

No. 760,272.

PATENTED MAY 17, 1904.

B. J. SUCH.
MULTICOLOR PRINTING PRESS.

APPLICATION FILED FEB. 17, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1

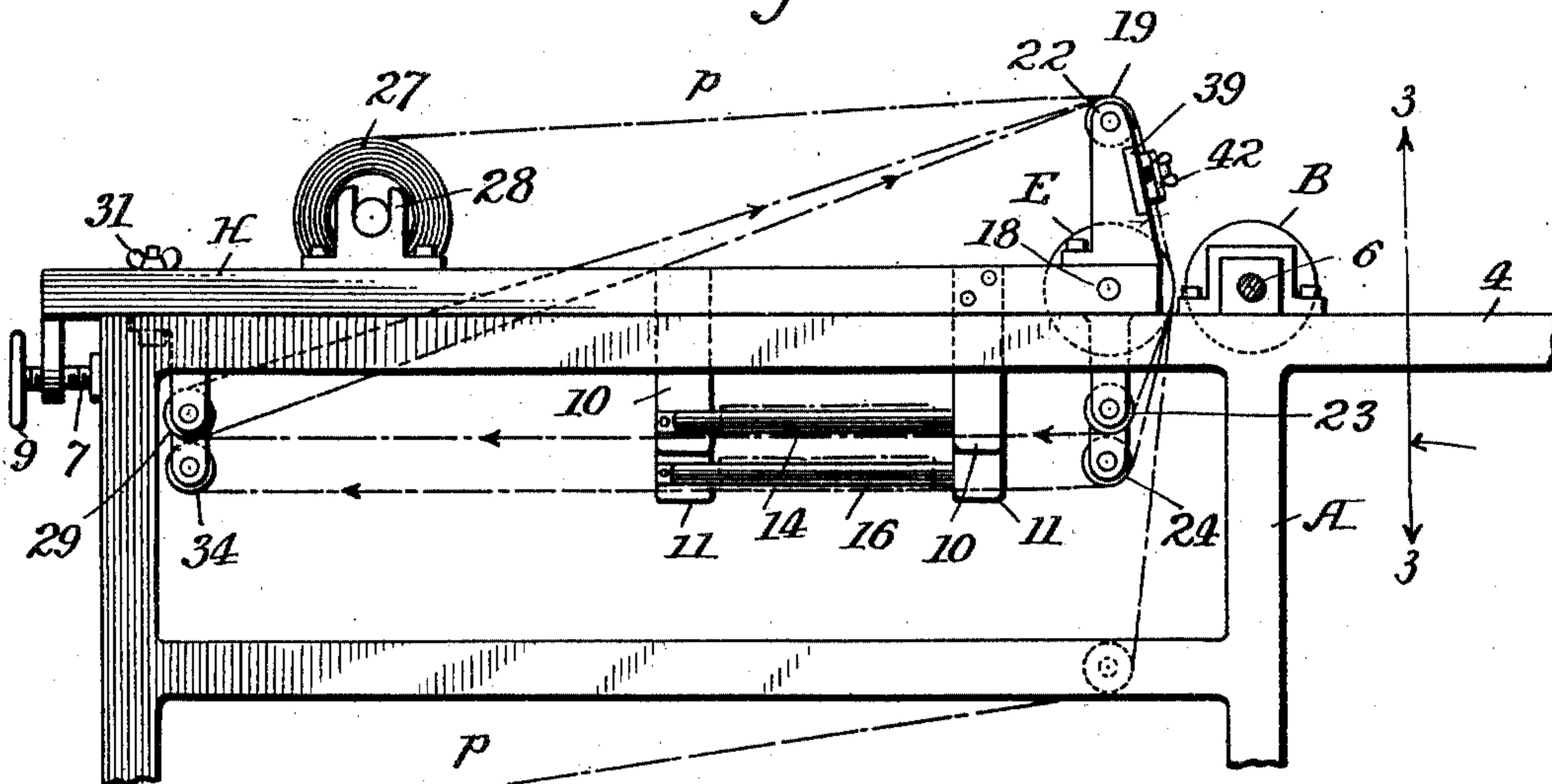
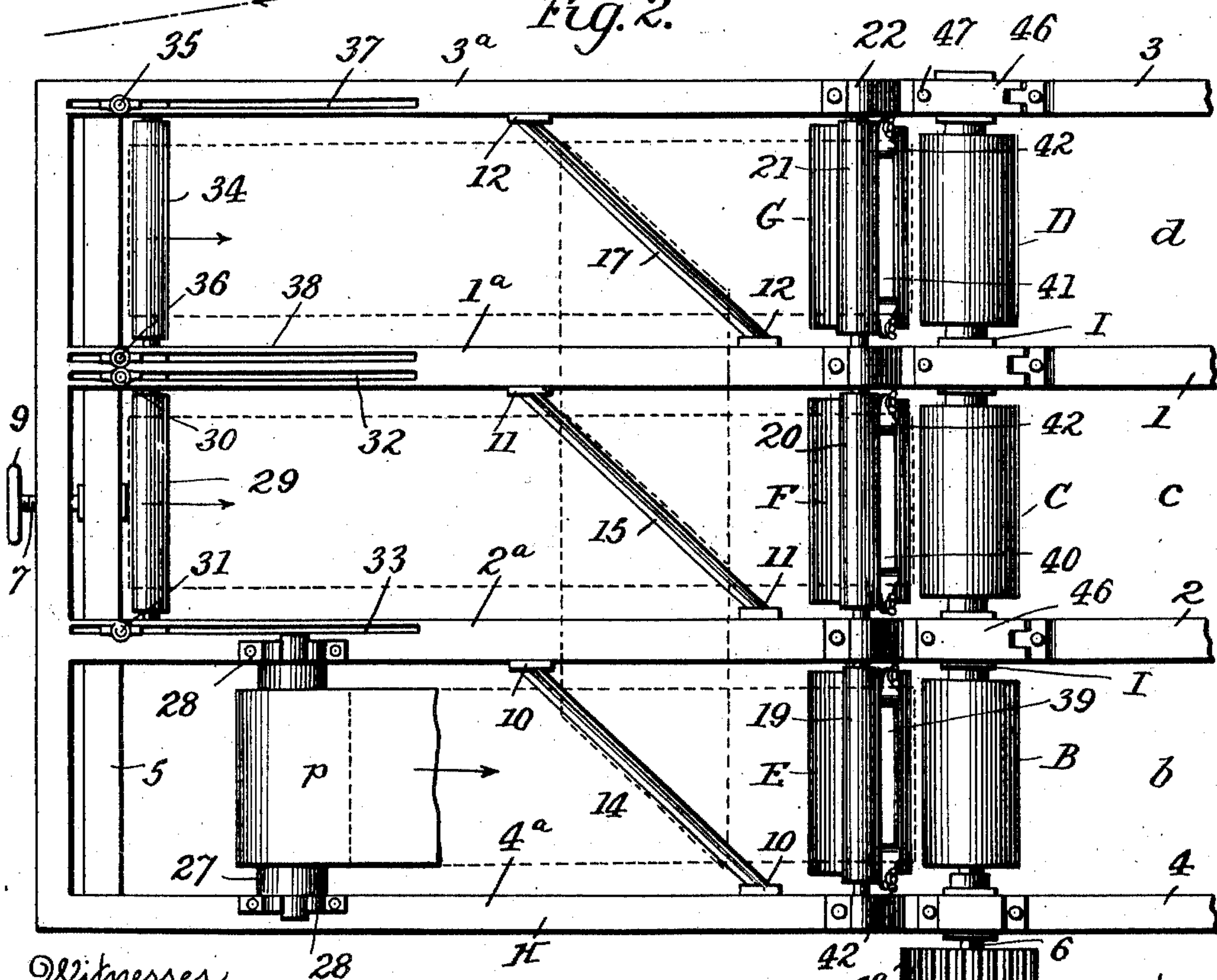


