No. 678,472. Patented July 16, 1901.

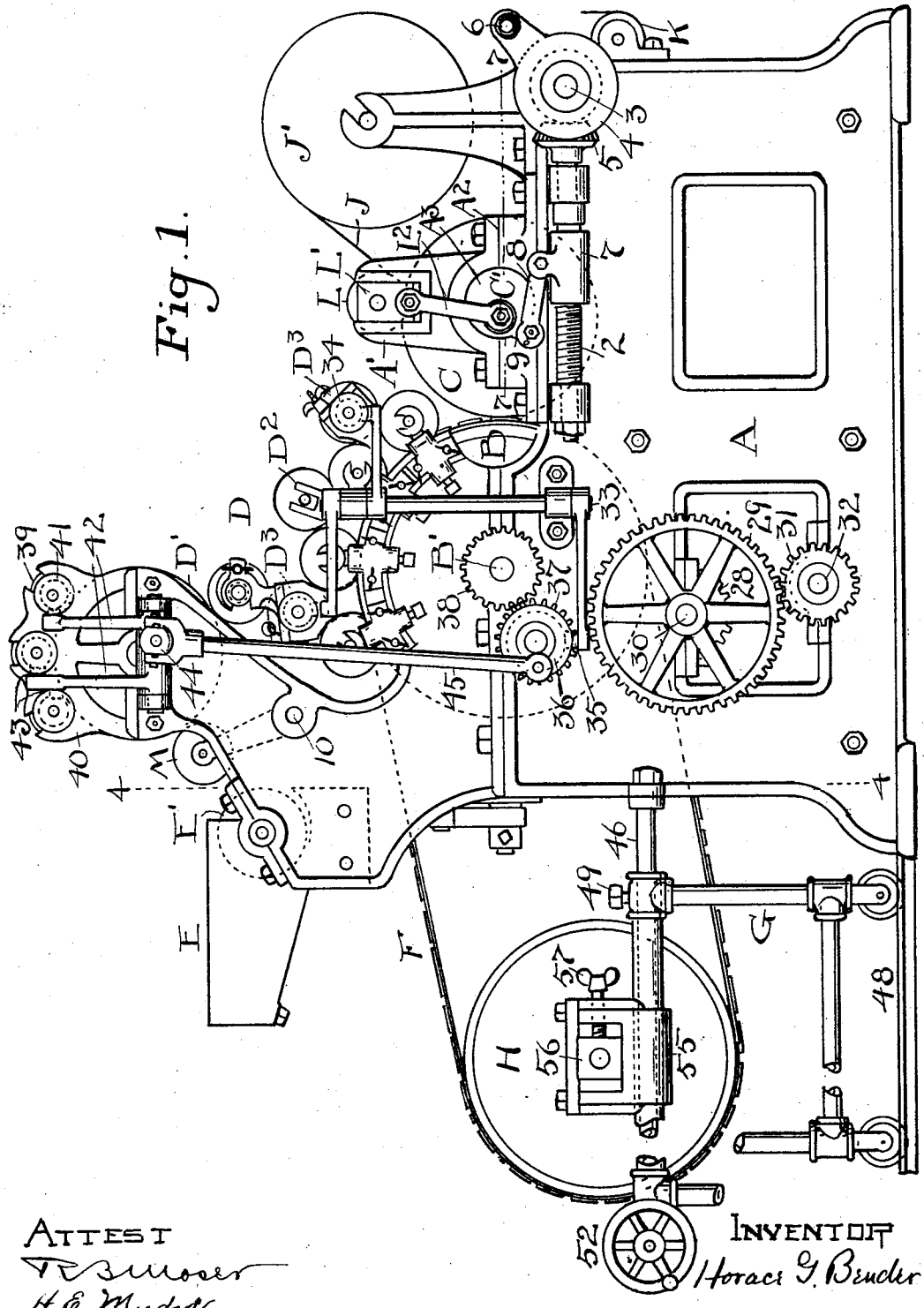
H. G. BENDER.

PRINTING MACHINE.

(Application filed May 26, 1900.)

(No Model.) 5 Sheets—Sheet 1.

Fig. 1.



Attest
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H. E. Mudd.

Inventor
Horace G. Bender
By H. T. Fisher Atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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H. G. BENDER.

