

(No Model.)

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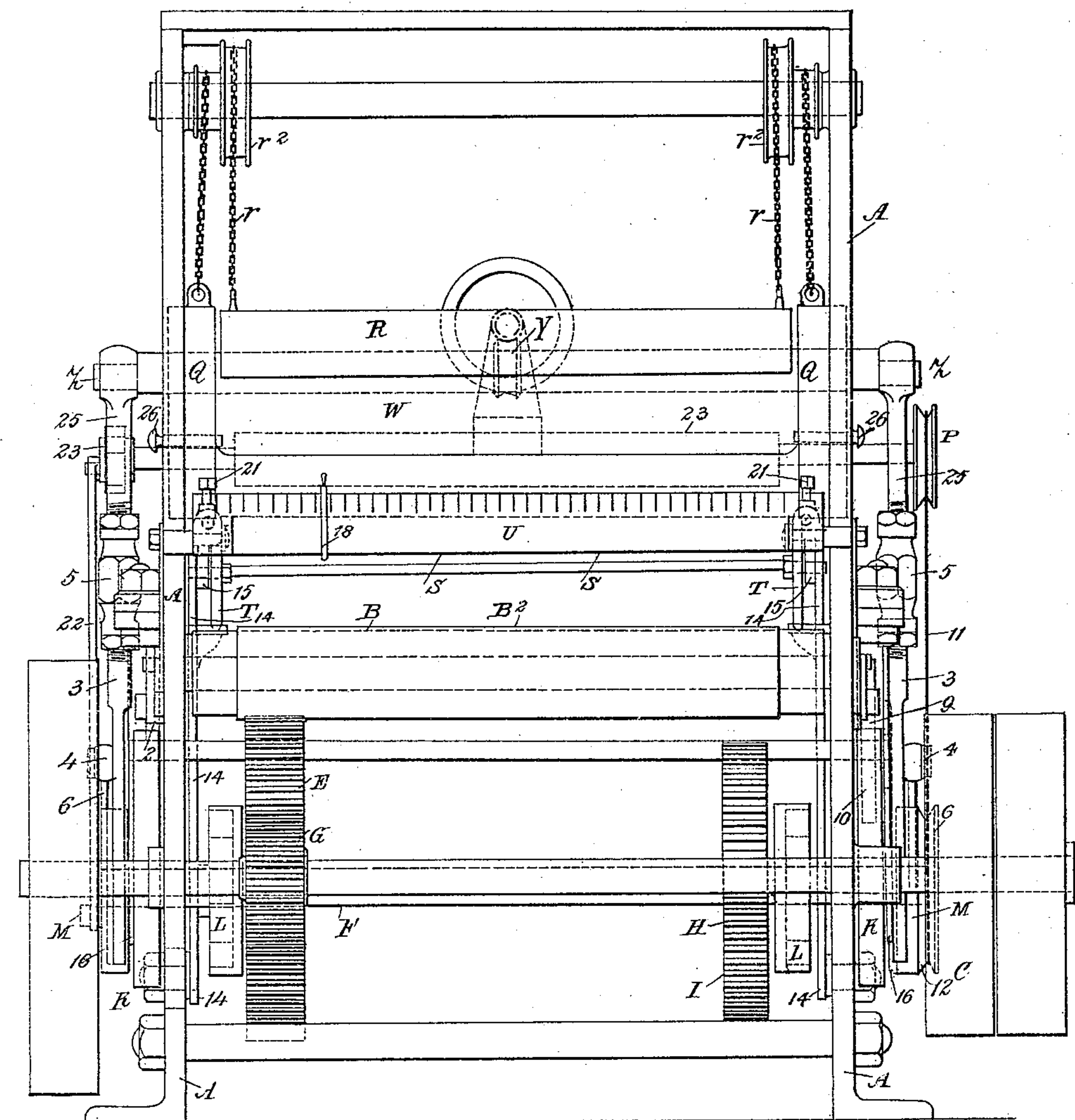
J. A. CUNDALL.

