

June 18, 1929.

C. H. HARTMAN

1,718,145

SHEET MATERIAL FEEDING AND SEVERING APPARATUS

Filed Nov. 13, 1922

3 Sheets-Sheet 1

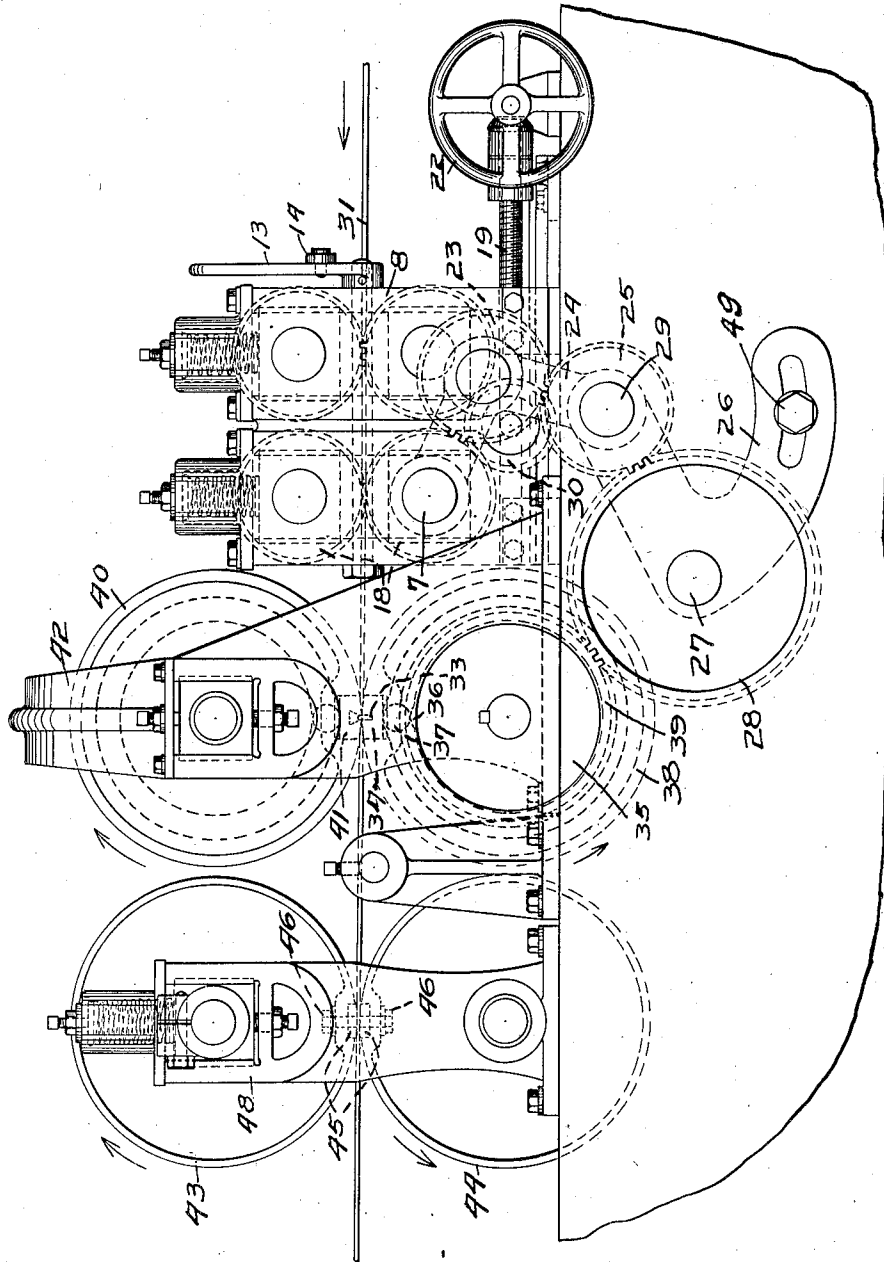


FIG. 1.

INVENTOR

Carl H. Hartman

by

Owen, Owen & Crumpton

June 18, 1929.

