W. F. C. FOSTER.

CUTTING AND FOLDING DEVICE FOR PRINTING PRESSES.

APPLICATION FILED AUG. 19, 1907.

999,980. Patented Aug. 8, 1911.

2 SHEETS—SHEET 1.

Fig. 1

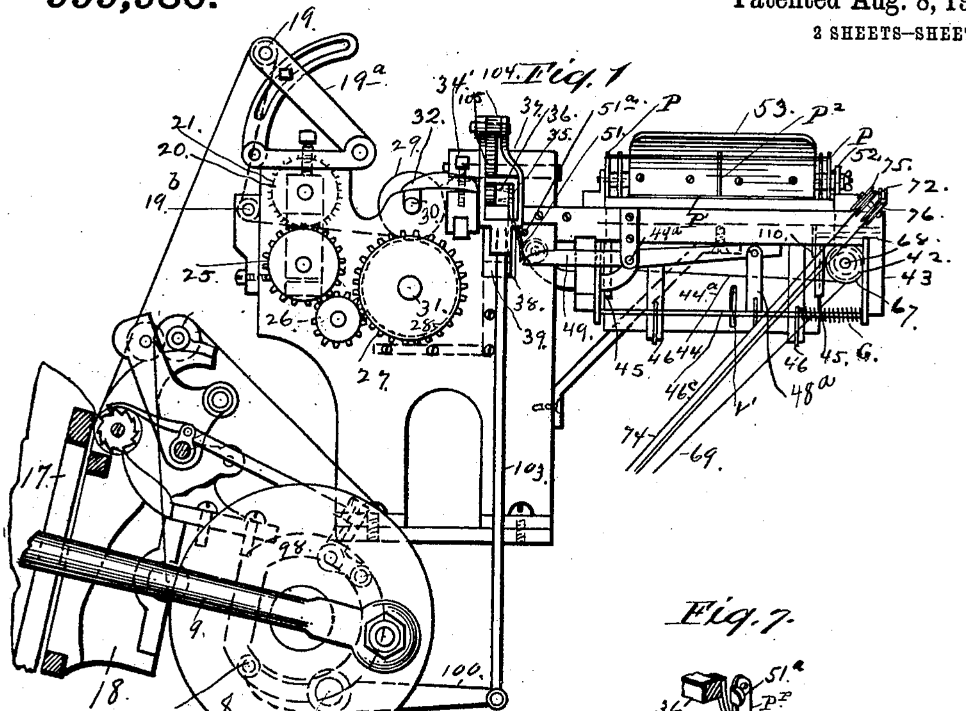


Fig. 7

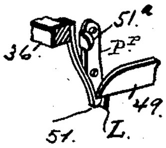


Fig. 6

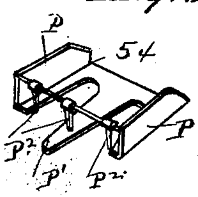


Fig. 3

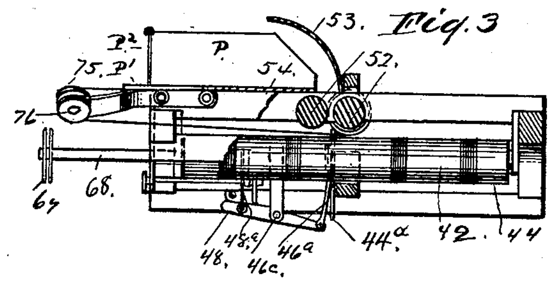
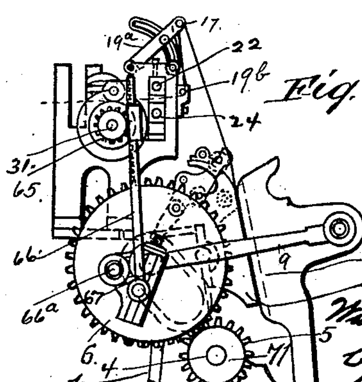