APPARATUS FOR PRINTING ON FOLDED PIECE GOODS.

No. 438,225.

Patented Oct. 14, 1890.

Fig. 3.



OLD BLOCK



Fig. 1.

NEW BLOCK



Fig. 2.

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(No Model.)

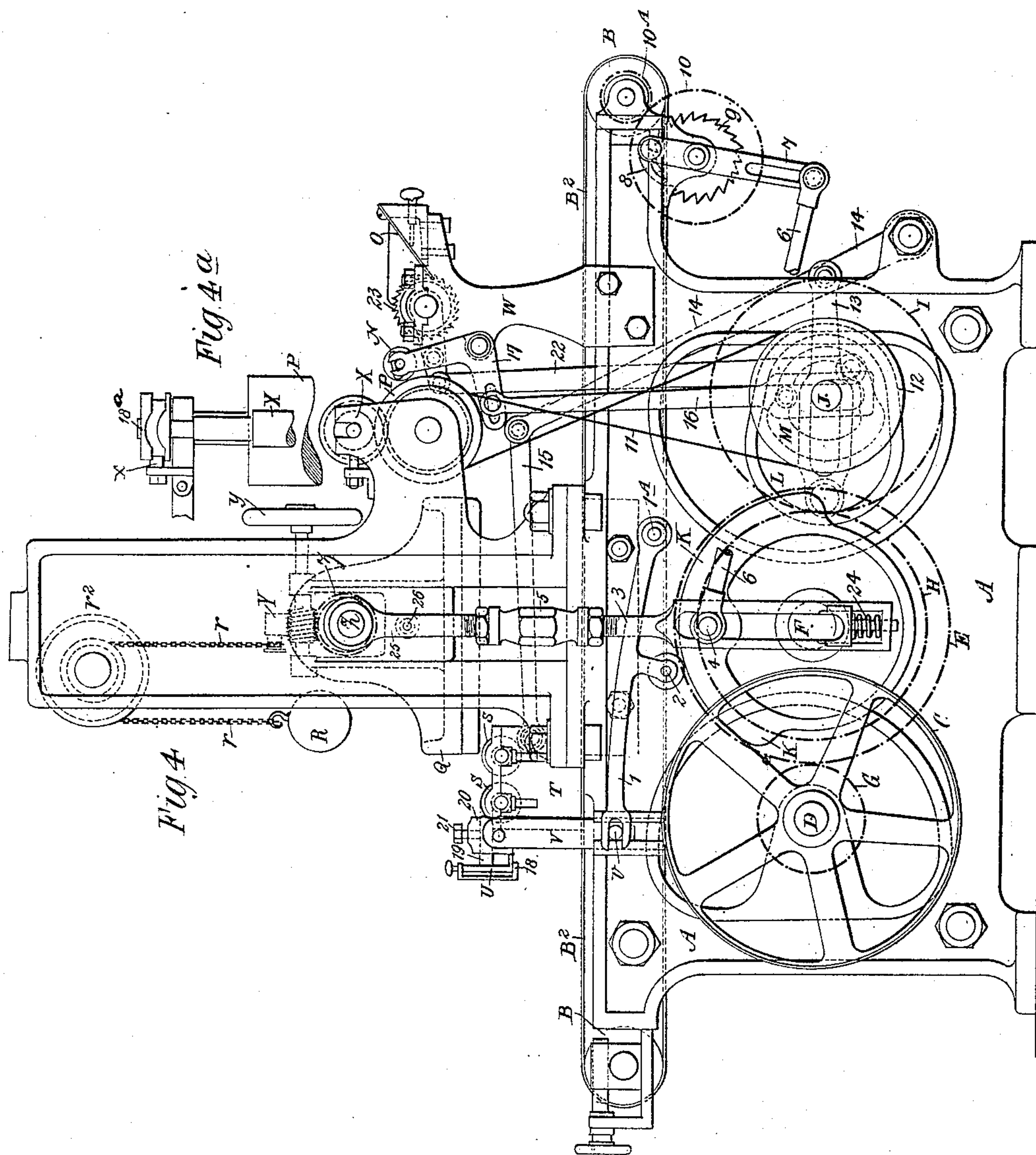
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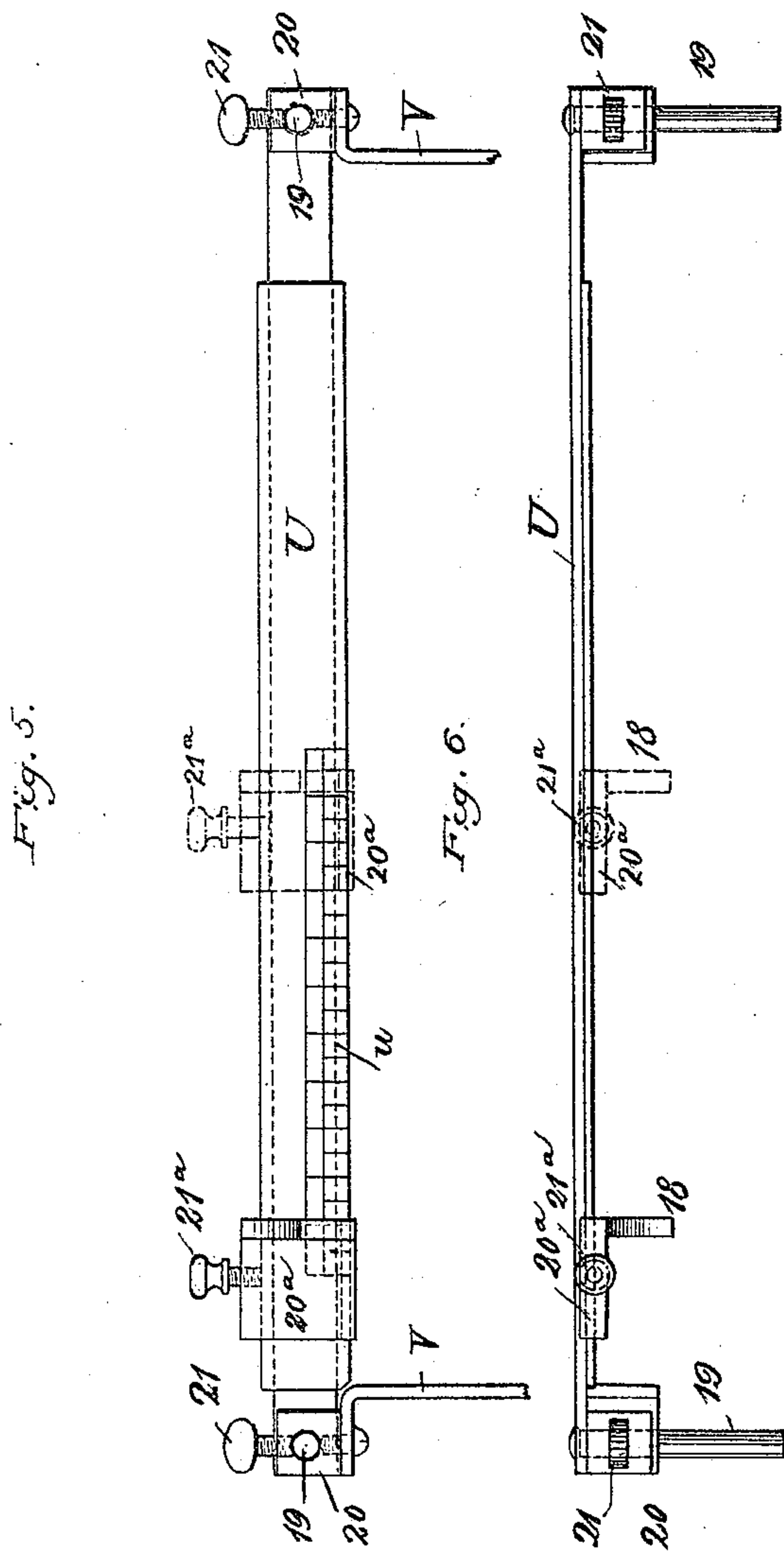
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APPARATUS FOR PRINTING ON FOLDED PIECE GOODS.