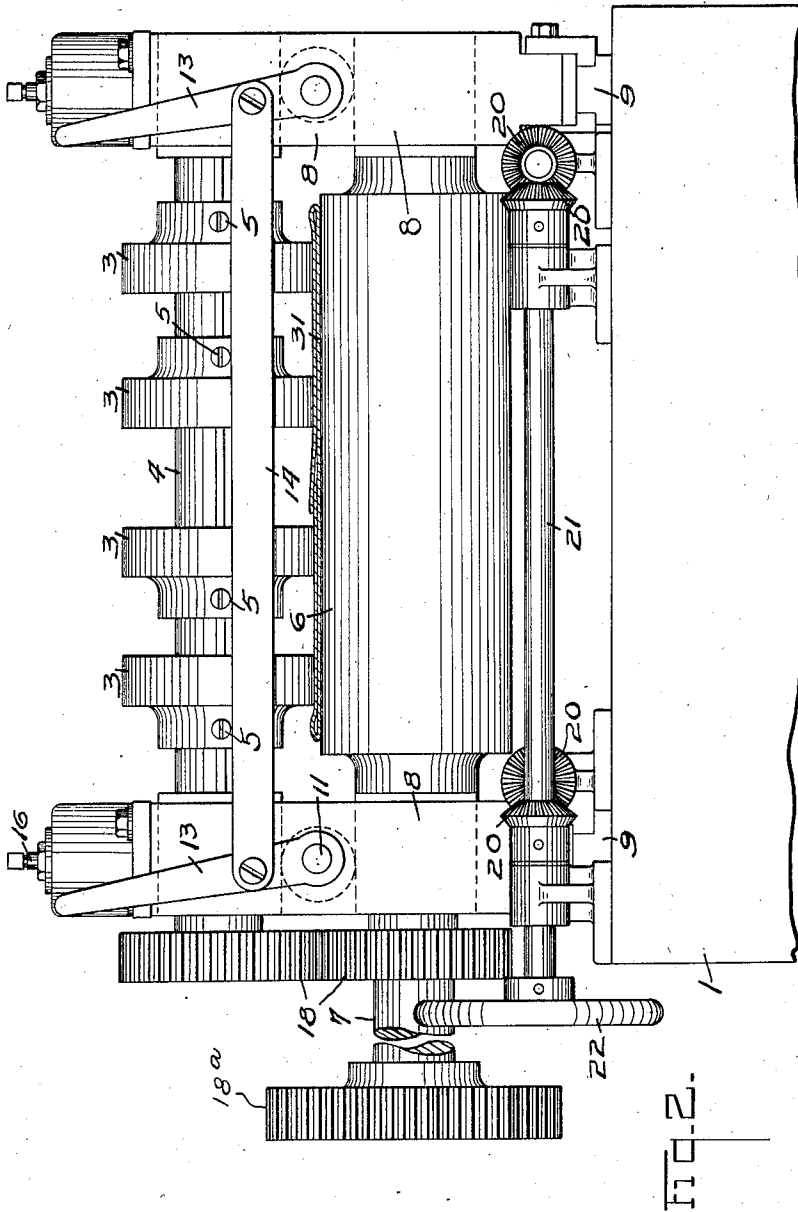
C. H. HARTMAN

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SHEET MATERIAL FEEDING AND SEVERING APPARATUS

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INVENTOR
Carl H. Hartman
by
Owen, Owen & Hampton

June 18, 1929.

