF NORWOOD, MASSACHUSETTS, ASSIGNOR TO HENRY H. KIMBALL, OF BOSTON, MASSACHUSETTS.

MACHINE FOR MAKING HEAD-BANDS FOR BOOKS.

965,901.

Specification of Letters Patent.

Patented Aug. 2, 1910.

Application filed September 20, 1904. Serial No. 225,225.

To all whom it may concern:

Be it known that I, ADOLPH G. HOELSCHER, of Norwood, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making Head-Bands for Books, of which the following is a specification.

The subject of the present invention is a machine for making headbands which consist of pieces or lengths cut from a strip of cloth folded double lengthwise and having the thickness of the folded edge increased by a piece of string placed in the fold extending longitudinally of the strip, for use in binding books. The headbands are saturated with glue or paste and are applied to books during the process of binding, being placed on the backs of the books inside of the outer coverings after the signatures are stitched together with their enlarged edges projecting over the upper and lower rear edges of the book to cover the folded edges of the signatures and hide the irregularity caused by the projection of these edges.

Hitherto headbands have been made by hand by taking strips of cloth about an inch wide and as long as can conveniently be manipulated, usually about two feet, folding them over strings stretched between suitable supports and pasting the flaps together. This method is slow and expensive, as skilled operatives must be employed and the amount which any operative can produce by hand is limited. I have therefore devised a machine by which headbands can be made more rapidly and accurately than by hand and of which the output is practically unlimited, while only slight attention is necessary to maintain it in operation.

The machine illustrated in the accompanying drawings and hereinafter described and claimed constitutes the preferred embodiment of my invention.

In the drawings,—Figure 1 represents a side elevation; Fig. 2 represents an end elevation; Fig. 3 represents a plan view, and Fig. 4 represents a longitudinal vertical sectional view of a machine embodying my invention. Fig. 5 represents a perspective detail view of a folder and string-guide used in connection with this machine.

The same reference characters indicate the same parts in all the figures.

In this machine a breadth of cloth 1 is taken from a roll 101 supported by brackets 102 on the frame of the machine, and is caused to pass by rotary cutters 2 3 which are mounted on parallel shafts 4 and 5 carried by the machine-frame and are operated in connection with each other to cut the breadth into a plurality of strips 7. These strips are preferably about an inch in width, although they may be of any desired width, and any desired number may be formed from a breadth of cloth. After passing the cutters the strips are drawn over guide-rolls 103 and through folders 6 which fold the strips double and have provisions for guiding strings 14 so that they will lie in the folds of the strips. From the folders the strips pass over the guide-rolls 104 through the feed-rolls 10 11 to the cutters 12 13 which sever pieces from the ends of the strips of the proper length to make the completed headband. After being severed by the cutters 12 and 13, the headbands fall upon the conveyer 18 which is supported on a table or bracket 19 in close proximity to the cutters, and is caused to move transversely of the machine to carry away the headbands. In order to distinguish the rotary cutters 2 3 which slit the cloth longitudinally into strips, from the reciprocating cutters 12 13, which chop off the completed headbands, the former cutters may be conveniently considered and called "slitters." The conveyer consists of a belt or tape which is supported on a stud 51 on the frame of the machine in the form of a roll 50 and is led over a guide 65 and the table 19 past the cutters, and is then rolled up over the stud 53 by means to be hereinafter described to form a roll 52 between the convolutions of which the completed headbands are held.

21 is a receptacle or tank adapted to contain a quantity of paste, glue or other adhesive material, and the folders 6 are mounted on the lower part of the bracket 8 in such manner that they normally extend beneath the level of the paste and are submerged therein. The guide-rolls 103 104 are located so as to guide the fabric strips into the paste receptacle and through the



paste. The bracket 8 is pivotally mounted at 9 to the frame of the machine so that it can be rotated to bring the folders out of the paste when it is necessary to thread new pieces of string and strips of fabric through the folders.