No. 438,225.

Patented Oct. 14, 1890.



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# UNITED STATES PATENT OFFICE.

JAMES A. CUNDALL, OF MANCHESTER, ENGLAND.

## APPARATUS FOR PRINTING ON FOLDED PIECE-GOODS.

SPECIFICATION forming part of Letters Patent No. 438,225, dated October 14, 1890.

Application filed November 21, 1888. Serial No. 291,465. (No model.) Patented in England October 3, 1887, No. 13,358.

*To all whom it may concern:*

Be it known that I, JAMES ARTHUR CUNDALL, a citizen of the United Kingdom of Great Britain and Ireland, and a resident of Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Apparatus for Printing on Folded Piece-Goods, (for which I have received Letters Patent of Great Britain No. 13,358, dated October 3, 1887,) of which the following is a specification.

This invention relates to apparatus for imprinting trade-marks and other distinctive marks, devices, or words and combinations thereof upon folded cloths or textile piece-goods; and it has for its object to reduce the cost and to increase the facility of the operation and the excellence of the result. Hitherto such marks and devices have been produced or imprinted by means of hand-stamps or by rollers, both of which are expensive to produce. These improvements consist in imprinting the marks or devices by means of blocks specially prepared, the operation being effected by the agency of suitable mechanism or apparatus. The printing-blocks are formed with the grooves therein of a peculiar shape, as hereinafter explained, and are prepared by a modification of the well-known zincographic process, as hereinafter described. The printing mechanism or apparatus includes a platen, inking-ducts, and rollers, a block-carrier or head, a traveling carrier or web, a gage plate or plates, and means and devices for supporting, adjusting, and operating the mechanism. The folded goods are placed upon the traveling carrier or web in front of the machine with one edge in contact with the gage plate or plates, and the goods are then carried by the traveling carrier or web to a position beneath the head, where the motion of the said goods is temporarily arrested by the stoppage of the web while the impression is made by the descent of the head carrying the printing-block, after which, by the resumed motion of the carrier or web, the goods are conveyed from beneath the head, after which they may be removed by hand or by mechanical devices.

In order that my invention may be more readily understood, I will proceed to more

particularly describe it with reference to the accompanying drawings.

Figure 1 illustrates part of a printing-block as ordinarily produced. Fig. 2 shows part of one as made according to my invention, while Fig. 3 is an end elevation and Fig. 4 is a side elevation of a machine suitable for printing with blocks according to this invention. Fig. 4<sup>a</sup> is a detail in plan of part of the machine. Figs. 5 and 6 are a side elevation and a top plan view, respectively, on an enlarged scale, of the gage for controlling the position of the goods being operated upon.

For convenience of description I will first describe the machine for printing with the block according to my invention and then describe the blocks themselves.

A is the framing of the machine.

B B are rollers carrying an endless carrier or web B<sup>2</sup>, through one of which rollers B motion is imparted to the said carrier or web.

C is the driving-pulley, mounted on the first-motion shaft D.

E is a spur-wheel mounted on the shaft F and driven by a pinion G on the first-motion shaft D and gearing with the similar wheel I, mounted on the shaft J.

K are the gage-plate cams, mounted on the shaft F.

L are cams mounted upon the shaft J and employed to operate the inking-rollers.

M are second cams on the shaft J, through which cams the motion of the roller N, which transfers the ink from the ink-doctor O to the main inking-roller P, and the motion of the ink-duct roller 23 are derived.

Q is a block carrier or head, on the under side of which the printing-block is secured, face downward.

R is the counter-weight connected to the head Q by cords or chains *r* passing over the pulleys *r*<sup>2</sup>.

S S are the inking-rollers which distribute the ink upon the face of the printing-block, and which are mounted upon the reciprocating carriage T.