Fig. 2



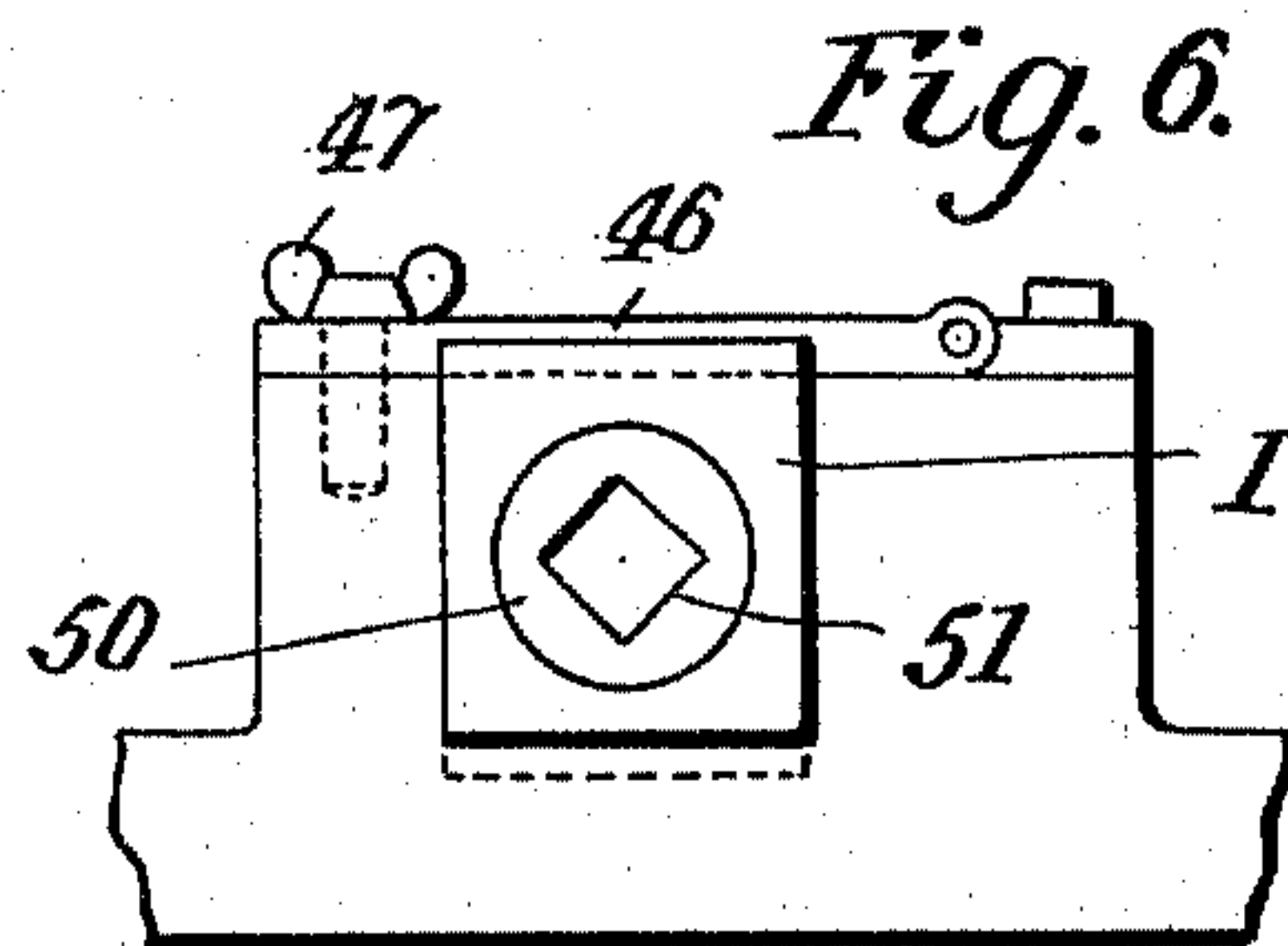
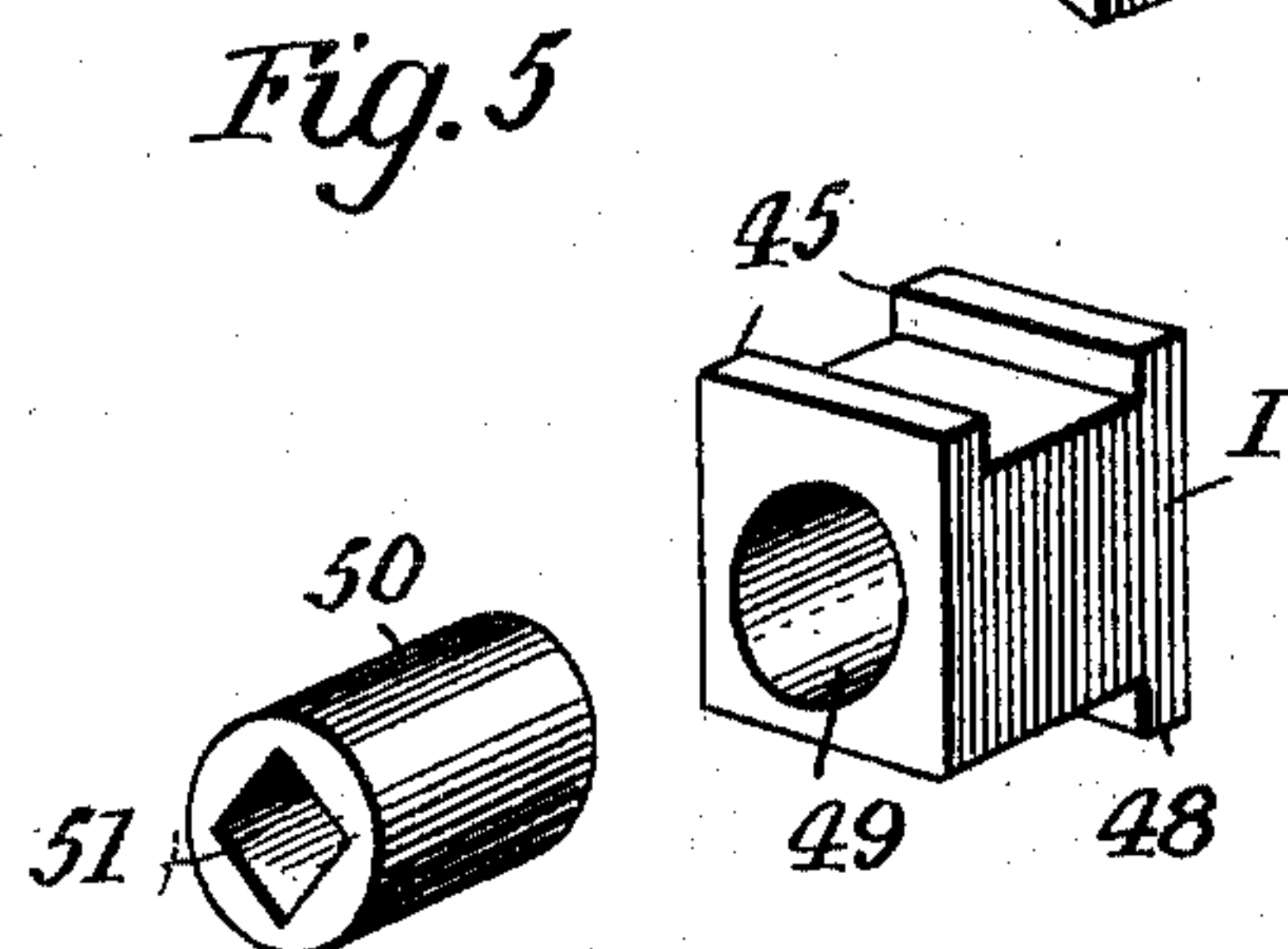