Fig. 2



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3

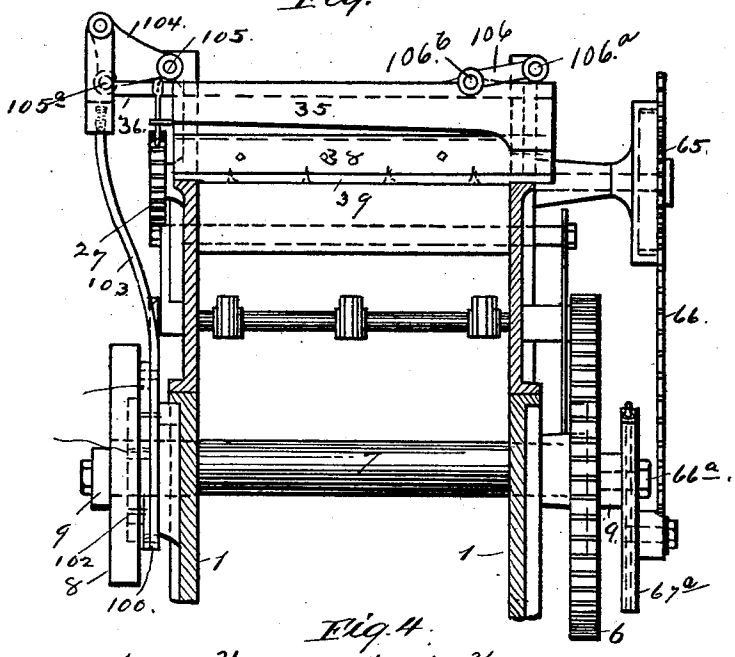
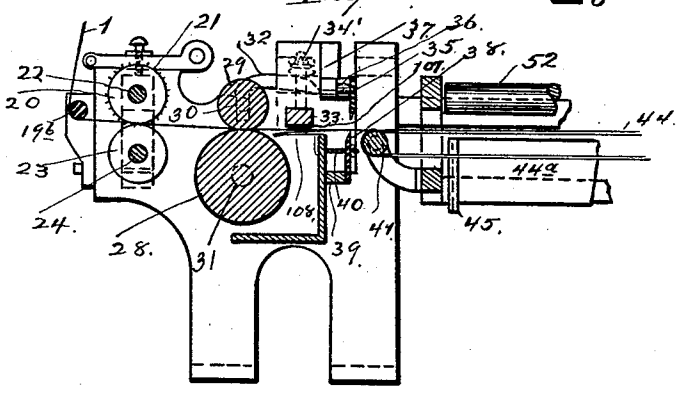


Fig. 4.



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CUTTING AND FOLDING DEVICE FOR PRINTING-PRESSES.

999,980. Specification of Letters Patent. **Patented Aug. 8, 1911.**

Application filed August 19, 1907. Serial No. 389,157.

To all whom it may concern:

Be it known that I, WILLIAM FREDERICK CHARLES FOSTER, a citizen of Canada, and resident of Wawanesa, Province of Manitoba, Canada, have invented certain new and useful Improvements in Cutting and Folding Devices for Printing-Presses, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

The objects of the invention are to provide a combined folding and cutting machine for paper delivered from a printing device, and is particularly adapted to a printing press for small work such as counter sales slips, dodgers, sales bills, etc., and is designed to deliver them perforated cut and folded ready for use, from a continuous roll of paper.

The invention comprises automatically acting devices to produce these results, and is applicable to any small press such as a Gordon press and is operated thereby, and readily attachable thereto, so as to convert the press into an automatically acting machine.

The invention consists in the automatically acting devices for the purpose described, and in the mechanism connecting the press movements therewith, as hereinafter described, shown in the accompanying drawings, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of the upper portion of a press having the invention applied thereto, Fig. 2 is a reduced view of a portion of the other side of said press, Fig. 3 is an end view partially in section, of the folding device, Fig. 4 is a partial longitudinal section through the perforating and feed rollers, Fig. 5 is a transverse section of the machine, Fig. 6 is a detail view of the paper holder or receptacle, and, Fig. 7 is a detail perspective view of a spring catch hereinafter described.

In these views, 1 designates the frame of the printing press, 7, the main shaft thereof, and 6 and 8, the operating cranks for the links 9 by which movement is imparted to the platen. One of these cranks is in the form of a spur gear. The impression is made between the platen 17 and bed 18. From the point of impression, the paper is fed over a roller 19 adjustably mounted on swinging arms 19^a, by means of which the position of the cut is determined. From the roller 19, the paper passes over a second roller 19^b and thence between the perforating disks 20 and 23, mounted upon shafts 22 and 24, respectively. Teeth 21 carried by the disks 20 perforate the paper as desired. Movement is imparted to these toothed disks by reason of their engagement with the paper and by reason of their engagement with the disks 23. Movement is imparted to the disks 23 by means of gear wheels 25, 26, and 17, the gear wheel 27 being mounted upon a shaft 31. This shaft 31 carries a feed roller 28 and the paper is fed between this roller and a second feed roller 29 is mounted upon a shaft 30.