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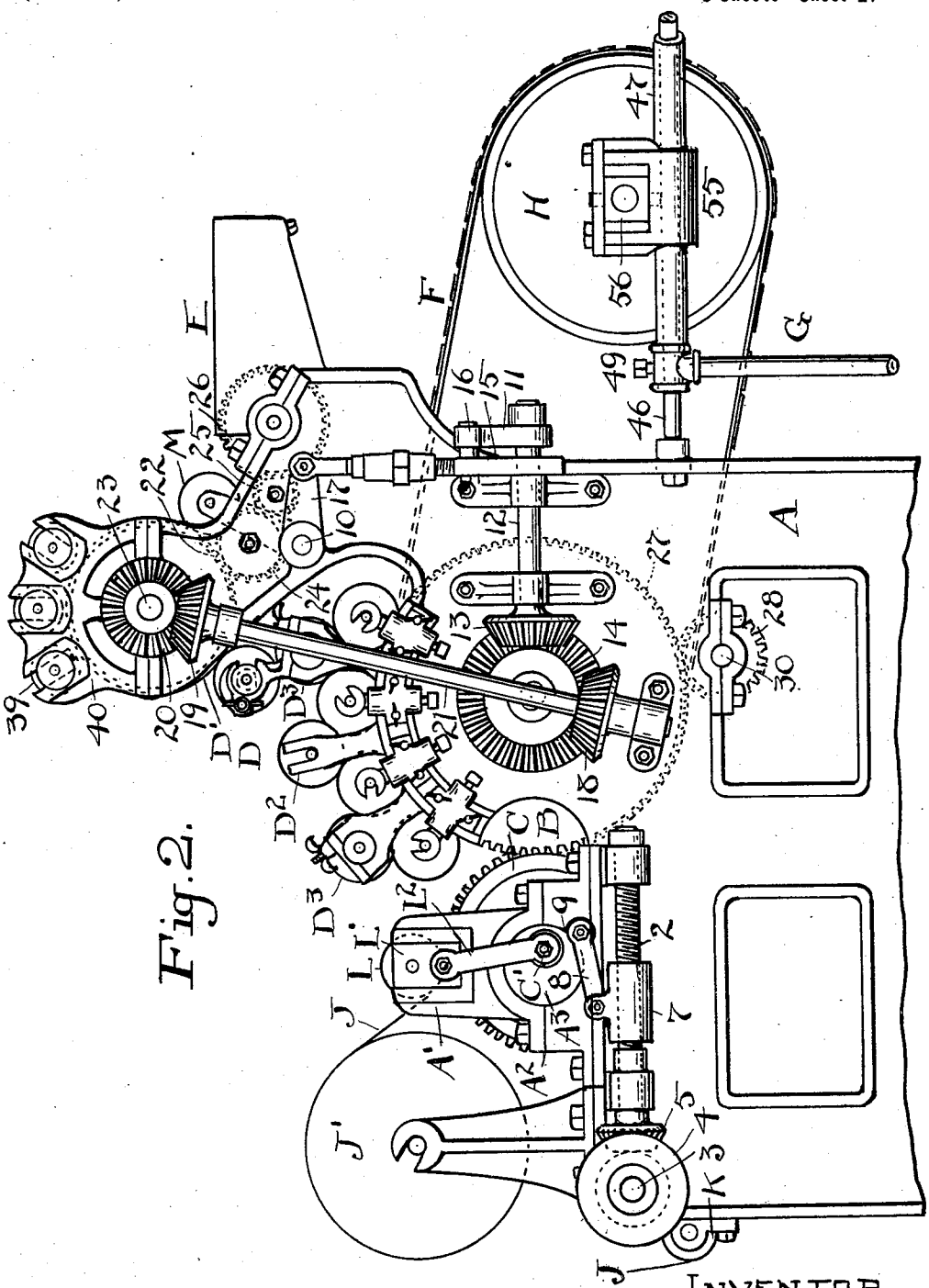


Fig. 2.