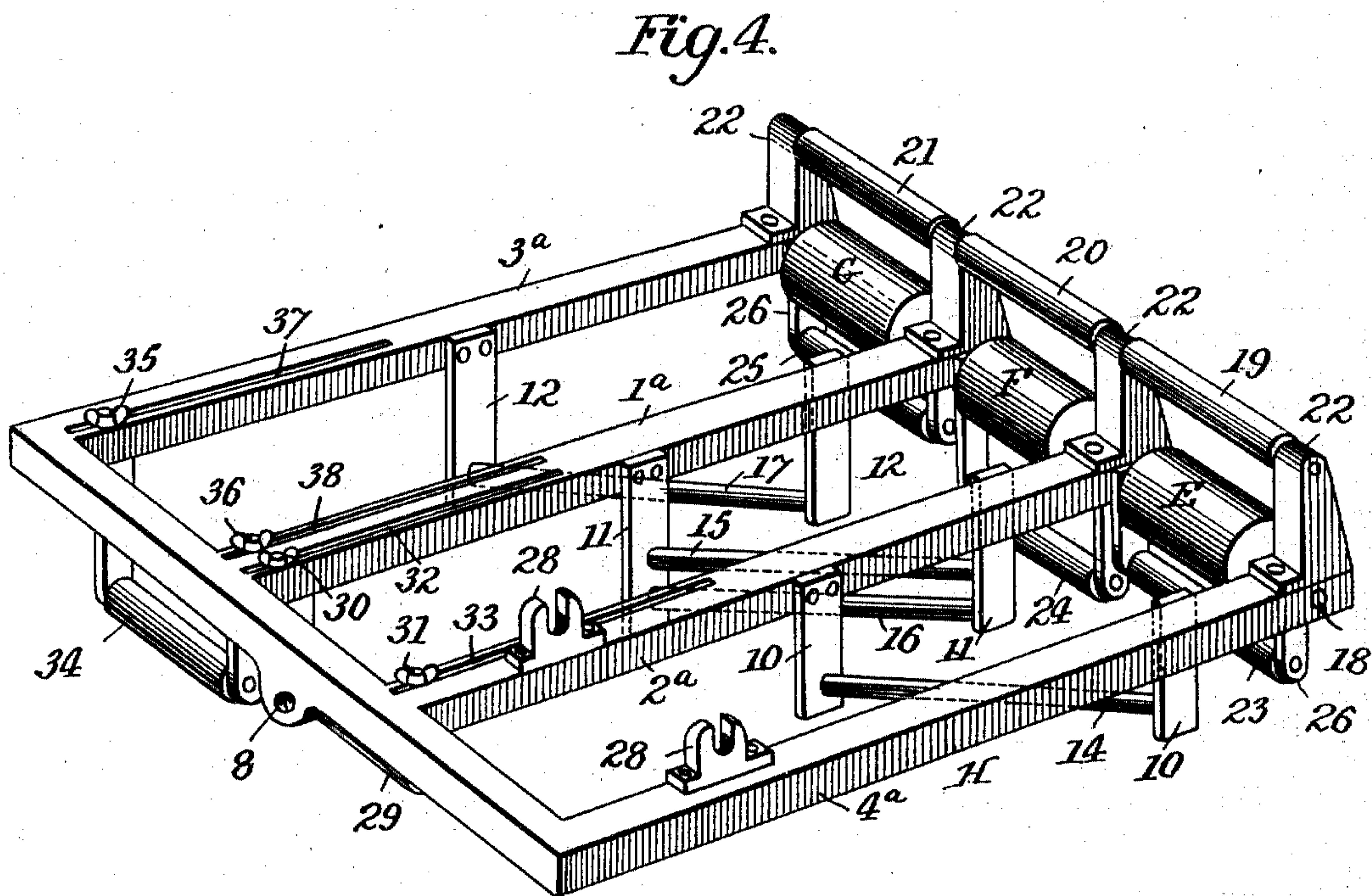
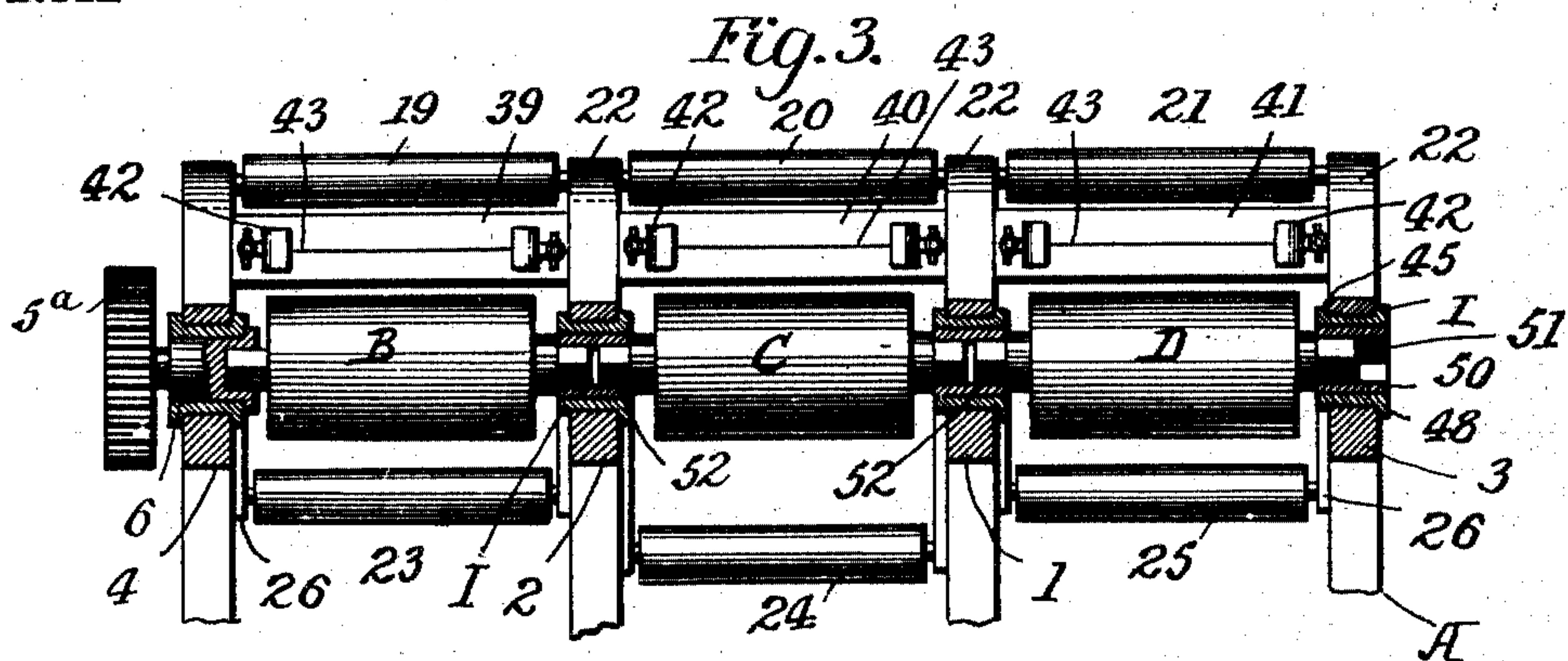
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NO MODEL.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

