

No. 671,861.

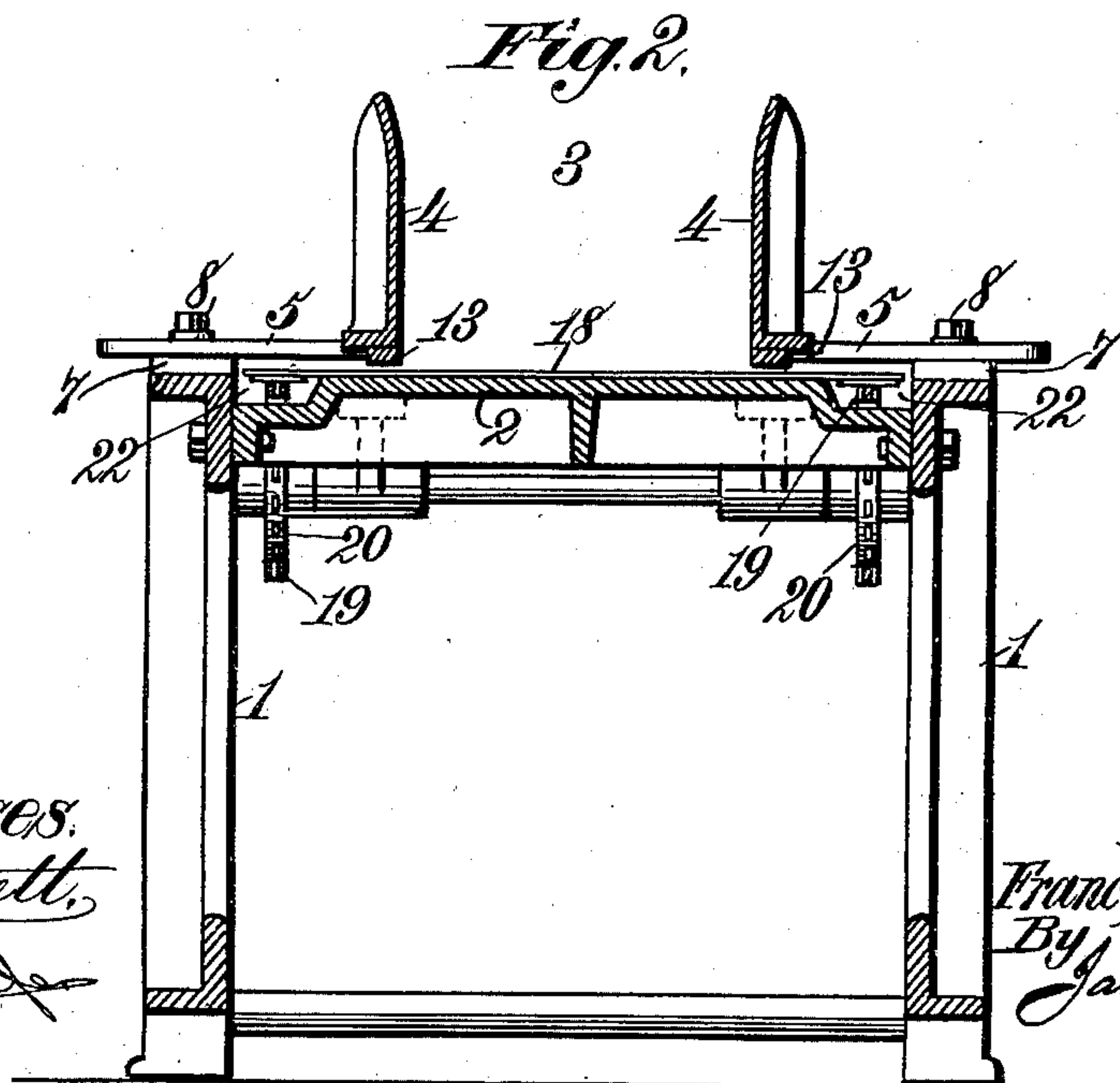