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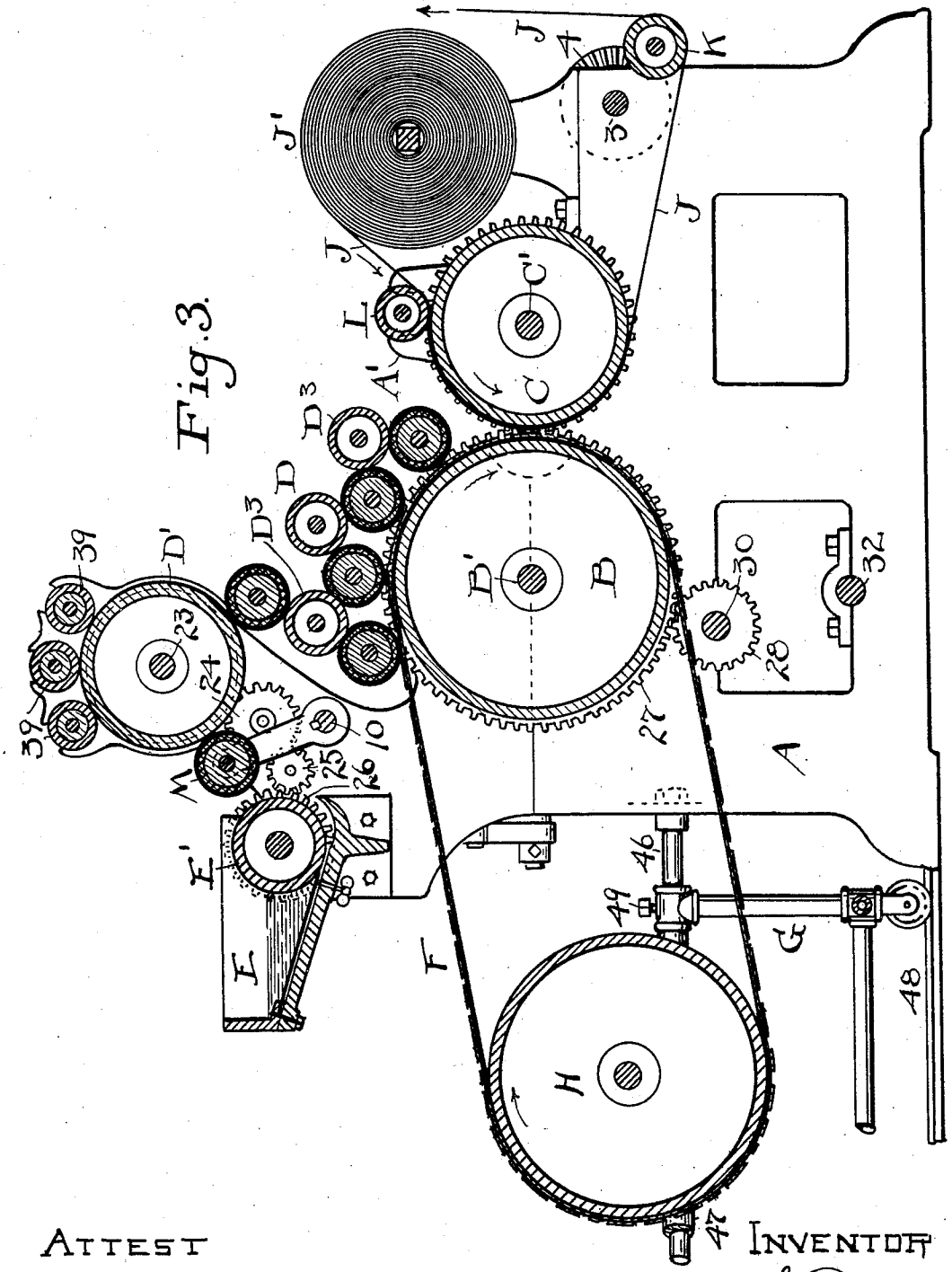
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Fig. 3.



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(No Model.) 5 Sheets—Sheet 4.