BENJAMIN J. SUCH, OF WASHINGTON, DISTRICT OF COLUMBIA.

MULTICOLOR-PRINTING PRESS.

SPECIFICATION forming part of Letters Patent No. 760,272, dated May 17, 1904.

Application filed February 17, 1904. Serial No. 193,959. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN J. SUCH, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Multicolor-Printing Presses, of which the following is a specification.

My invention relates to improvements in multicolor-printing presses adapted to print complementary patterns successively upon a web of paper which is passed between a series of impression-cylinders and a series of printing-rollers before leaving the machine.

The invention is particularly adapted for use in connection with printing-rollers of the kind shown in my application Serial No. 160,401, in which the roller is made from a photo-engraved plate bent into cylindrical form and having its meeting ends connected to form a continuous printing-surface, the cylinder thus formed having an interior filling which constitutes a backing and support for the plate. The diameters of such cylinders, it will be understood, will vary with the size of the photograph; and the press which forms the subject of the present invention has for its object the provision of suitable means whereby the patterns upon the paper may be made to register with the patterns upon a series of printing-rollers of any given diameter.

In the accompanying drawings, which illustrate my invention, Figure 1 is a side view of a portion of the press, showing the adjustable paper-carrying frame and the printing-rollers. Fig. 2 is a top plan view of the same. Fig. 3 is a section on the line 3 3 of Fig. 1, the bearings for the printing-rollers being shown in section. Fig. 4 is a perspective view of the paper-carrying frame. Fig. 5 is a view showing a bearing-block and coupling-sleeve for the shaft ends of adjacent printing-rollers; and Fig. 6 is a side view of part of the main frame, showing the bearing-block and coupling-sleeve in position thereon.

The printing-press shown in the drawings is provided with three printing-rollers and is adapted for printing in three colors.

Referring to the drawings, A indicates the

main frame of the machine, the upper part of which is rectangular in plan view, and this upper portion of the frame is divided into three equal sections or divisions *b*, *c*, and *d* by bars 1 and 2, extending longitudinally of the machine and parallel with the side bars 3 and 4. These longitudinally-arranged bars are all connected to cross-bars 5 at the ends of the machine, only one of said cross-bars being illustrated in the drawings. The printing-rollers B, C, and D are arranged in the same axial line and are journaled in bearings mounted upon the bars 1, 2, 3, and 4. The printing-rollers may be mounted upon one common shaft; but preferably they are mounted upon independent shafts, so as to be independently removable, and the rollers are rotated in unison by means of suitable gearing meshing with a gear 5^a, which is fixed upon a stud 6, the latter being mounted in a bearing upon the side bar 4 and coupled to the end of the shaft of the adjacent roller B. The details of the bearings and couplings will be hereinafter referred to. The several printing-rollers have complementary photo-engraved patterns thereon. The circumferences of the cylinders must therefore conform to the size of the photograph from which the etching is made. Ordinarily in multicolor-printing machines the pattern is arranged upon rollers of predetermined size, and the impression-cylinder is geared so that it will rotate in harmony with printing-rollers of a given diameter. With my printing-rollers, however, wherein the diameters of the rollers vary with the size of the photograph, it would be necessary to provide an impression-cylinder corresponding in diameter to each set of printing-rollers if the impression-cylinder and printing-rollers were geared together, as it would be practically impossible to provide changeable gearing which would give the impression-cylinder the same circumferential speeds as the variety of printing-rollers of varying diameters which may be used. In order that a single impression-cylinder or set of cylinders may be used with my printing-rollers, I arrange the impression-cylinders upon a sliding frame, so that they may be moved into frictional en-

gagement with the printing-rollers and driven thereby, and with this arrangement there need be no fixed relation between the diameters of the printing-rollers and impression-cylinders.

5 Upon the frame carrying the impression-cylinders I provide means for directing the web of paper between the impression-cylinders and the successive printing-rollers and means for adjusting the length of paper between suc-
10 cessive printing-rollers so that the patterns impressed upon the paper will register with one another.

The impression-cylinders E, F, and G and the paper carrying, directing, and adjusting devices are carried upon a sliding frame H, which
15 rests upon the main frame A. The sliding frame H is rectangular in form and provided with bars 1^a, 2^a, 3^a, and 4^a, which rest upon the bars 1, 2, 3, and 4 of the main frame, re-
20 spectively. The sliding frame is adjustable longitudinally of the main frame by means of an adjusting-screw 7, fitting within a threaded opening 8 in the rear of the sliding frame and having one end journaled in the
25 cross-bar 5 of the main frame and a hand-wheel 9 at its opposite end. Lateral motion of the sliding frame is prevented by three pairs of hangers 10, 11, and 12, which extend downwardly from the longitudinal bars of the
30 sliding frame and engage the sides of the corresponding bars of the main frame. These hangers serve as guides for the sliding frame, as well as supports for a series of angle-bars 14, 15, 16, and 17, which direct the web of
35 paper around the impression-cylinders. The impression-cylinders are arranged at the forward end of the sliding frame upon a shaft 18, mounted in the bars 1^a to 4^a, inclusive. The rollers are, by preference, journaled upon the
40 shaft so that they may turn independently, although they may be mounted upon separate short shafts. Rollers 19, 20, and 21 of small diameter are supported above the cylinders E, F, and G, respectively, in bearings 22, se-
45 cured to the sliding frame, and similar rollers 23, 24, and 25 are supported below the cylinders in hangers 26, depending from said frame. The paper-roll 27 is carried in bearings 28 upon the bars 2^a and 4^a. A roller 29 is sus-
50 pended beneath the sliding frame in hangers 30 and 31, which are adjustable longitudinally of the frame in guide-slots 32 and 33, formed in the bars 1^a and 2^a, respectively. This adjustable roller is provided for the purpose of
55 adjusting the length of paper between the cylinders E and F. Similarly a roller 34 is suspended in hangers 35 and 36, which are adjustable in guide-slots 37 and 38 in the bars 1^a and 3^a, respectively, the purpose of this
60 latter roller being to adjust the length of paper between the cylinders F and G. The printing-rollers are all arranged upon their respective shafts so that their patterns com-
65 mence in the same radial planes. Index-plates 39, 40, and 41 are arranged across the front of

the sliding frame above the impression-cylinders E, F, and G, these plates being supported by the bearings 22. At each end of each index-plate is arranged a clamp 42, adapted to
70 clamp the paper against the plate, and each plate has an indicating-mark 43, extending longitudinally thereon, these marks being in line with one another and at equal distances from the impression-points on the cylinders.