A tension device to press the roller 29 toward the roller 28, comprises a lever 32, one end of which bears upon the bearing of shaft 30, and the other end of which is fulcrumed upon a cross bar 33. An adjusting screw 34′ passes through this lever and into the bar 33 and serves to adjust the tension of the roller 29 against the roller 28. A cutting knife blade 35 is mounted upon a transverse bar 36 movable in guides 37, and operates against the lower knife blade 38 fixed upon the cross bar 39 (see Fig. 4). The lower knife blade may be adjusted by means of screws 40 with relation to the cutting edge of the knife blade 35. As soon as cut off, the sheet of printed paper is instantly transferred to the folding device by means of a conveyer comprising rollers 41 and 42 and a belt or band 44 (see Figs. 3 and 4), this band being in constant rearward motion.

The folding device acts in conjunction with the movements of the upper knife to fold the sheet centrally immediately after the sheet is detached, and in one of the lines of perforations, if there should be more than one. The folder is shown to be a vertically acting blade 44^a which moves in guides 45 on the frame, and is operated at the right moment by means of a lever 48, see Fig. 3. This lever is connected by means of the link 46^a with the blade 44^a. The lever 48 is fast upon a rock shaft 46^c. This rock shaft is encircled by a spring G which normally tends to rock said shaft and throw the blade 44^a to its lowermost position. The opposite end of the lever 48 is connected by a link 48^a (see Figs. 1 and 2) with the rear end of a lever 49. This lever is pivoted at

49[a] and its front end projects into the path of a spring catch 51 carried by the upper knife bar 36, so that as the upper knife ascends after cutting off the sheet, the catch rises and lifts the outer end of the lever 49, rocking said lever upon its pivot 49[a], and through the link 48[a], rocking the shaft 46[c] to lift the blade 44[a] which folds the sheet between the rapidly revolving rollers 52. These rollers carry the sheet upward folded flat and it is delivered by the curved plate 53 into a receptacle 54 placed to receive it. A resting lug L upon a small plate P[p] receives the lever 49 when it drops after raising the folder, the release of the lever 49 from engagement with the spring catch 51 occurring when said spring catch engages a releasing pin 51[a] (see Fig. 1) during the upward movement of the upper knife bar. As before stated, the spring G returns the parts to their normal position.

The receptacle 54 comprises side pieces P and a long bottom strip P′ upon which the paper rests, and pivoted stop fingers P[2] which serve to aline the paper as it falls into a pile, but which do not have enough resistance to prevent the easy withdrawal of a pile of the paper.

The movements are automatically performed by means of actuating mechanism operatively connected with the normal movement of a Gordon press in the following manner: The feed rollers adjacent the knife are operated by means of the ratchet gear 65 upon the shaft 31. This gear is operated periodically by means of a rack 66, the lower end of which is adjustably pivoted upon a radial guide 67[a]. This guide is mounted upon a crank pin 66[a] of the crank or gear wheel 6 at one side of the machine. As the crank rotates to bring the printing surfaces together, the rack is actuated to rotate the feed roller after each impression and once in each revolution of the crank, to deliver the printed sheet. The feed rollers for operating the traveling band, which carries the detached sheet to the folder, are operated by means of a pulley 67 upon the rear roller shaft 68. A belt 69 passes over the pulley 67 and over a pulley 71 upon one end of a shaft 4, this shaft being driven by a gear wheel 5 which meshes with the gear wheel 6. The folder rollers are rotated more rapidly by means of a pulley 72 (see Fig. 1) which is on the shaft of the larger of these rollers (see Figs. 1 and 3). A belt 74 passes over this pulley and over guiding pulleys 75 and 76, and thence over a pulley (not shown) on the shaft 4.