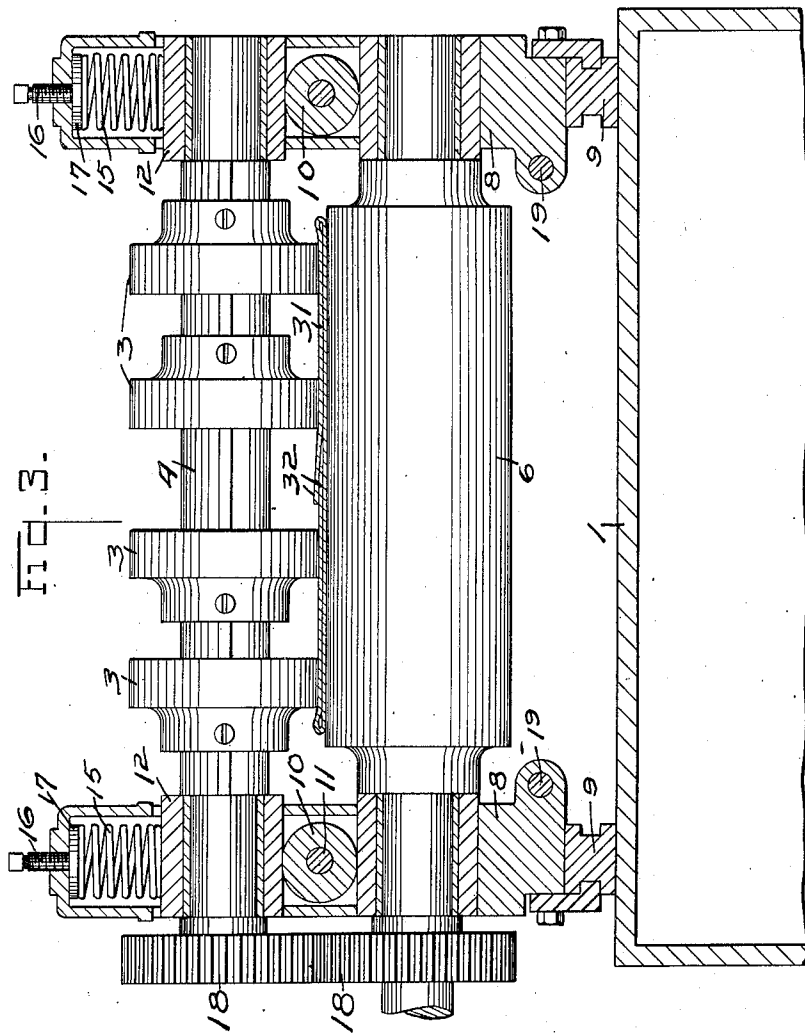
C. H. HARTMAN

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SHEET MATERIAL FEEDING AND SEVERING APPARATUS

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3 Sheets-Sheet 3



INVENTOR

INVENTOR
Carl H. Hartman,
by
Owen, Owen & Crampton.

Patented June 18, 1929.

1,718,145

UNITED STATES PATENT OFFICE.

CARL H. HARTMAN, OF TOLEDO, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ST. REGIS PAPER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SHEET-MATERIAL FEEDING AND SEVERING APPARATUS.

Application filed November 13, 1922. Serial No. 600,648.

My invention has for its object to provide a positive feed and control for sheet material, or sheet materials in the process of the formation of articles, including the severing of the material into lengths, whereby a sheet material may be adjusted to other parts of the machine in connection with which my invention is used or in which it is embodied and whereby creeping or slippage of the sheet material due to the operations of other parts of machines will be avoided or prevented notwithstanding the draft or drawing force to which the sheet material may be subjected in such operations.

The invention is particularly applicable to apparatus by which a continuous sheet is severed into successive lengths, which are moved away from the severing device at a faster rate than the material is fed to the severing device, so as to separate the successive lengths for subsequent operations.

Figure 1 of the drawings illustrates a side view of a part of the machine used for forming bags from long strips of paper. The part shown illustrates the structure selected as an example. Fig. 2 illustrates a front view of the mechanism shown in Fig. 1, and Fig. 3 illustrates a section of the part of the mechanism illustrated in Fig. 1.

In the figures, 1 is a base or bed or table of the machine on which its parts are mounted. The sheet material is manipulated by the machine to form bags and in the formation of the bags sheet material is drawn through parts of the machine that fold the side edges of the sheet material so as to bring the side edges together and seal the overlapping side edges and thus continuously form a tube. The paper is necessarily irregularly stretched as it comes from a large roll and the edges are laid over to overlap. Thus it is necessary that the paper be kept exceedingly taut to avoid wrinkling or a distorted shape. After the tube has been completely formed and the overlapping edges sealed it is cut into lengths from which the bags are formed. In order to sever the folded sheet material it is necessary that the paper be drawn taut. To prevent the transmission of the action of this part of the machine to the preceding part or parts of the machine that are used to form the paper into tube prior to its severance into lengths and in order to adjust the sheet material with reference to the cutting means, I have provided two sets of rolls that draw the paper in

absolute regularity as to movement and performance of the tube forming part of the machine and feed and hold the paper as to the cutting operation of the machine and also means for adjusting the rolls and consequently, the sheet material with reference to the said parts of the machine. Inasmuch as the severing of the paper occurs periodically or at the ends of short periods of time and the paper is drawn with greater tautness during the quick cutting operation while the tube is formed continuously and throughout the operation of the machine as a whole, the invention produces an absolute regularity of movement of the paper in the tube forming part of the machine notwithstanding the periodic excessive draft and severance of the paper.

The means for controlling the draft and feed of the tube from a tube forming part of the machine and the cutting part of the machine, comprises two sets of rolls. The rolls 3 are short and are secured to the shaft 4 by means of a suitable key means, such as the key bolts 5. Below the rolls 3 is located the roll 6 which is supported on a shaft 7. The shafts 4 and 7 are supported in housings 8 movable along guides or rails 9 that are secured to the bed 1 of the machine.