Any desired folder having provisions for doubling over the edge of a strip of cloth and for guiding a string so that it will lie snugly in the fold may be used, one such folder being shown in Fig. 5. This folder contains a flat guide-plate *a* and a curved plate *b* which partially surrounds the guide-plate *a* and turns one edge of the strip over the guide-plate in the manner shown by dotted lines in Fig. 5. The guide-plate *a* is provided with holes *c* which receive and guide the string 14 to cause it to lie snugly within the folded edge of the strip. The string is contained in a receptacle 16 from which receptacle a string is led to each one of the folders. While passing through the paste the strips become thoroughly saturated therewith so that after they have passed the folders and lower guide-roll 104 and emerged from the paste, the folded-over flaps are firmly stuck together and constitute with the strings strips which are of half the original width of the strip 7, having one edge thickened and which may, for convenience, be called "headband strips." The feeding rolls consist of the lower cylindrical roll 10 and the upper roll 11 which is formed with grooves 64 so spaced as to accommodate the enlarged edges of the headband strips. The lower roll is mounted in fixed bearings while the upper roll is mounted in bearing-blocks 22 which are adjustable in vertical guides 23 by means of screws 24 to vary the pressure which they exert on the headband strips. The rolls are positively geared together by means of pinions 25 carried by their axes and meshing together, and are driven intermittently by mechanism consisting of a ratchet-wheel 26 carried on the axis of one of the rolls and operated by a pawl 28 carried by an arm 27 which is loosely journaled on the same axis. A spring 29 retains the pawl 28 in engagement with the ratchet-wheel. The arm 27 is oscillated to move the pawl 28 backward and forward and so advance the feed-roll step-by-step through a pitman 30 which is pivoted to the end of the arm and the other end of which is mounted on a crank-pin 31 carried by a crank-disk 32 on the end of the main drive-shaft 35. The step-by-step rotation of the feed-rolls draws the strips through the folders and advances the free ends of the strips to the cutters.

As it is desirable to have the machine produce headbands of different lengths, provision is made for varying the amount of the feed, and to this end the crank-pin 31 is formed on a block 105 mounted in a dia-

metrical slot in the crank-disk, and a screw 34 which takes into the block 105 is also mounted in this slot, as shown in Fig. 1. By rotating this screw the eccentricity of the crank-pin may be varied and thus the distance through which the feed-rolls and the headband strips are advanced at each rotation of the driving-shaft may be either increased or diminished, thereby increasing or diminishing the lengths severed by the cutters to form headbands.

The severing cutters comprise the fixed knife 12 and the movable knife 13 which is carried by a vertically-reciprocating cross-bar 17 and coacts with the fixed knife to shear off pieces from the ends of the headband strips. The ends of the cross-bar 17 are connected to vertical plunger-rods 39 which are caused to move up and down by the rotation of the drive-shaft 35 through a cam 36 carried by said shaft which actuates an arm 37 attached to a rock-shaft 370. Upon the ends of the rock-shaft are mounted arms 38 which are connected at 40 to the plungers 39. As will be readily seen, the rotation of the shaft 35 causes oscillation of the rock-shaft 370 and thereby raising and lowering of the movable knife 13.

The means for operating the conveyer-belt will now be described.

The drive-shaft 35 carries on one end a pulley 46 which by means of a belt 45 drives a pulley 44 on a counter-shaft 43. On this counter-shaft is a friction-drum 41 which is mounted beneath the stud 53 about which the conveyer-belt is wound. The stud 53 is carried by an arm 54 pivoted at 56 to a bracket 57 on the machine-frame and pressed downwardly by means of a weight 55 carried by the arm. The free end of the conveyer-belt is wrapped about the stud 53 and is caused to rest upon the drum 41. The weight 55 causes the belt to bear against the drum 41 with sufficient friction so that rotation of the drum causes the conveyer to be carried past the knives and to be wound up on the stud 53.

In order to cause the conveyer to remain stationary while headbands are being severed from the ends of the strip, a means is provided for moving the conveyer out of contact with the drum 41 while the upper knife is performing its cutting stroke. This means comprises a lever 58 pivoted at 62 to a bracket 61 and having an operative connection at 59 with one of the plunger-bars 39 and having at its other end a projection 63 which is adapted to engage one of a series of teeth formed upon a bar 60 which is carried by the arm 54 and hangs vertically downward therefrom. As the upper knife is lowered to cut, the left-hand end of the lever 58, as seen in Fig. 2, is lowered, while the right-hand end is raised, thereby raising the bar 60 and elevating the arm 54 to carry



the roll 52 out of engagement with the drum 41, thus rendering the driving connection inoperative and causing the conveyer to remain stationary. Flanges 42 are formed on opposite ends of the drum 41 and extend on both sides of the roll 52 to guide the conveyer-tape as it is wound up on the roll.

By reason of the construction of the driving mechanism above described the speed of the conveyer-tape is always uniform regardless of the diameter of the roll 52 which constantly increases. The belt is formed preferably of felt or similar material and is kept wet in order that the paste-saturated headbands which are rolled up with it will not stick to it. After all of the tape has been unwound from the roll 50 and wound up on the roll 52 the latter is removed from the stud 53 and taken to a work-table where headbands are being applied to books in process of binding, or if not needed for immediate use is put where it will remain wet until wanted.