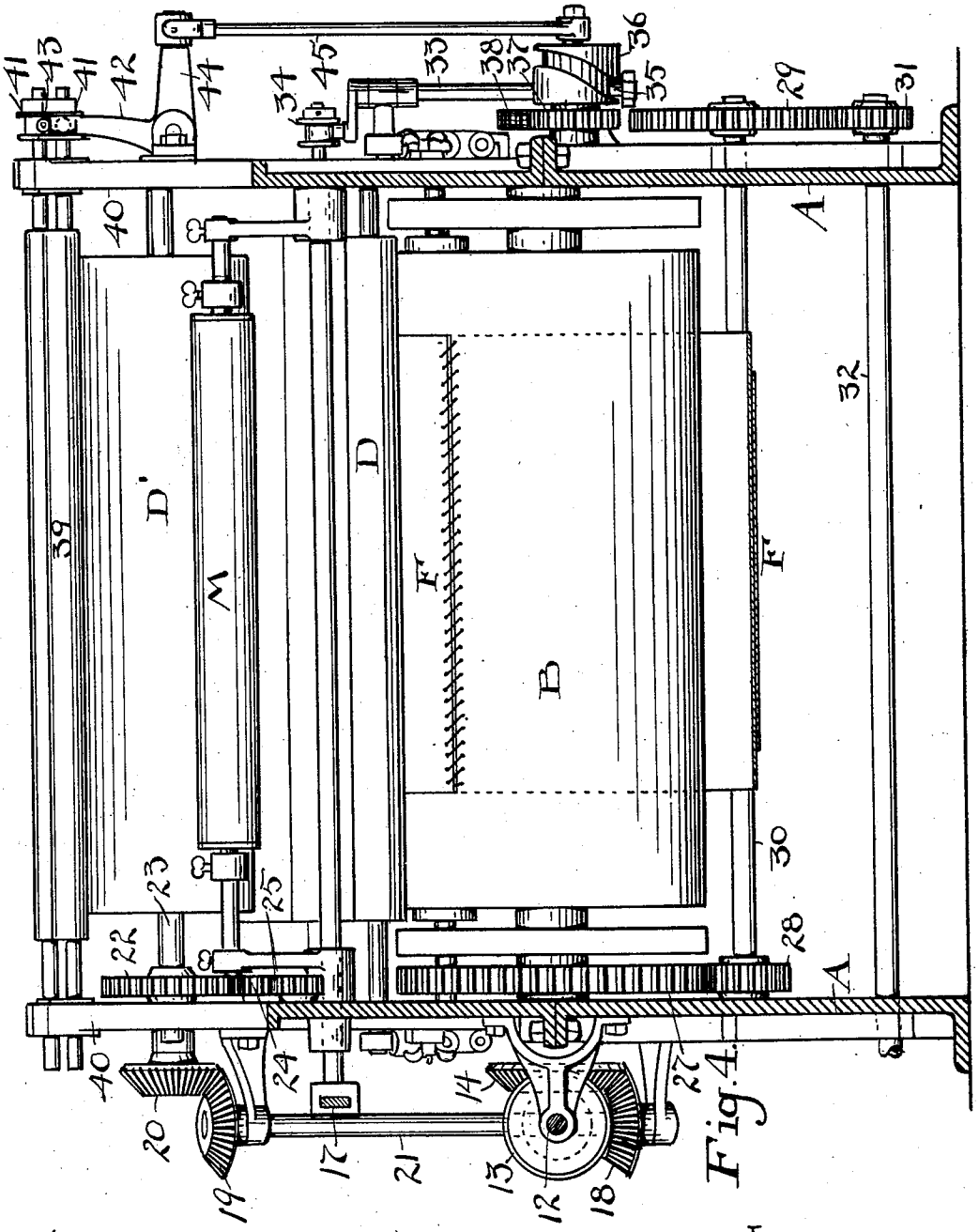


Fig. 4.

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PRINTING MACHINE.

(No Model.) (Application filed May 26, 1900.)

5 Sheets—Sheet 5.

Fig. 6.

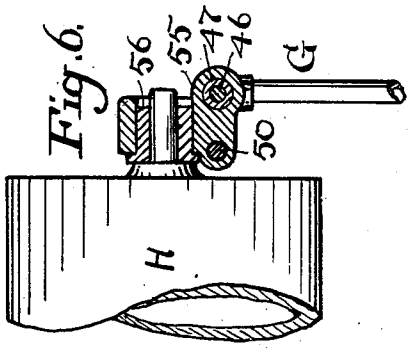


Fig. 7.