The course of the paper through the press
75 is indicated by the arrows in Figs. 1 and 2. From the paper-roll 27 the paper web *p* passes over the guide-roll 19, thence around the forward face of the impression-cylinder E, thence
80 beneath the guide-roll 23 and beneath the angle-bar 14, thence over said bar and over the angle-bar 15, thence beneath the adjusting-roller 29 and around said roller to the top of the guide-roll 20. From the guide-roll 20 the web
85 passes around the front face of the impression-cylinder F, thence beneath the guide-roll 24 to the lower side of the angle-bar 16, thence around said bar 16 and over the angle-bar 17, thence beneath and around the adjusting-roller
90 34, and thence to the top of the guide-roll 21. From the guide-roll 21 the paper passes around the front face of the impression-cylinder G, thence beneath a roller 44, journaled in the main frame, and from thence passes to suitable
95 take-up devices. The web of paper is thus passed successively around the three impression-cylinders, with the side to be printed upon facing the printing-rollers.

In Figs. 1 and 2 the sliding frame is shown
100 moved backward a short distance, so that the paper is not in contact with the printing-rollers and may be adjusted. When, however, the sliding frame is moved forward, it will be seen that the impression-cylinders will press
105 the paper against the printing-rollers, and the impression-cylinders will be driven frictionally by said rollers and at the same circumferential speed, the patterns being impressed upon the paper at the same time.

The purpose of mounting the impression-
110 cylinders and the paper carrying and adjusting devices on the sliding frame is to provide for adjustment of the paper web, so that the patterns thereon may be brought into register with the patterns on the successive printing-
115 rollers. To effect this adjustment of the paper, the sliding frame is moved forward into operative position and the printing-rollers are operated until each of the first and second
120 printing-rollers has impressed a series of patterns upon the paper extending between it and the succeeding printing-roller. The sliding frame is then moved backward, so as to free the paper from contact with the printing-
125 rollers while the latter remains stationary. The paper web is then pulled backward until one end of one of the last patterns printed by the roller B is in exact register with the indicat-
130 ing-line 43 above the adjacent impression-cylinder E, and the paper is clamped at its edges

against the plate 39 by the clamps 42. The slack paper is rewound upon the paper-roller. The portion of the web between the cylinders E and F is then adjusted by bringing one end of one of the first patterns printed by the roller B opposite the indicating-line on the plate 40, so that there will be an exact number of patterns between the indicating-lines on the plates 39 and 40, the paper being taken up or let out by moving and resetting the adjusting roll or bar 29, and the paper is clamped against the plate 40. The paper between the cylinders F and G is then adjusted by bringing one end of one of the first patterns printed by the roller C opposite the indicating-line on the plate 41, the paper being then clamped against said plate and the adjusting roller or bar 34 being moved and reset to take up or let out the paper between the cylinders, as required. When this adjustment of the bars or rollers 29 and 34 is effected, the length of paper between the impression-lines of each successive pair of cylinders will be equal to the length of an exact number of patterns, and when the clamps are released and the machine again started into operation the patterns upon the several printing-rollers will register upon the paper. A single adjustment is all that is necessary for a given set of printing-rollers, and as all the paper holding and guiding devices are mounted upon the sliding frame the latter may be moved bodily with respect to the printing-rollers for any purpose, such as inserting a new paper-roll, without disturbing the adjustment.

In order to facilitate the insertion and removal of the printing-rollers, I provide bearing-blocks I, rectangular in cross-section, which rest within corresponding sockets upon the upper sides of the bars 1, 2, and 3 of the main frame. These bearing-blocks are provided with end flanges 45 upon their upper sides and each block is locked in position by a clamp 46, hinged at one end to the frame and adapted to fit between said flanges. The opposite end of each clamp is secured to the frame by a screw 47. Each bearing-block is also provided with a single flange 48 on its lower side, which bears against the side of the bar upon which the block is supported. An axial opening 49 is formed in each bearing-block, and a sleeve 50 is fitted to turn within said opening. The sleeve has an angular opening 51 extending axially therethrough, and the ends 52 of the roller-shafts are angular in form and fit closely within the openings 51 of the sleeves. The sleeves thus serve as couplings for the shafts. To remove the printing-rollers, the clamp on bar 3 is opened, when the bearing-block on said bar may be slid off of the bar to the right in Fig. 3. The roller D may then be moved longitudinally and disengaged from the sleeve in the block on the bar 1. The latter block may then be unclamped and slid to the right and the roller C removed, and, lastly,

the block on the bar 2 is released and moved to the right and the roller B removed. The rollers are inserted in the reverse order.