In the form of the invention shown in the drawings the rotary cutters 2 and 3 are continuously driven by means of a gear 48 carried by the shaft 4 in mesh with a gear 47 on the counter-shaft 43, the two cutter-shafts 4 and 5 being positively connected by pinions 49. However, I do not desire to restrict myself to this manner of operation as it is sometimes desirable to have the shafts 4 and 5 act as feed-rolls in order to diminish the strain put upon the headband strips when all of the feeding is performed by the rolls 10 and 11. In this case the spaces between the cutters on the cutter-shafts 4 and 5 are occupied by resilient rolls which grip the fabric strips, and the rolls instead of being driven continuously are suitably geared so as to operate synchronously with the rolls 10 and 11.

I claim:—

1. A machine for making headbands for books comprising a folder having provisions for guiding a string and adapted to fold a strip of fabric about the string to form a headband strip, intermittently-acting feeding means arranged to engage the strip after it has been folded about the string and draw the headband strip by the folder, and cutters arranged adjacent and beyond the feeding means to sever pieces constituting completed headbands from the end of the strip.

2. A machine for making headbands for books comprising a folder arranged to guide a string and fold a strip of fabric lengthwise about said string to form a headband strip, provisions for applying adhesive both to the string and fabric, feeding devices arranged to engage the headband strip and feed it past the folder, mechanism for intermittently operating said feeding devices, causing them to move always in the same direction, and means for adjusting said op-

erating mechanism to vary the extent of motion of the feeding devices and thereby the length of the strip fed at each feeding operation of said devices.

3. A machine for making headbands for books comprising a folder arranged to guide a string and fold a strip of fabric lengthwise about said string to form a headband strip, provisions for applying adhesive to said strip after the latter leaves said folder, feeding devices arranged to engage the headband strip and feed it past the folder, mechanism for rotarily moving intermittently said feeding devices, but always in the same direction, means for adjusting said operating mechanism to vary the extent of motion of the feeding devices and thereby the length of the strip fed at each feeding operation of said devices, and cutters actuated during the inoperative periods of said feeding devices to sever completed headbands from the strip.

4. A machine for making headbands, comprising a folder for doubling a strip of fabric lengthwise to form a headband strip, pressure-feeding rolls for gripping and drawing the strip through and from the folder, an oscillating driver for moving said rolls intermittently, a crank for actuating said driver, adjustable as to its eccentricity, so as to vary the amount of the feed, and a connecting rod between said crank and driver.

5. In a headband-making machine, means for folding a strip of fabric lengthwise to form a headband, and provisions for impregnating the same with fluid adhesive during the folding operation, and for preventing drying of the adhesive on the folding means and obstruction of the passage for the strip.

6. In a headband-making machine, a folder having provisions for guiding a string and doubling a fabric strip lengthwise about the string, and a container for adhesive surrounding the folder.

7. In a machine for making book headbands, a container for fluid adhesive, means for guiding a strip of fabric and a string through the adhesive, and means for folding the strip lengthwise about the string, said means being surrounded by said container and submerged in the adhesive, whereby the latter is prevented from drying on the folding means and obstructing the passage for the string and strip.

8. A machine for making headbands for books comprising a receptacle adapted to contain paste, folding instrumentalities normally located within said receptacle below the level of the paste contained therein and having provisions for guiding a string and for folding a fabric strip lengthwise thereabout to form a headband strip, and feeding means arranged to engage the headband



strip after it has passed the folding instrumentalities and draw the strip through the folding instrumentalities and the receptacle.

9. A machine for simultaneously making  
5 a plurality of headbands for books comprising means for supporting and guiding a breadth of fabric, slitting means constructed and arranged to divide said breadth into a plurality of relatively-narrow strips, fold-  
10 ing instrumentalities constructed to fold said strips lengthwise and each having provisions for guiding a string to cause the latter to lie within the folds, means constructed and arranged to engage the folded strips and feed  
15 the same past the folding instrumentalities, severing means adapted to sever headbands from the ends of the folded strips, and a conveyer adjacent said severing means arranged to receive and carry away the severed head-  
20 bands.

10. A machine for simultaneously making a plurality of headbands for books comprising means for supporting and guiding a breadth of fabric, slitting means constructed  
25 and arranged to divide said breadth into a plurality of relatively-narrow strips, folding instrumentalities constructed to fold said strips lengthwise and each having provisions for guiding a string to cause the latter to  
30 lie within the folds, means constructed and arranged to engage the folded strips and feed the same past the folding instrumentalities, severing means adapted to sever headbands from the ends of the folded  
35 strips, a conveyer belt located adjacent said severing means and adapted to receive and carry away the severed headbands, and driving mechanism for operating said feeding and severing means connected to drive said  
40 belt transversely of the machine.