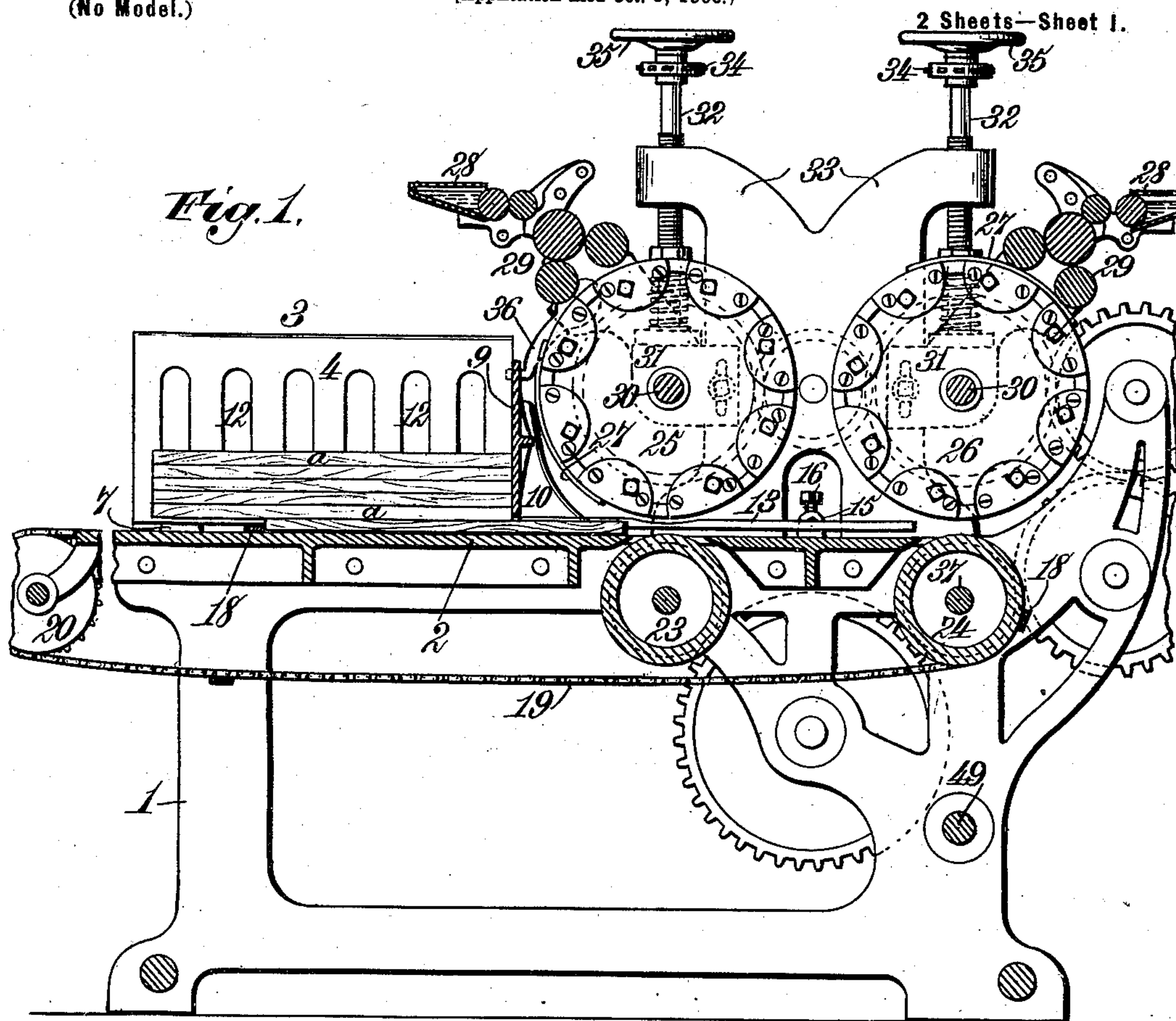
Patented Apr. 9, 1901.