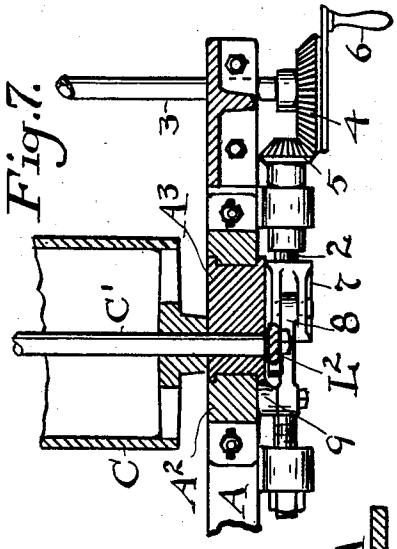
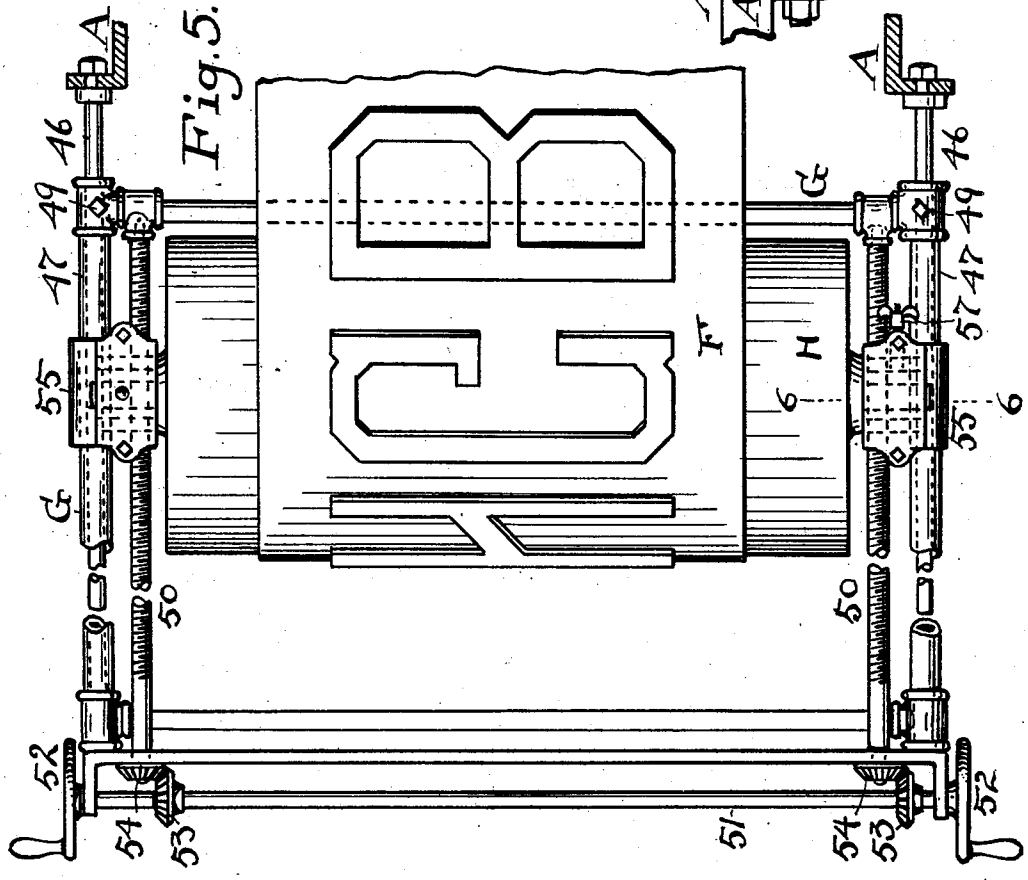


Fig. 5.



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UNITED STATES PATENT OFFICE.

HORACE G. BENDER, OF AKRON, OHIO, ASSIGNOR OF ONE-HALF TO THE GLOBE SIGN COMPANY, OF SAME PLACE.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 678,472, dated July 16, 1901.

Application filed May 26, 1900. Serial No. 18,135. (No model.)

To all whom it may concern:

Be it known that I, HORACE G. BENDER, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Printing-Machines; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to printing-machines; and the invention consists in the improved construction and novel arrangement of parts, substantially as hereinafter described, and more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved machine with the idler-roller frame at the left broken away and brought together to come within the limits of the sheet. Fig. 2 is a similar side elevation, but showing the opposite side of the machine. Fig. 3 is a central longitudinal section of the machine looking from the same side as Fig. 1. Fig. 4 is a cross-sectional view taken on line 4 4, Fig. 1, and looking forward. Fig. 5 is a plan view of the printing-belt idler and its adjustable supporting-frame in broken sections and brought together. Fig. 6 is a cross-section on line 6 6, Fig. 5, showing the adjustable bearing and shifting support for the idle roller. Fig. 7 is a sectional view looking down from line 7 7, Fig. 1, and showing the eccentric bearing for the impression-cylinder.