11. A machine for making simultaneously a series of headbands from a single breadth of cloth, comprising slitters for cutting the cloth into strips, a series of folders each hav-  
45 ing provisions for guiding a string and doubling a strip of cloth lengthwise about the string, and a paste-receptacle in which said folders are located and through which the strips and strings are led in passing to and  
50 through the folders.

12. A machine for simultaneously making a plurality of headbands for books comprising means for supporting and guiding a breadth of fabric, cutting means constructed  
55 and arranged to divide said breadth into a plurality of relatively-narrow strips, folding instrumentalities constructed to fold said strips lengthwise and each having provisions for guiding a string to cause the latter to lie  
60 within the folds, means constructed and arranged to engage the folded strips and feed the same past the folding instrumentalities, provisions for applying an adhesive substance to the strips, severing means adapted  
65 to sever headbands from the ends of the

folded strips, a conveyer located adjacent said severing means arranged to receive and carry away the severed headbands, and driving means connected to operate said feeding and severing means and said conveyer.

13. In a machine of the character described, strip-folding and feeding instrumentalities, a cutter for severing lengths of headbanding from the folded strips, a holder for the severed strips, consisting of a flexible  
75 band lying beside the cutters and movable transversely of the machine, and means for winding up the holder into a roll and confining the severed headbands between the convolutions thereof.

14. In a machine of the character described, strip-folding and feeding instrumentalities, a cutter for severing lengths of headbanding from the folded strips, a holder for the severed strips, consisting of a flexible  
85 band lying beside the cutters and movable transversely of the machine, and means for winding up the holder into a roll and confining the severed headbands between the convolutions thereof, said winding means  
90 being a driven roll in frictional engagement with the periphery of the holder, whereby the latter may be driven at the same linear speed, regardless of the number of convolutions of the same.

15. In a machine of the character stated, a set of folders each having a string guide, provisions for supplying strings and fabric strips to said folders in such manner that  
100 each fabric strip is doubled lengthwise about a string to form a headband strip, and co-operating rolls for drawing said headband strips from said folders, one of said rolls having grooves to receive the thickened portions of said strips caused by the interposed  
105 strings.

16. In a machine of the character stated, a set of folders each having a string-guide, provisions for supplying strings and fabric strips to said folders in such manner that  
110 each fabric strip is doubled lengthwise about a string to form a headband strip, coöperating rolls for drawing said headband strips from said folders, one of said rolls having grooves to receive the thickened portions of  
115 said strips caused by the interposed strings, and means for adjusting one of said rolls toward and from the other.

17. In a machine of the character stated, a driving-shaft, means for feeding a folded  
120 headband strip, driving connections from said shaft arranged to operate said feeding means intermittently, a reciprocating cutter operated by said shaft to sever completed headbands from the strip while the feeding  
125 means is inoperative, a conveyer arranged to receive the headbands severed by the cutter, driving connections from the shaft arranged to actuate said conveyer to cause the same to remove the headbands, and means  
130



actuated by the cutter during its cutting stroke to render said driving connections inoperative.

5 18. In a machine of the character described, means for feeding a folded headband strip, a cutter for severing headbands from said strip, a flexible conveyer for receiving and removing the severed headbands having one end formed into a roll, a driving  
10 roll on which the conveyer roll rests and by which it is driven frictionally, reciprocating devices by which the cutter is operated, and means operated by said reciprocating devices for lifting the conveyer from the driv-  
15 ing roll to render the same inoperative during the cutting stroke.

19. In a machine of the character described, means for feeding a folded headband strip, a cutter for severing headbands  
20 from said strip, a flexible conveyer for receiving and removing the severed headbands having one end formed into a roll, a driving roll on which the conveyer roll rests and by which it is driven frictionally, reciprocating

devices by which the cutter is operated, a 25 toothed bar depending from the conveyer roll support, and an arm having a toothed end adapted to engage a tooth of said bar and operated by the said reciprocating devices during the cutting stroke to lift the 30 conveyer roll from the driver and render the same inoperative.

20. In a machine of the character stated, a receptacle adapted to contain a quantity of paste, a bracket, folding devices carried 35 thereby, and pivotal connections between said bracket and the frame of the machine located and arranged to permit the folders carried by the bracket to be immersed in the paste in said receptacle and to be rotated 40 about the pivot to remove the folders from said receptacle.

In testimony whereof I have affixed my signature, in presence of two witnesses.

ADOLPH G. HOELSCHER.

Witnesses:

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A. H. BROWN.