In referring to a series of impression-cylinders I do not wish to confine myself to a series of independent cylinders, as when secured to the shaft they may be considered as one cylinder having several impression surfaces or portions.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a multicolor-printing press, a series of printing-rollers having complementary patterns thereon, and means for rotating said rollers, of a corresponding series of impression-cylinders adapted to be driven frictionally by said rollers, means for frictionally engaging and disengaging said cylinders and rollers, and means for directing a web of paper around said impression-cylinders successively.

2. In a multicolor-printing press, the combination with a series of printing-rollers and means for operating the same, of a frame adjustable toward and from said printing-rollers, a series of impression-cylinders mounted in said frame and adapted to be driven frictionally by said printing-rollers, and means upon said frame for directing a web of paper around said impression-cylinders successively.

3. In a multicolor-printing press, the combination with a series of printing-rollers and means for operating the same, of a frame adjustable toward and from said rollers, a series of impression-cylinders mounted in said frame and adapted to bear against said rollers, means upon said frame for directing a web of paper around said cylinders successively, and means connected with said frame for adjusting the length of paper between each successive pair of impression-cylinders.

4. In a multicolor-printing press, the combination with a series of printing-rollers and means for operating the same, of a frame adjustable toward and from said rollers, a series of impression-cylinders mounted in said frame and adapted to bear against said rollers, means upon said frame for directing a web of paper around said cylinders successively, and means connected with said frame for adjusting the length of paper between each successive pair of impression-cylinders comprising a guide bar or roller arranged parallel with the second cylinder of the pair, said bar being adjustable toward and from said second cylinder.

5. In a multicolor-printing press, the combination with a series of printing-rollers and means for operating the same, of a frame adjustable toward and from said rollers, a series of impression-cylinders mounted in said frame and adapted to bear against said rollers, means upon said frame for directing a web of paper around said cylinders successively, indicating devices upon said frame for indicating the positions of the patterns upon the paper rela-

tively to the impression-points upon the several cylinders, and means connected with said frame for adjusting the length of paper between successive indicating devices.

5 6. In a multicolor-printing press, the combination with a series of independent printing-rollers arranged in line with each other and having spindles projecting from their ends, of means for supporting and coupling
10 adjacent rollers together comprising a bearing arranged between adjacent rollers and a coupling-sleeve journaled in said bearing, said coupling-sleeve being suitably formed to interlock with the spindles of adjacent rollers.

15 7. In a multicolor-printing press, the combination with a series of independent printing-rollers arranged in line with each other and having spindles projecting from their ends, of means for supporting and coupling
20 adjacent rollers together comprising a bearing arranged between adjacent rollers and a coupling-sleeve journaled in said bearing, said coupling-sleeve having an opening therein adapted to receive and interlock with the spin-
25 dles of adjacent rollers.

8. In a multicolor-printing press, the combination with a main frame and a series of printing-rollers journaled therein, said rollers having spindles projecting from their ends, of
30 a bearing-block removably secured to said frame between each adjacent pair of rollers, and a coupling-sleeve journaled in said bearing, said coupling-sleeve being suitably formed to support and interlock with the spindles of
35 adjacent rollers.

9. In a multicolor-printing press, the combination with a main frame and a series of printing-rollers journaled therein, said rollers having spindles projecting from their ends, of
40 a bearing-block removably secured to said

frame between each adjacent pair of rollers, and a coupling-sleeve journaled in said bearing, said coupling-sleeve having an opening therein adapted to receive and interlock with the spindles of adjacent rollers. 45

10. In a multicolor-printing press, the combination with a main frame having a series of bars extending longitudinally thereof, of bearing-blocks arranged upon said bars, each bearing-block having a flange at one end adapted
50 to bear against a side of the adjacent bar, clamps adapted to clamp said blocks upon the bars, coupling-sleeves rotatably mounted in said blocks, said sleeves having axial openings therein, and printing-rollers arranged between
55 said bars and having spindles extending into the openings in the sleeves and suitably formed to interlock with said openings.

11. In a multicolor-printing press, the combination with a main frame having a series of
60 bars extending longitudinally thereof, of bearing-blocks arranged upon said bars, each bearing-block having a flange at one end adapted to bear against a side of the adjacent bar and a pair of flanges projecting upwardly from
65 opposite ends of the block, clamps hinged to the bars and adapted to fit between the upwardly-projecting flanges of the blocks, coupling-sleeves rotatably mounted in said blocks
70 said sleeves having axial openings therein, and printing-rollers arranged between said bars and having spindles extending into the openings in the sleeves and suitably formed to interlock with said openings.

In testimony whereof I affix my signature in
75 presence of two witnesses.

BENJAMIN J. SUCH.

Witnesses:

BERNARD W. BONTZ,
GEORGE D. BROOKES.