F. X. HOOPER.
PRINTING MACHINE.

(Application filed Oct. 9, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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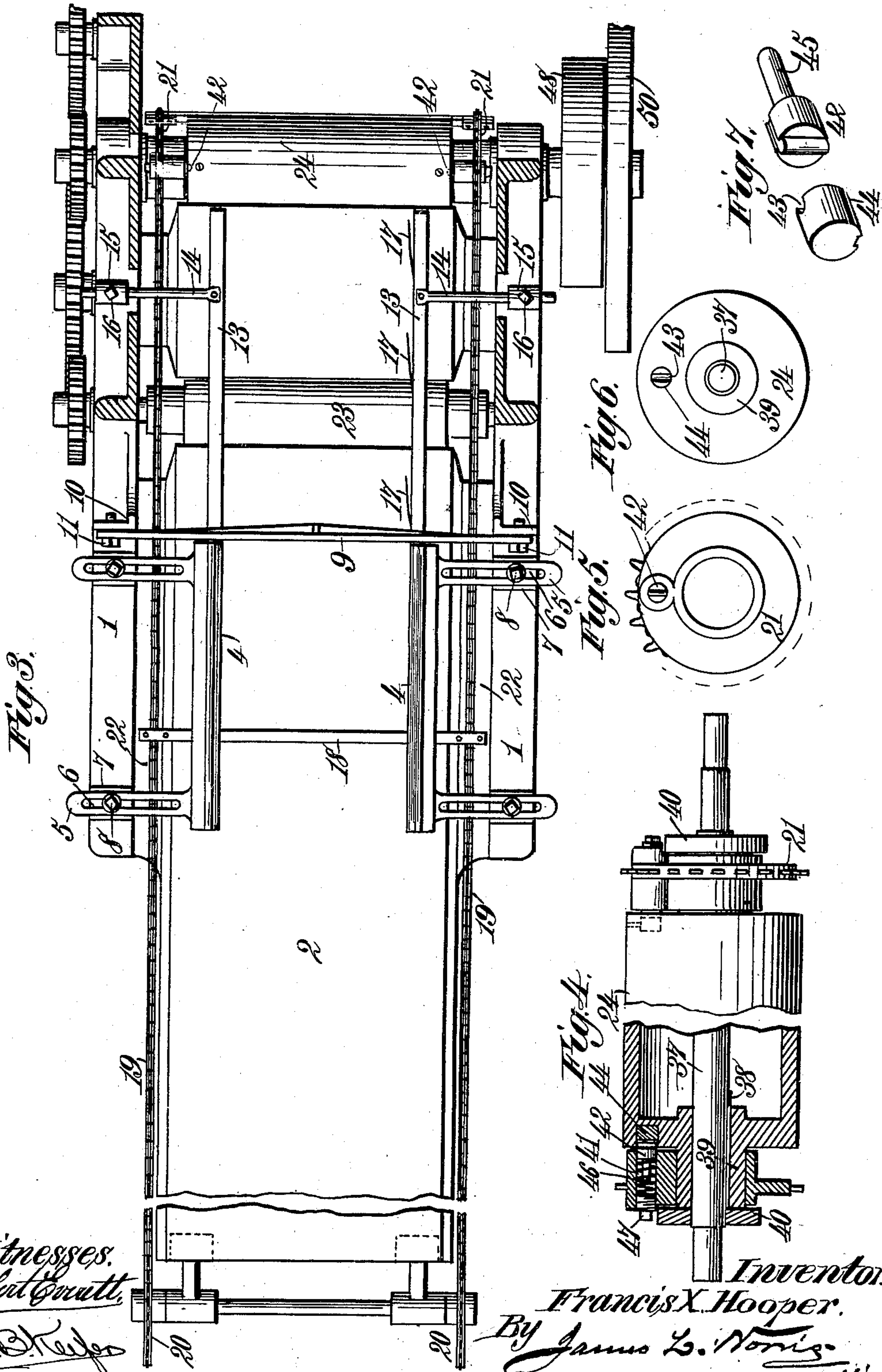
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

FRANCIS X. HOOPER, OF GLENARM, MARYLAND.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 671,861, dated April 9, 1901.

Application filed October 9, 1900. Serial No. 32,511. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS X. HOOPER, a citizen of the United States, residing at Glenarm, in the county of Baltimore and State of Maryland, have invented new and useful Improvements in Printing-Machines, of which the following is a specification.

My invention has for one object to provide certain improvements in printing-machines of the general character described in United States Letters Patent No. 359,972 for printing on boards with a plurality of colors in one continuous operation.

In the making of boxes for packing goods of various kinds, especially canned goods, it is convenient to have on hand a quantity of boards of differing dimensions for the sides and ends of boxes and to put these together when required according to the desired dimensions of the box. In order to denote the contents of the box or the brand of goods or the name of the manufacturer, it is convenient to print the same upon the box ends before the parts of the box are put together.