U is a gage-plate carried upon the slides V and having an intermittent vertical motion.

X is a roller having longitudinal motion to distribute the ink upon the main roller P. The longitudinal motion of the roller X is ob-



tained by means of a fixed pin  $x$ , arranged to engage in a cam-groove formed in the periphery of a disk  $18^a$ , fixed on the end of the shaft carrying the roller X.

5 Y is a worm capable of being rotated by a hand-wheel  $y$  and engaging with a worm-wheel  $z$  upon the shaft Z.

The gage-plate U is operated from the cams K, through forked levers 1, centered at  $1^a$ , the  
 10 forked ends of which levers engage with pins  $v$  upon the slides V which carry the gage-plate. The motion is transmitted from the cams K to the levers 1 through friction-rolls 2, carried upon projections from the said levers. The  
 15 cams K are so timed that the gage-plate U descends upon or near to the endless carrier or web  $B^2$  just before the downstroke of the carrier Q, and remains in that position until just before the carrier returns, when the said gage-plate  
 20 returns to the position shown in Fig. 4. The function of this device is to bring corresponding parts of successive bundles of cloth into exactly the same position for printing, so that all the bundles may be printed in exactly cor-  
 25 responding parts. As shown in Figs. 5 and 6, the gage consists of a plate U, provided, preferably, with graduations  $u$  for purposes of reference. To the ends of this plate rods 19 are firmly secured. These rods pass through  
 30 blocks 20, which are secured, respectively, to the lifting-plates V, hereinbefore referred to. To adjust the gage for a greater or less width of the bundle of cloth, the rods 19 are slid to a greater or less distance backward or for-  
 35 ward, as required for the particular width to be printed. The gage is then fastened in this position by means of set-screws 21. To adjust the gage so that the head or top of the bundle will always come to the same position  
 40 under the platen, a sliding stop  $20^a$  is moved along the gage until it occupies the desired position, where it is secured by a set-screw  $21^a$ . This sliding stop is shown nearly at its extreme position at 18 in full lines, and at a  
 45 position for a short piece of cloth in dotted lines 18. In operation the piece of cloth is placed with its side against the plate U, and with its top end against the adjustable stop upon the traveling web. The gage is now  
 50 lifted and the cloth passes under it to the head and is printed, when the gage again descends and the operation is repeated.

The gage-plate, as hereinbefore described, and its operating mechanism may be omitted,  
 55 and the substituted gage-plates may be permanently fixed to the endless traveling web at regular intervals; but this arrangement does not lead itself to variable adjustment for different dimensions of cloth.

60 The block carrier or head is operated through the connecting-rods 3, the crank-pins 4, and the counter-weight R. The lower parts of these connecting-rods are slotted and the crank-pins are included within the slots,  
 65 as represented. The counter-weight R tends at all times to keep the head in its highest position, and the slots in the connecting-rods

3 are formed so that when in this position and when the crank-pin 4 is also at its highest position the upper ends of the slots will  
 70 be clear of the crank-pins. The total length of each slot is less than the diameter of the path of each crank-pin, and it follows therefore that the crank-pins will operate the platen during a part only of their revolution,  
 75 and that the stroke of the head will equal the difference between the length of the slot and the diameter of the path of the crank-pin minus the diameter of the crank-pin. To enable the length of the connecting-rods 3 to  
 80 be adjusted, they are divided at convenient parts of their lengths and the divided ends are connected by the couplings 5, each having at one end a right-hand and at the other end a left-hand internal screw, which screws,  
 85 respectively, engage with corresponding external screw-threads formed upon the divided ends of the rods 3.

I prefer to support the bearing for the crank-pins in the bottom of each of the slots  
 90 in the connecting-rods 3 by spiral springs 24, Fig. 1. These springs tend to prevent shocks and cause a dwell or prolonged contact of the printing-block with the cloth in the act of printing.