The main frame A of the machine supports the greater part of the printing mechanism, which consists of the main drive and printing cylinder B, the impression-cylinder C, the ink-distributing rollers D, ink-fount E, and the endless printing-belt F. At the rear of the machine, supported on a movable frame G, is an idler-roller H, around which belt F travels, and this idler-and-frame arrangement permits of various lengths of belt to be used, the length of printing-surface to be printed depending upon the length of the belt and the distribution of the characters thereon. The belt F is driven by drive-cylinder B, and the printing occurs at the bite between impression-cylinder C and drive-cylinder B, the cloth or material J to be printed upon feeding downward from roll J′ between the characters on belt F and around cylinder C and then forward to a point underneath an idle roller H, where it passes upward, usually to the second story, where the strip is cut down to the size of each sign. The belt F and the printing material J are driven independently of each other by their respective cylinders B and C, the printing-cylinder C having a tension-roller L located at its top and beneath which the material passes as it is fed along by the bite between them. This tension-roller L has its bearings in slides L′, mounted in the standards A′, and a link L^2, pivoted at the sides of slides L′, connects with the ends of the shaft C′ of cylinder C. At each side of cylinder C, supported in bearings A^2, are roller-disks A^3, through which the ends of shaft C′ pass at a point off their center and which provide an eccentric bearing for cylinder C. The object of this eccentric bearing is to provide an adjustment whereby the peripheral face of impression-cylinder C can be brought nearer to or farther away in a parallel line from the printing-face of the belt F, and the mechanism for rotating the disks simultaneously consists of the horizontal screw-shafts 2, one at each side of frame A and connected at the front with a cross-shaft 3, having bevel-gears 4 meshing with bevel-gears 5 on shafts 2. Bevel-gear 3 in Fig. 1 has a crank-handle 6 to rotate said shafts, and a threaded traveling box 7 on each shaft 2 has a connecting-link 8 pivoted to an arm 9, rigid with each disk A^3, to impart a rotative movement to said disks when an adjustment is desired. The tension-roller L and cylinder C have a fixed relation to each other through their connecting-links L^2 and rise and lower together. A most accurate adjustment can be obtained between the face of the printing surface or belt F and cylinder C with this arrangement without affecting the tension necessary to a perfect feed of the material, and, furthermore, the rapidity and simplicity with which the adjustment is made, is an important factor in the saving of time and labor.

The ink-distributing rolls D for inking the printing characters on belt F are located above drive-cylinder B, and consist of a series of rollers arranged parallel with each

other and having a successive arrangement of peripheral face contacts which lead back to the large ink-distributing cylinder D'. The ink-fount E is mounted at the upper rear portion of frame A and has an inking-roll E', from which an ink-transferring roller M, supported on arms fastened to a rock-shaft 10, takes the ink and carries it over to the ink-cylinder D'.

The oscillating movement of roller M is imparted through rock-shaft 10 by means of a cam 11, fastened to a shaft 12, supported on frame A and driven by bevel-gearing 13 and 14 from the drive-cylinder shaft B'. A vertical slide 15, having a roller 16 riding on the edge of the cam, has a pivotal connection with the end of an arm 17, rigid with the outer end of rock-shaft 10, and completes the connection for rocking said shaft. The inking-cylinder D' is driven by means of a bevel-gear 18 and 19, meshing with gears 14 and 20, respectively, through inclined shaft 21, and the ink-fount roller E' is also driven through this connection by the further series of gears beginning with a gear 22 on shaft 23, meshing with the line-pinions 24 and 25, and ink-fount-roller gear 26. The main drive-cylinder shaft B' has power communicated to it through any suitable arrangement of gears and shafting, and which in this instance are represented by gear 27 on shaft B', pinion 28 and gear 29 on shaft 30, and pinion 31 on power-shaft 32, all of said shafts being supported in suitable bearings on frame A.