My improvements are more especially designed to facilitate the feed of the boards to the type-cylinders and in such manner that the individual boards will be fed consecutively from the bottom of a pile of boards and only one at a time regardless of the thickness of the boards. In the usual feed devices for machines of this character it is ordinarily necessary to replace or change the adjustment of a portion of the feed devices according to the thickness of the board to be fed through the machine. This is inconvenient for various reasons, and if the required adjustment has been inadvertently neglected and the stock to be fed is light and thin, while the feed device is adjusted for thick stock, there would be two or more boards fed forward at one operation instead of a single board, as required.

With the improved feed mechanism that I have devised it is not necessary to make any change of adjustment for varying thicknesses of boards and only one board will be fed at a time, regardless of whether the board is of thick heavy stock or thin stock.

Another object of my invention is to provide an automatic clutching and unclutching of the feed-actuating mechanism in case of any obstruction to the passage of a board over

the machine bed or table or from the hopper in which the boards are placed preparatory to printing.

It is another object of my invention to provide a positive feed for the boards throughout their progress over the machine-table and beneath the type-cylinders.

Another object of the invention is to provide for a direct forward movement of each board between suitable guides, one of which exerts a yielding pressure on one edge of the board, so that the board will follow a perfectly straight path regardless of any slight irregularities in its width.

Other objects and advantages of the invention will hereinafter appear from the following description, taken in connection with the annexed drawings, in which—

Figure 1 is a vertical longitudinal section of my improved machine for printing on boards. Fig. 2 is a vertical transverse section of the same through the feed mechanism and the hopper or receptacle in which the boards are piled preparatory to printing. Fig. 3 is a plan of the machine. Fig. 4 is a part-sectional side elevation of one of the rollers for supporting a board while it is passed beneath the type-cylinders and showing also clutching devices for releasing the feed of the board in the event of there being any obstruction to its proper passage through the machine. Fig. 5 is an elevation of the inner side of one of the feed sprocket-wheels with a clutch device. Fig. 6 is an end elevation of a roller with a clutch device for the sprocket-wheel. Fig. 7 is a perspective of the parts of the clutch.

The reference-numeral 1 designates the frame of the machine, and 2 is the machine bed or table supported by said frame. Above the table 2 there is supported a receptacle or hopper 3 for receiving the boards *a* that are to be printed upon. This hopper 3 comprises vertical side walls or pieces 4, having laterally-extended arms 5 with longitudinal slots 6 therein. The arms 5 rest upon elevations 7 at each side of the machine-table and are secured thereto by means of bolts 8, passed through the slots 6 in such manner as to permit lateral adjustment of the side pieces 4 to vary the width of the hopper 3 according to the width of the boards placed therein one

upon another, as shown. At their upper ends the side pieces 4 of the hopper are preferably flared outwardly to facilitate placing the boards within the hopper one upon another. The rear end of the hopper is open, as shown, but its forward end is closed by a vertical and transversely-arranged gage-board 9, which rests against the rear sides of standards 10 on the machine-table. These standards 10 are provided with vertical slots for the passage of screw-bolts 11, that hold the said gage-board against said standards, and at the same time permit a vertical adjustment of the gage-board according to the thickness of the board to be fed out from the hopper and to the type-cylinders. The hopper 3 may be slotted, as shown at 12, for the sake of lightness.

Beneath and secured to the under edges of the hopper side pieces 4 there are placed longitudinally-arranged guide-strips 13, which are adjustable with the sides of the hopper, and are extended in advance of the same to exert guiding action on each board *a* as it is fed out from the hopper to and beneath the type-cylinders. Near their forward ends there is secured to each of these guide-strips 13 a laterally-extended arm 14, that is passed through a perforated lug 15 on the machine-frame, where each guide-strip is secured by a set screw or bolt 16 to prevent the forward ends of said guide-strips from spreading and to hold them practically rigid. On the inner side of the forwardly-projecting portion of one of said guide-strips it is preferable to arrange a series of flat springs 17 to exert a yielding pressure against one edge of a board, and thus hold its opposite edge against the other guide-strip, so that the board will be fed forwardly in a direct or straight path, regardless of any slight inequalities in its width.