The motion of the traveling endless web is derived from the crank-pin 4, through the connecting-rod 6, the arm 7, the pawl 8, the ratchet-wheel 9, and the spur-wheel and pin-  
 100 ion 10 and  $10^a$ . This motion is arranged so that the web-roller B is rotated, and movement of the endless web consequently takes place only when the gage-plate U and the head Q are in their most elevated positions. The main inking-roller P is driven by the  
 105 crossed cord 11 from the pulley 12 on the shaft J. The carriage T, supporting rollers S S, is reciprocated from the cams L by the slotted connecting-rods 13, the levers 14, and the rods 15. The slots in the connecting-rods  
 110 13 and 16 are for the purpose of clearing the shaft J, and they may be cranked instead of being slotted for the same purpose. The roller N, which transfers the ink from the doctor-roller 23 to the main roller P, is driven  
 115 from the cams M on the shaft J by the connecting-rods 16 and the bell-crank levers 17. The rotation of the ink-duct roller W is obtained from one of the cams M on the shaft J, through the rod 22 and the pawl and ratchet-  
 120 wheel 23. The motion of the ink-distributing roller X upon the roller P is obtained from the cam and fixed stud 18, Fig. 4<sup>a</sup>. The head Q is carried by the shaft Z in eccentric bearings. The true vertical motion of the head is se-  
 125 cured by means of the blocks 25, each of which slides in a vertical slot in the framing at opposite ends of the head. These blocks are connected to the head by means of the pins 26, which are withdrawn when it is de-  
 130 sired to tilt the head for the attachment or removal of a printing-block. Upon the head shaft Z there is mounted a worm-wheel which is in gear with the worm Y, capable of being



rotated by a hand-wheel. This worm and worm-wheel, in combination with the eccentric bearings of the shaft Z, afford a means of secondary adjustment for the head independently of the adjustment by the couplings 5.

The operation of the machine is as follows: The gage U being in its lowest position with its lower edge near to the traveling carrier or web, the folded piece of cloth is laid upon the carrier with its edge in contact with the gage, and with one end in contact with or near to the adjustable pointer 18. The gage is now lifted and the traveling carrier moves forward until the folded cloth is below the head, which then descends and imprints the desired mark or device, the traveling web being again stationary during this operation. Meanwhile the gage again descends and another piece of cloth is placed against it on the traveling web. After being printed the folded cloth is carried forward by the traveling web clear of the head, and it may be removed by hand or by any suitable means. Between each descent of the head the inking-rollers S S move forward and backward under the head, inking the printing-block and come to rest clear of the head. These inking-rollers are mounted in their carriage at such a distance above the endless web that they will clear the pieces of folded cloth over which they have to pass.

I desire it to be understood that I do not limit myself to the precise construction of the apparatus to be used with my printing-block, as this may be varied in many ways, as will be well understood by those acquainted with printing machinery.

The printing-blocks constructed and employed according to this invention are made as shown in Fig. 2, and are etched from zinc plates by a modification of the well-known process employed in producing "zinco" blocks for typographic printing, but such blocks produced by any process at present in use are unsuitable for the purposes of this invention.

To produce printing-blocks suitable for the purposes of this invention, I proceed in the ordinary manner to get a transfer or a line-photograph in resisting-ink—such as bitumen or the like—upon the surface of the zinc. I then commence the etching, and proceed in the ordinary manner for the first two or three baths. On removing the block from the bath after the second or third immersion I do not roll it with a fresh supply of ink, but merely dry it, sprinkle it with rosin, and warm it. This causes a less amount of protective material than usual to flow down the sides of the etched parts. The block is then reimmersed in the bath, and after etching as far as possible without risk of biting under the lines or undercutting it is again removed, and may this time be rolled with ink as well as sprinkled with the powdered rosin. Each immersion of the block after the second or third bath is prolonged to about double the

time occupied in the ordinary process, and the total time occupied is about four times longer than is required in the production of ordinary zincos. Toward the end of the operation the inking of the block is effected at more frequent intervals, and in the last two or three baths it may be inked twice for each bath. Very precise details of the etching process cannot be set forth, because they will differ with the character of the block. The chief differences from the ordinary process are that a longer immersion in each bath after the second or third is required, that at the beginning of the process fewer inkings are required, while toward the end of the process the inkings are more frequent and that more immersions or more baths are required.