The ink-distributing rolls D are mounted in bracket-bearings D^2, supported upon frame A, and two of these rolls D^3 have an axial as well as a rotary movement to more uniformly distribute the ink, and the axial movement is imparted by a vertical rock-shaft 33, supported at the side of frame A and having right-angled arms with rollers at their ends which ride in the grooved members 34 at the ends of the ink-roll shafts. At the lower end of rock-shaft 33 is an arm having a roller 35 at its end which rides in the spiral groove or cam-channel of the head 36, supported to rotate on a stud-shaft fastened to frame A, and the axial movement of roller 35 when the head 36 is rotated rocks shaft 33 and transmits the axial movement to the ink-distributing rolls D^3. This head is driven through gear 37, meshing with a gear 38 on the main drive-cylinder shaft B'. The inking-cylinder D' has a set of three axial and rotary moving ink-distributing rollers 39, located at its top and supported by bracket-bearing 40, and these rollers 39 are actuated axially by means of grooved members 41 at the end of their shafts and the right-angled arms 42, having engaging rollers 43 on the upright arms. These arms are supported to pivot in brackets attached to frame A, and a lower horizontal arm 44 has a knuckle and pivotal connection with a pitman-rod 45, which is eccentrically connected to the outer face of the rotating head 36.

In order that any length sign or strip of material may be printed, I have provided means for adjusting the idle roller H to fit any length of printing-belt, and which consists of the traveling frame G, supporting said idler. At the rear of the frame sides A rearwardly-extending rods 46 are attached, and upon which the tubular side members 47 are sleeved. These rods in conjunction with tracks 48 on the floor guide the frame in perfectly parallel lines back as far as desired, and set-screws 49 hold the frame G in adjusted position. Then as an additional factor in adjusting and tightening the belt I provide feed-screws 50, having bearings in frame G at each inner side of tubular members 47 and which when rotated by means of the cross-shaft 51 and its crank-wheels 52 and bevel-gears 53 and 54 feed the bearing-supports 55 of the idler H along as much as may be desired. To aline the idler-roller H with the belt so that straight running can be obtained without wrinkling or binding at any point, I provide bearing-boxes 56 for the idle-roller-shaft ends, one of which has vertical trunnions in one of the bearing-supports 55 and the other a tightening or adjusting screw 57, and this latter box is free to slide to a limited extent in its bearing-support 55, but is controlled by said screw 57.

What I claim is—

1. In a printing-machine, a main printing-cylinder and an impression-cylinder opposite thereto, a printing-belt for said cylinders, a tension feed-roller for the impression-cylinder, and means to adjust said impression-cylinder to the face of the belt and printing-cylinder and having a connection with said tension-roller operatively adjustable therewith, substantially as described.

2. In a printing-machine, a main drive-cylinder and an endless printing-belt thereon, an impression-cylinder and a tension feed-roller therefor, an eccentric bearing at each side of said impression-cylinder, and means to operate said eccentric bearings simultaneously to adjust the impression-cylinder to said drive-cylinder, substantially as described.

3. In a printing-machine the printing and impression cylinders and the printing-belt therefor, eccentric bearings for said impression-cylinder, and screw-shafts geared to work together having traveling boxes connected to said bearings for the adjustment of said impression-cylinder to said printing-cylinder, substantially as described.

4. In a printing-machine, the printing and impression cylinders and the printing-belt therefor, eccentric bearings for the impression-cylinder, screw-shafts having traveling boxes connected to said bearings to rotate the same, means to operate said shafts together, and a tension feed-roller having a link connection with the shaft of said impression-cylinder, substantially as described.

5. In a printing-machine, the combination of the main drive and printing cylinder, the idler-roller and an endless printing-belt stretched over said cylinder and roller, a fixed

frame and a movable frame supporting said roller and slidably mounted on said fixed frame, and having rolling supports at its bottom, and means to adjust said movable frame and roller to tighten said belt, substantially as described.

6. The main frame and the printing mechanism supported thereon, guide-rods and tracks extending to the rear of said frame, a movable frame for said rods and tracks, a drive-cylinder on the main frame and an idler-roller on said movable frame, an endless printing-belt stretched between said cylinder and roller, and means to adjust said roller back and forth on said movable frame, substantially as described.

7. The main frame and the printing mechanism supported thereon, a movable frame at the rear of said main frame, and guides therefor, a drive-cylinder on said main frame and an idler-roller on the movable frame and an endless belt carried by said cylinder and roller, bearing-supports for said roller slidably mounted on said movable frame, means to operate said supports back or forth, and independent shifting bearings in said supports constructed to aline the roller and belt, substantially as described.

Witness my hand to the foregoing specification this 30th day of April, 1900.

HORACE G. BENDER.

Witnesses:
O. B. FRANCE,
W. H. SPICER.