As shown in Fig. 1, a positive and continuous feed is imparted to the lowermost board in the hopper by means of a transversely-arranged slat or bar 18, that is carried by endless feed-chains 19, arranged on opposite sides of the machine. These feed-chains 19 are mounted on sprocket-wheels 20 and 21, Figs. 1, 2, 3, 4, and 5, as hereinafter described. The feed-chains 19 will be provided with any suitable number of transversely-arranged feed slats or bars 18, disposed at intervals suited to the length of the boards to be fed out consecutively from the bottom part of the hopper. The feed-chains 19 are arranged to run in longitudinal depressions or channels 22 along the opposite sides of the machine-table, so that the under side of each feed slat or bar 18 will pass along and in direct contact with the top of the table, and thereby obtain a direct bearing against the rear end of each board *a* at its lower edge. The feed slats or bars 18 are made of such reduced thickness as not to exceed the thickness of the thinnest stock that is to be operated upon. By this means only a single board will be fed out from the hopper at one time, no matter

what the thickness of the board may be. It is obvious that if the feed slats or bars 18 exceeded the thickness of the thinnest stock to be operated upon more than one board would be fed out at a time. Though these feed slats or bars 18 are made of reduced thickness for the purpose described, they must of course have strength enough to exert sufficient force for feeding out heavy stock.

As the boards *a* are carried out consecutively from the lower part of the hopper they pass into bearing contact with supporting-rollers 23 and 24, arranged, respectively, beneath the type-cylinders 25 and 26, which may be of any suitable or usual construction. Each of these type-cylinders 25 and 26 carries a removable impression-plate 27, that can be adjusted relatively to each other in order to secure a proper register in printing upon a board in a plurality of colors—say two colors, as shown. Suitable ink-receptacles 28 and ink-distributing rollers 29 are provided for each type-cylinder; but as these form no part of my invention they need not be particularly described. The shaft 30 of each type-cylinder is journaled in vertically-adjustable boxes 31, suspended by means of vertical screw-shafts 32 from bracket-arms 33 on opposite sides of the machine. The adjusting screw-shafts 32 of each type-cylinder are provided with chain-wheels 34, connected by suitable chains, so that when a hand-wheel 35 on one of these screw-shafts is turned in the proper direction the opposite screw-shaft will be also rotated to impart the required vertical adjustment to the type-cylinder to accord with the thickness of the board to be printed upon. Of course a corresponding adjustment is at the same time given to the inking devices of the respective type-cylinders, these being suitably supported from the boxes in which the type-cylinder is mounted. The brackets which carry the ink devices of the type-cylinder 25 are provided with downwardly and rearwardly curved arms 36, engaging at their lower ends the gage-board 9 at the front end of the hopper in which the boards *a* are placed preparatory to printing. Therefore when the type-cylinder is adjusted to varying thicknesses of the boards the gage board or piece 29 will receive a corresponding adjustment. The machine-table 2 is of course suitably constructed to permit each board *a* to come into bearing contact with its supporting-rollers 23 and 24 in passing beneath the type-cylinders.

The endless feed-chains 19 are actuated from the sprocket-wheels that are loosely mounted on the hub of the roller 24 but adapted to clutch with and unclutch from said roller, as and for the purpose hereinafter explained. The roller 24 is secured to its shaft 37 by a key 38 or otherwise, and each end of the roller is formed with a hub 39, on which one of the sprocket-wheels 21 is loosely placed. Collars 40, Fig. 4, are placed on the shaft 38 to retain the sprocket-wheels 21 on

the roller-hubs. Each sprocket-wheel 21 is provided with a transverse recess or passage 41, in one end of which there is placed a spring-pressed latch or clutch-jaw 42, Figs. 4, 5, and 7, to engage a suitable clutch-recess 43, formed in a plug 44, Figs. 4, 6, and 7, inserted into the end of the roller 24. The movable or spring-pressed clutch-jaw 42 has on its inner side a stem 45, surrounded by a spiral spring 46, and a screw-plug 47 is inserted into one end of the recess 41 in bearing contact with one end of said spring for the purpose of adjusting its compression, so that the clutch-jaw 42 may be made to engage the clutch-recess 43 with more or less force, as required. By means of these clutch devices the sprocket-wheels 21 will be automatically engaged with or disengaged from the roller 24, so that should there be any obstruction to the feed of a board from the hopper and toward and beneath the type-cylinders the sprocket-wheels 21 and roller 24 will automatically unclutch, thereby avoiding any damage to the feed mechanism. In like manner the sprocket-wheels will become automatically clutched with the roller 24 as the said roller continues to revolve, thus again giving movement to the feed-chains.

