

(No Model.)

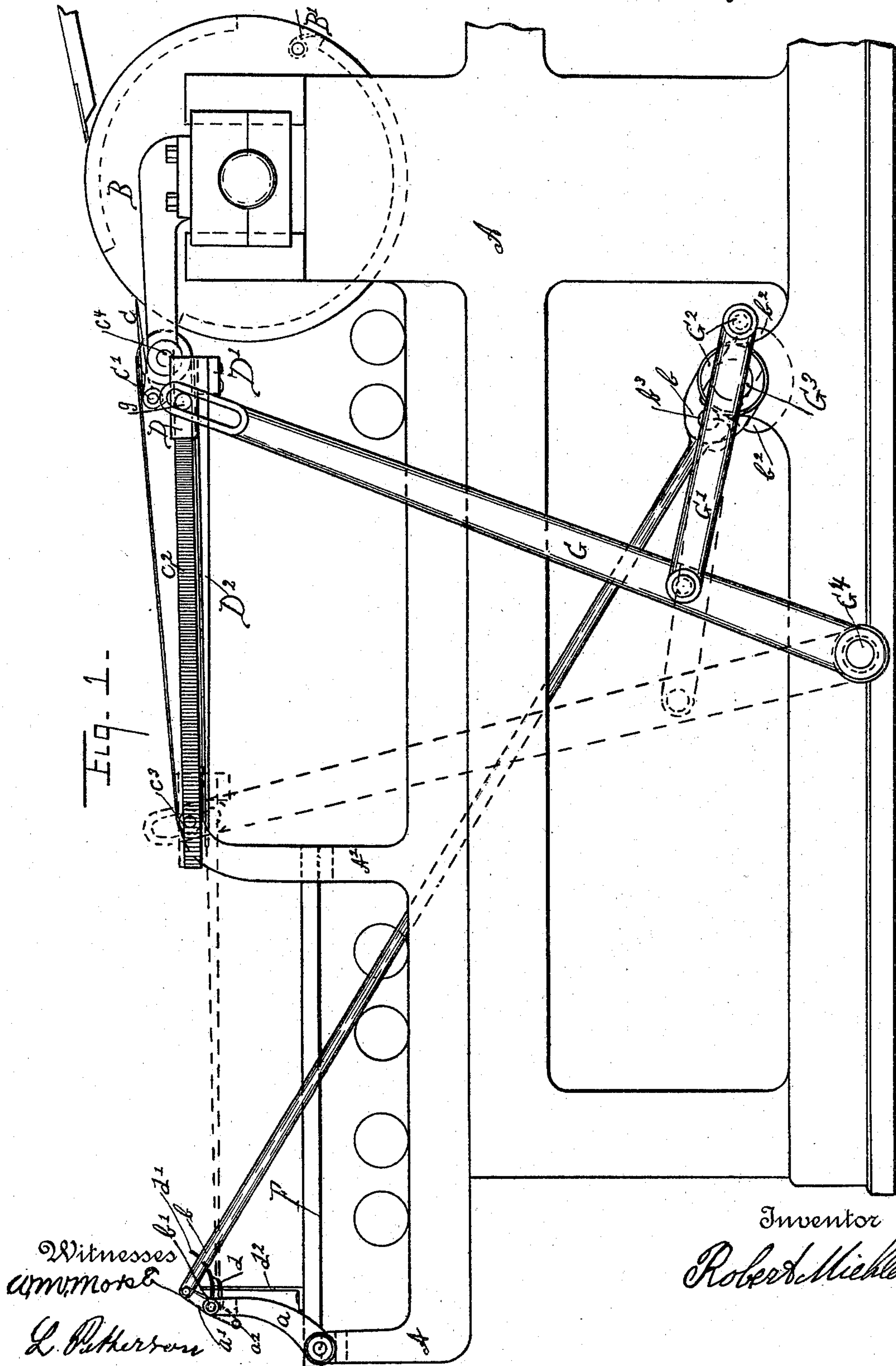
4 Sheets—Sheet 1.

R. MIEHLE.

SHEET DELIVERY APPARATUS FOR PRINTING PRESSES.

No. 585,920.

Patented July 6, 1897.



(No Model.)