The diagrams, Figs. 1 and 2, represent the difference between an ordinary zinco and a block prepared according to and for the purpose of this invention. In the ordinary block the sides of the lines slope considerably from the printing-surface, as shown in Fig. 1, each line occupying the summit of a short truncated conical section, the spaces between the lines being shallow, while in the blocks produced according to my invention the sides of the lines are nearly vertical or even slightly undercut, as shown in Fig. 2, so that each line occupies the summit of a rectangular, or nearly rectangular, figure which is little, if any, broader at its junction with the main body of the block than it is at the printing-surface. I also prefer to etch the grooves between the lines to a greater depth than hitherto—say to not less than the one-twentieth of an inch. It will generally be found more advantageous to print from electros of the blocks than from the blocks themselves. Such electros may be prepared in the ordinary manner without difficulty.

I have described my blocks as prepared by the zinc etching process because that is the cheapest and best mode of producing them known to me; but it will be evident that the advantages they possess might be secured by constructing them of the same shape as hereinbefore described but by a different process. All blocks so made I claim as being within my invention.

If blocks or zincos prepared in the ordinary manner were used for the printing of the folded goods, it would be found that the fabric would "bottom the whites," and that the spaces between the lines would be speedily filled with fluff and sizing material, and that therefore they would be practically useless. These defects are entirely obviated with blocks prepared as hereinbefore described.

In printing folded piece-goods according to these improvements a larger quantity of ink is required than is employed in ordinary typographic printing. The precise quantity of ink must be determined in each case by the absorbent and other qualities of the cloth to be printed upon.



Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

5 1. In a machine for printing on folded cloths, &c., the combination of the endless carrier and platen with the vertically-movable head provided with a printing-block, the  
10 vertically-movable gage U, the stationary inking mechanism, the reciprocating carriage T, provided with ink-distributing rolls, and mechanism, substantially as shown and described, for operating said parts.

15 2. In a machine for printing on folded cloths, &c., the combination of a platen, an endless carrier B<sup>2</sup>, and the cam mechanism, substantially as shown, for moving the same intermittently, the vertically-movable head and the cam mechanism for actuating the  
20 same, and the vertically-movable gage U and the cam mechanism for operating the same.

3. In a machine for printing on folded cloths, &c., the combination of a bed or support, the vertically-movable head thereover,  
25 the counter-weight, the slotted pitmen connected to the head, the spring-supported boxes in said pitmen, and the crank-pins seated in the slots and arranged to act upon the yielding boxes.

30 4. In a machine for printing on folded goods, the combination of a platen, a vertically-moving head thereover provided on its lower face with printing characters, a car-

riage provided with inking-rollers, said carriage located normally at one side of the head 35 and arranged to move to and fro at each impression beneath the same independently thereof, and a relatively fixed ink-supplying mechanism at the opposite side of the head in position to encounter the rollers on the  
40 forward stroke of the carriage and acting to supply them with ink.

5. The block for printing on cloths and similar soft surfaces, formed with raised printing-surfaces, said raised portions being wider on 45 their active faces than where they join the block, substantially as described.

6. In a machine for printing on cloths and similar soft material, the combination of a platen, an endless carrier, a vertically-mov- 50 able head provided with a printing-block, a vertically-movable gage, and mechanism, substantially as shown, acting, first, to advance and stop the carrier; second, to lower the gage thereover, and, third, to depress the 55 head, whereby the operations of advancing, stopping, and printing the fabric are performed in the order named.

In testimony that I claim the foregoing as my invention I have signed my name, in pres- 60 ence of two witnesses, this 21st day of September, 1888.

JAMES A. CUNDALL.

Witnesses:

WILLIAM E. WEYS,  
ROBT. MATHIESON.