The several instrumentalities for reciprocating the cutting knife blade are operated by an actuating cam upon the inner face of the crank disk 8 in the following manner: The device for operating the knife blade to cut off the paper sheet must operate alternately with the action of the printing devices. Therefore, as the machine opens after the impression has been made and the paper is fed forward to the limit, a lever 100 pivoted at 101 and which has a roller 102 traveling in a cam groove 98 formed in the inner face of disk 8, is actuated, and this in turn actuates a connecting rod 103. This connecting rod has its upper end secured to one of the arms of a bell crank 104 (see Fig. 5). This bell crank is pivoted at 105 to the frame and is pivoted at 105[a] to the knife bar 36. A link 106 pivoted at 106[a] to the other side frame and at 106[b] to the knife bar, cooperates with the bell crank 104 to give the knife both a vertical and a drawing movement which movement easily cuts the paper.

The guide plates 107 and 108 (see Fig. 4) aid in delivering the paper from the feed rollers to the knives. A stop plate 110 (see Fig. 1) limits the movement of the detached sheet when it is carried by the band 44 into the folder.

Having described the invention what I claim as new and desire to secure by Letters Patent is:—

1. In combination in an automatic printing press for roll paper, perforating rolls, feed rolls, a reciprocating knife blade having an inclined cutting edge, arranged to cut the paper into sheets, endless carriers arranged to convey the detached sheets away from the knife, a reciprocating vertical blade, and horizontal rollers, between which the blade passes to fold the said sheet, and mechanism for raising said blade, operatively, whereby each sheet is folded simultaneously with the raising of the knife, a paper receiving receptacle located above and slightly to one side of said horizontal folding rollers and a curved plate fixed above said rollers and adapted to direct the folded sheet into said receptacle.

2. In a paper cutting and folding device, the combination with a reciprocating knife blade, of a frame, means for withdrawing the detached paper from the knife and mounted on said frame, a vertically reciprocating folding blade in said frame and rapidly revolving rollers on said frame between which the folded paper passes, and means for raising said folding blade, coincidently with the raising of the knife blade, consisting of a pivoted lever on said frame and operatively connected with the folding blade, a spring catch upon the knife blade arranged to raise the projecting lever, as the knife blade rises, and a releasing means therefor, substantially as described.

3. In a printing press having a frame and rotating shaft therein and adapted to print paper from a roll, a cutting and folding device for the paper comprising a reciprocating knife blade in said frame, a set of endless carrier bands upon which the sheet is

delivered from the blade, a folder frame, rollers mounted therein, upon which said bands are secured, a stop for the sheet, a folding plate vertically mounted in guides in said frame, parallel rollers between which said plate passes to fold the sheet, an adjustable curved plate or guide, automatically operating mechanism connecting the movements of said plate and knife blade, whereby the upward movements of said knife blade and folding plate are coincident, and means for rotating the carrier rollers and folding rollers, consisting in pulleys on said rotating shaft in said frame, a pulley on the shaft of one of said carrier rollers, a pulley on the shaft of one of the folder rollers, idler pulleys and driving belts thereon, substantially as described.

4. The combination with an ordinary bed and platen press, of a folding mechanism supported from the frame thereof and comprising perforating rolls, feed rolls, a reciprocating knife blade for cutting paper into sheets, an endless carrier for conveying the detached sheets away from the knife, a pair of horizontal and rotative fold rollers, a reciprocating vertical plate beneath said rollers which passes between the horizontal rollers to carry the sheet to be folded between said rollers, mechanism for raising said blade operatively connected with the movements of the knife, and a reciprocatory rack bar actuated from the press.

5. The combination with an ordinary bed and platen press, of a folding mechanism supported from the frame thereof and comprising perforating rolls, feed rolls, a reciprocating knife blade for cutting paper into sheets, an endless carrier for conveying the detached sheets away from the knife, a pair of horizontal and rotative fold rollers, a reciprocating vertical blade beneath said rollers which passes between the horizontal rollers to carry the sheet to be folded between said rollers, mechanism for raising said blade operatively connected with the movements of the knife, a reciprocatory rack bar actuated from the press, a paper receiving receptacle located above the folding rollers, and a curved plate fixed above said rollers and adapted to direct the folded sheets into said receptacle.

In testimony whereof I hereunto set my hand this (10th) tenth day of April 1907.

WILLIAM FREDERICK CHARLES FOSTER.

In presence of—

CHARLES LORRAINE ATKINSON,

WILLIAM SMITH FOSTER.