The machine may be driven through belt-ing applied to a driving-pulley 48, Fig. 3, on a shaft 49, Fig. 1, which also may carry a fly-wheel 50, Fig. 3, the several moving parts of the machine being driven from the shaft 49 through any suitable gearing, as shown.

In operating the machine the sides 4 of the board receptacle or hopper are adjusted toward and from each other to suit the width of the boards to be printed upon, and the boards α are placed in said hopper in a pile one upon another with their forward ends against the gage-board 9, that constitutes the forward end of the hopper. By means of the hand-wheels 35 the type-cylinders 25 and 26 will be adjusted up or down to suit the thickness of the boards which are to be fed beneath and in contact with the impression-plates of said cylinders. In adjusting the type-cylinders 25 the gage-board 9 will at the same time receive a vertical adjustment corresponding with the thickness of a board contained in the hopper. The laterally and forwardly extended guides 13 receive an adjustment toward and from each other at the same time that the side pieces 4 of the hopper are adjusted, and in order to permit this the set-screws 16 will of course require to be loosened before the necessary adjustment of said guides and hopper sides is attempted. On applying power to the machine the endless feed-chains 19 will be moved in a proper direction to carry one of its slats or cross-bars 18 against the lower rear edge or the whole of the rear edge of the bottom board α , contained in the hopper, and thus as the said feed-slat 18 is carried forward the lowermost board in the pile will be fed out forwardly from the hopper and beneath the lower edge of the gage-board

9 to and below the type-cylinders. When each board is thus fed outward from the hopper, it is caused to follow a straight or direct forward path by reason of being held between the forwardly-extended guides 13, as already mentioned. The springs 17 on one of these guides 13 will bear against one edge of each board, so as to exert a yielding pressure for forcing the opposite edge of the board against the opposite guide, thus causing the board to move forward in a straight line regardless of any irregularities or inequalities on either edge thereof. Should there be any obstruction to the feeding of the board, the sprocket-wheels 21 will become automatically unclutched from the roller 42, thus avoiding breakage, and as said roller continues to revolve the sprocket-wheels will become again clutched therewith, so as to again actuate the feed-chains, if the obstruction no longer resists.

As before mentioned, the feed-slats 18, carried by the endless feed-chains 19, are reduced in thickness to correspond with or not exceed the thickness of the lightest stock that is to be treated in the machine. Thus only the one board will be fed outward at a time from beneath the pile of boards in the hopper, as the feed-slats 18 of reduced thickness will act equally as well for feeding stuff that is either thick or thin, and consequently no adjustment of the feed mechanism is necessary for different thicknesses of boards.

The ink-receptacles of the type-cylinders are to be supplied with different-colored inks, and the arrangement and operation of the several parts of the machine are such that these type-cylinders will make the differently-colored parts of the design or imprint at a proper register one with the other. After the boards α have been thus printed upon they may be used for the ends of packing-boxes in which such articles as various kinds of canned goods are commonly put up, or the boards thus printed upon may be used to advantage as advertising-signs or for other purposes.

What I claim as my invention is—

1. In a machine for printing on boards, the combination of a type-cylinder, a hopper or receptacle in which the boards to be printed upon are piled one upon another, endless feed-chains provided with feed-slats or cross-bars to bear against the rear edge of the undermost board in the pile of boards contained in the hopper and thereby impart a positive feed to each board in succession to carry the same from the lower part of the hopper and forward beneath the type-cylinder, and parallel guides extended forwardly from said hopper and beneath the type-cylinder, one of said guides being provided with means for exerting a yielding pressure against one edge of a board to press it toward the opposite guide, substantially as described.

2. In a machine for printing on boards, the combination of a type-cylinder, a hopper or

receptacle provided with laterally-adjustable sides, whereby said hopper is adapted to receive boards of any required width piled one upon another, endless feed-chains provided with cross-bars or transversely-arranged feed-slats to bear against the rear edge of the lowermost board in the pile of boards in said hopper and thereby feed said boards consecutively from the lower part of the hopper forwardly and beneath the type-cylinder, and parallel guides adjustable with the hopper sides and extended forwardly therefrom and beneath the type-cylinder, one of said guides having on its inner side devices for exerting a yielding pressure against one edge of a board to press said board toward the opposite guide, substantially as described.