A second set of rolls 3 and 6 are similarly disposed and supported on similar shafts 4 and 7 that have their bearings in the housings 8. In order to raise the shafts 4 and the rolls 3 secured thereto, cams 10 are secured to bars or shafts 11 that are supported for rotation in the ends of the housings 8 and are located beneath movable bearing blocks 12 that are guided by edges of openings formed in the housings 8. Rotation of the shafts 11 raises the shafts 4 and consequently raises the rolls 3 away from the rolls 6. The shafts 11 are connected to arms 13 which are connected together by means of the bar or link 14. The movement of one of the arms 13 causes movement of the shafts 11 and consequent raising of the rolls 3. The arrangement for separating the feed rolls is made the subject of a divisional application, No. 284,611 filed June 11, 1928, and, therefore, is not claimed in this application.

The rolls 3 are spring pressed by means of the springs 15 that are located between the bearing blocks 12 and tops of the housings 8. The pressure of the springs 15 may be adjusted by means of the screws 16 and the discs 17 whereby the compression of the

springs 15 may be varied and thus the pressure of the rolls 3 against the rolls 6 may be adjusted. When the rolls 3 bear against, or are in close proximity to the rolls 6 the shafts 4 and 7 are mechanically connected to cause rotation by the meshing of the gear wheels 18 that are connected to the shafts and thus the sheet material is drawn between the rolls.

The housings 8 are adjustably positioned with reference to the bed 1 of the machine by means of the screws 19 that are connected by means of the bevel gear wheels 20 to the shaft 21. A hand wheel 22 is connected to the shaft 21 to rotate the gear wheels 20 and consequently to rotate the screws 19, which move the housings 8 to the desired positions. The rolls are driven through the gear wheels 23 and 25 which are pivotally supported on links 24. The gear 23 meshes with a gear 18^a (see Fig. 2) and the gear 25 meshes with the gear 28. The gear wheel 25 is on a fixed shaft 29 and a frame 26 is pivoted on the shaft 29. The gear wheel 28 is rotatably supported on the shaft 27. The frame 26 is adjustably secured in position by the bolt 49, the position of this frame being adjusted so that gear 28 meshes with a gear 39 on the lower cutting cylinder, the size of gear 39 determining the relative speed of the feeding rollers to the cutter, and thereby determining the length of the tube cut off at each revolution of the cutting cylinder. The gear wheels 18 are driven through the operation of the gear wheel 28 and consequently movements of the housings 8 within the limitations of the screws 19 will maintain mechanical connection of the rolls 3 and 6 with the driving means of the machine, the gear wheels 18 of one set being connected to the gear wheels 18 of the other set through the idler 30.

The paper 31, having been folded in tubular form by the part or parts of the machine that precede the feed control device in the sequence of operation upon the paper and so as to fold substantially the side quarters of the sheet to overlap the edges 32, is directed between the rolls 3 and 6. The rolls 3 are lifted by movement of the arms 13 whereupon the leading or advance end of the folded paper may be easily placed between the rolls 3 and 6. The rolls are then released from the cams 10 and the pressure of the springs 15 will operate to press the rolls 3 against the paper. The rolls 3 are made adjustable along the shaft 4 so as to bring the outside rolls near to the edge of the folded paper but not so as to ride on the folded edge and crease the paper and also so as to avoid the increased thickness caused by the fold and so as to present to each of the outside rolls only the double thickness of paper and consequently to enable the production of a uniform pressure throughout the width of the rolls on the paper. Also the inside rolls are

placed so as to avoid the overlapping edges 32 and thus the uniform thickness of the folded paper is also presented to the inside rolls. By this arrangement draft on the folded edge of the paper and on the overlapping edges is avoided and means is provided for adjusting the points of draft or drag relative to the width of the folded paper, the rolls 3 being adjustably located along the shaft 4. The leading rolls operate to draw the paper from the folding machine at a uniform rate of pull and speed, while the following rolls prevent the action of the cutting device, which is momentary and periodic, from varying the tension or drag produced by the leading rolls.

The cutting knife 33 extends across the folded paper to sever it into desired lengths. The knife is located in a bar 34 that may be operated by any suitable means. In the structure shown it is operated by a fixed cam 35 having the cam point 36 that operates on a suitable roller 37 which presses against the knife bar 34, the bar being carried by a rotated cylinder 38 that is driven by the gear wheel 39 which meshes with the gear wheel 28. A cylinder 40 is also driven at the same speed that the cylinder 38 is driven by gearing that interconnects the cylinders 40 and 38. The cylinder 40 carries a shearing bar 41. The shearing bar 41 may be fixed in the cylinder 40, but if desired the cylinder bar 41 may be advanced towards the bar 34 at the same time that the bar 34 is raised by the cam 35. The cylinders 38 and 40 are supported in a frame or housing 42 that is secured to the bed or base 1 of the machine. A pair of cylinders 43 and 44 are also driven by suitable gear wheels at the same speed that the cylinders 38 and 40 are driven. The cylinders 43 and 44 are provided with gripping bars 45 that are secured to the cylinders by bolts 46. The outer surfaces of the bars 45 are slightly raised above the surfaces of the cylinders 43 and 44 and thus momentarily grip and severely drag the paper since the bars are moving at a higher speed than the surfaces of the rolls 3 and 6. The bars 45 are so located as to produce this momentary sharp strain on the paper at the instant that the knife 33 penetrates the paper. This insures absolute severance of the paper into required lengths to form the bags. The following rolls 3 and 6, however, prevent this drag from being transmitted to the leading rolls 3 and 6 whereby absolute control and uniformity of feed is obtained. This is of particular advantage when the paper is printed in advance of the formation of the bags. It is obvious that the printing is accomplished more efficiently if done before the bags are formed and the feed control insures that the severing is done at points along the continuously fed tube to produce the proper top and bottom spaces between the printed areas and the tops and bot-

toms of the bags. The rolls 3 and 6 prevent absolute slippage or creepage of the paper relative to the knife. Exact adjustment may be made by rotation of the screws 19. By reason of the structure and arrangement of the rolls 3 and 6 the entire length of the tube as it is formed and passes through the machine up to the cutting of the knife is adjusted relative to the machine which greatly simplifies the control of this part or parts of the machine since by mere rotation of the hand wheel 22 the paper tube may be adjustably shifted.

It will be seen that this invention provides a device whereby a continuous strip of material may be fed to a severing device, even when considerable force is applied to the strip in order to present it to the severing device, and may be adjusted so that the severing will take place along predetermined lines, and the relation of the feeding means to the severing means may be readily and quickly adjusted to correct any slight difference in the operation of the feeding device from that required by the spacing of said predetermined lines, and wherein the feeding device presenting the strip to the severing device is not readily disturbed by any pull transmitted thereto by means snatching the severed length away from the severing device, and wherein the feeding device can be used to feed longitudinally folded paper without pressing on the fold lines of the paper. While specific apparatus has been disclosed, it will be understood that obvious changes may be made within the scope of the appended claims.

I claim:—

1. In combination, a device for severing lengths from a continuous strip of material, feed rolls parallel with the line of severance of said severing device and adapted to press a continuous strip and feed it to the severing device, driving connections operating the feed rolls and severing device in timed relation, and means to adjust the mean distance between the feed rolls and severing device.

2. In combination, a device for severing lengths from a continuous strip of material, a housing located on the receiving side of said device, feed rolls mounted in the housing parallel with the line of severance of said

severing device, common means for driving the feed rolls and severing device in timed relation with each other, and means to adjust the mean distance between the housing and severing device without changing the timed relation between the feed rolls and the severing device.

3. In combination, a device for severing lengths from a continuous strip, a pair of sets of rolls adapted to feed a strip to the device, and gripping means adapted to take the lengths as they are being severed and move them faster than the strip is moved by the feed rolls, the two sets of feed rolls pressing the strip between them and preventing the transmission of any jerk by the gripping means to the strip beyond the feeding rolls.

4. In combination, a rotary severing device adapted to sever lengths from a continuous strip, feed rolls adapted to feed a continuous strip to the severing device, spur gears forming a driving connection between the severing device and feed rolls, a frame with respect to which the axis of the severing device is fixed, a housing in which the feed rolls are mounted, and means to adjust the housing on the frame with respect to the severing device.

5. In combination, a device for severing lengths from a continuous tube, feed rolls adapted to feed to the device a tube formed by pasting together the edges of a strip of paper, one roll of each pair being constructed of a plurality of discs so spaced that they will not press against the folded edges of the tube or against the lapped seam, means normally pressing the feed rolls towards each other, and manually operable means for separating the rolls.

6. In combination, a device for severing lengths from a continuous tube, feed rolls adapted to feed to the device a tube formed by pasting together the edges of a strip of paper, one roll of each pair being constructed of a plurality of discs so spaced that they will not press against the folded edges of the tube or against the lapped seam, and means for adjusting the distance of the feed rolls from the severing device.

In testimony whereof I have hereunto signed my name to this specification.

CARL H. HARTMAN.