3. In a machine for printing on boards, the combination of a vertically-adjustable type-cylinder, a hopper or receptacle in which boards to be printed upon are piled one upon another, means for adjusting the sides of said hopper laterally to accommodate boards of varying width, a gage-board constituting the front of said hopper and vertically adjustable with the type-cylinder, endless feed-chains provided with cross-bars or transversely-arranged feed-slats to bear against the rear edge of the lowermost board in the pile of boards contained in said hopper for the purpose of imparting a positive and continuous feed to said boards consecutively from the lower part of said hopper to and beneath the type-cylinder, and parallel guides adjustable with the hopper sides and extended beneath the type-cylinder, one of said guides being provided with devices adapted to exert a yielding pressure on one edge of a board to press the board toward the opposite guide, substantially as described.

4. In a machine for printing on boards, the combination of a hopper in which the boards are to be piled one upon another and having its sides laterally adjustable to any required width of board, a vertically-adjustable gage-board constituting the front end of said hopper, a vertically-adjustable type-cylinder, laterally-adjustable guides extended forwardly from the lower part of the hopper to and beneath the type-cylinder, a spring device or devices on the inner side of one of said guides, and a positive feed to act against the rear edge of the lowermost board and thereby feed the boards consecutively from the lower part of the hopper forwardly between said guides and beneath the type-cylinder, substantially as described.

5. In a machine for printing on boards, the combination with a type-cylinder, and a hopper in which the boards to be printed upon are placed in a pile one upon another, of parallel guides extended forwardly from said hopper and beneath said type-cylinder, one of said guides being provided with means for exerting a yielding pressure against one edge of a board to press it toward the opposite guide, and positive feed mechanism to engage the

rear edge of the lowermost board in the pile of boards contained in the hopper and thereby feed said boards consecutively from the lower part of said hopper and between said guides to and beneath the type-cylinder, substantially as described.

6. In a machine for printing on boards, the combination of a type-cylinder, a hopper in which the boards to be printed upon are placed in a pile, one upon another, a positive feed mechanism comprising endless chains provided with cross bars or slats to engage the rear edge of the lowermost board in said hopper and thereby feed said boards consecutively from the lower part of the hopper to and beneath the type-cylinder, a driven roller having sprocket-wheels loose thereon and through which the endless feed-chains are actuated, and automatic clutch devices between said sprocket-wheels and said roller, substantially as described.

7. In a machine for printing on boards in a plurality of colors at one operation, the combination of a plurality of vertically-adjustable type-cylinders, a hopper or receptacle in which are to be placed the boards to be printed upon, means for adjusting the dimensions of said hopper to correspond with the width and thickness of the boards placed therein, feed mechanism comprising endless chains provided with cross-bars or feed-slats of a thickness not exceeding the thinnest boards to be operated upon, whereby the boards are fed only one at a time from the bottom of the pile of boards in the hopper, said feed-slats being adapted to bear against the rear edge of the lowermost board in the hopper and thereby feed it from the hopper to and beneath the type-cylinders, and automatic clutch mechanism for controlling the operation of said feed-chains, substantially as described.

8. In a machine for printing on boards in a plurality of colors at one operation, the combination of a hopper or receptacle in which the boards to be printed upon are to be placed in a pile, one upon another, means for adjusting the width of said hopper to correspond with the width of said boards, a vertically-adjustable gage-board constituting the front of said hopper, means for adjusting said gage-board to correspond with the thickness of each board in the pile of boards contained in the hopper, a plurality of vertically-adjustable type-cylinders, feed mechanism comprising endless chains provided with cross-bars or feed-slats to bear against the rear edge of the lowermost board in the hopper and feed the same therefrom to and beneath the type-cylinders, automatic clutch devices for the feed mechanism, and means for guiding each board in a straight line from the hopper to and beneath the type-cylinders, substantially as described.

9. In a machine for printing on boards in a plurality of colors at one operation, the combination of a hopper or receptacle to receive

a pile of boards to be printed upon, a plurality of type-cylinders, feed mechanism comprising endless chains provided with cross-bars or feed-slats to bear against the rear
5 edge of the lowermost board in the hopper and feed the same therefrom to and beneath the type-cylinders, automatic clutch mechanism for controlling the operation of said feed-chains, means for supporting the boards while
10 being printed upon, and guide devices for di-

recting each board forward in a straight line from the hopper to and beneath the type-cylinders, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses. 15

FRANCIS X. HOOPER.

Witnesses:

GEO. W. REA,

ROBERT EVERETT.