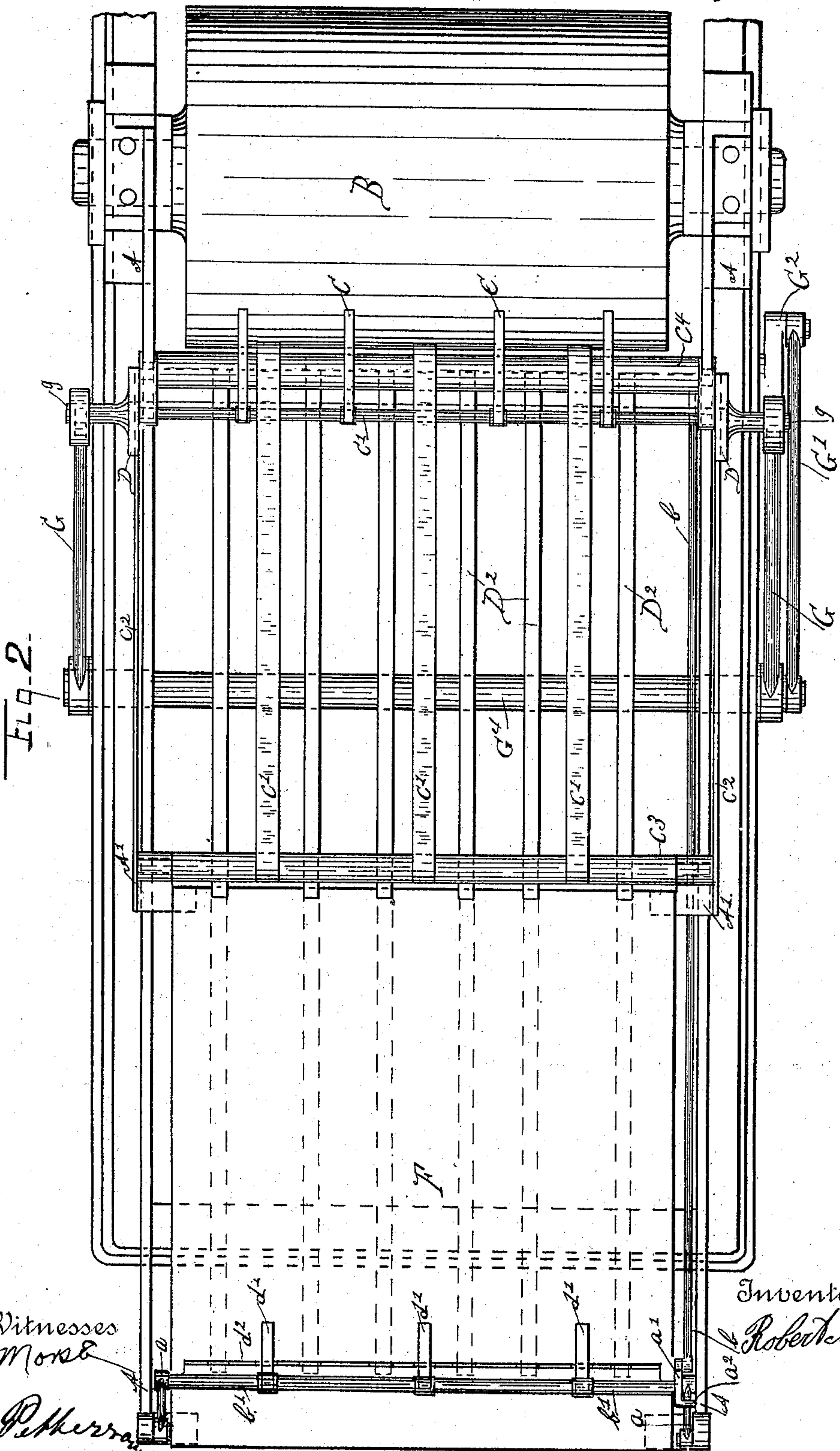
4 Sheets—Sheet 2.

R. MIEHLE.

SHEET DELIVERY APPARATUS FOR PRINTING PRESSES.

No. 585,920.

Patented July 6, 1897.



Witnesses
common

L. Petherick

Inventor
Robert Miehle

(No Model.)

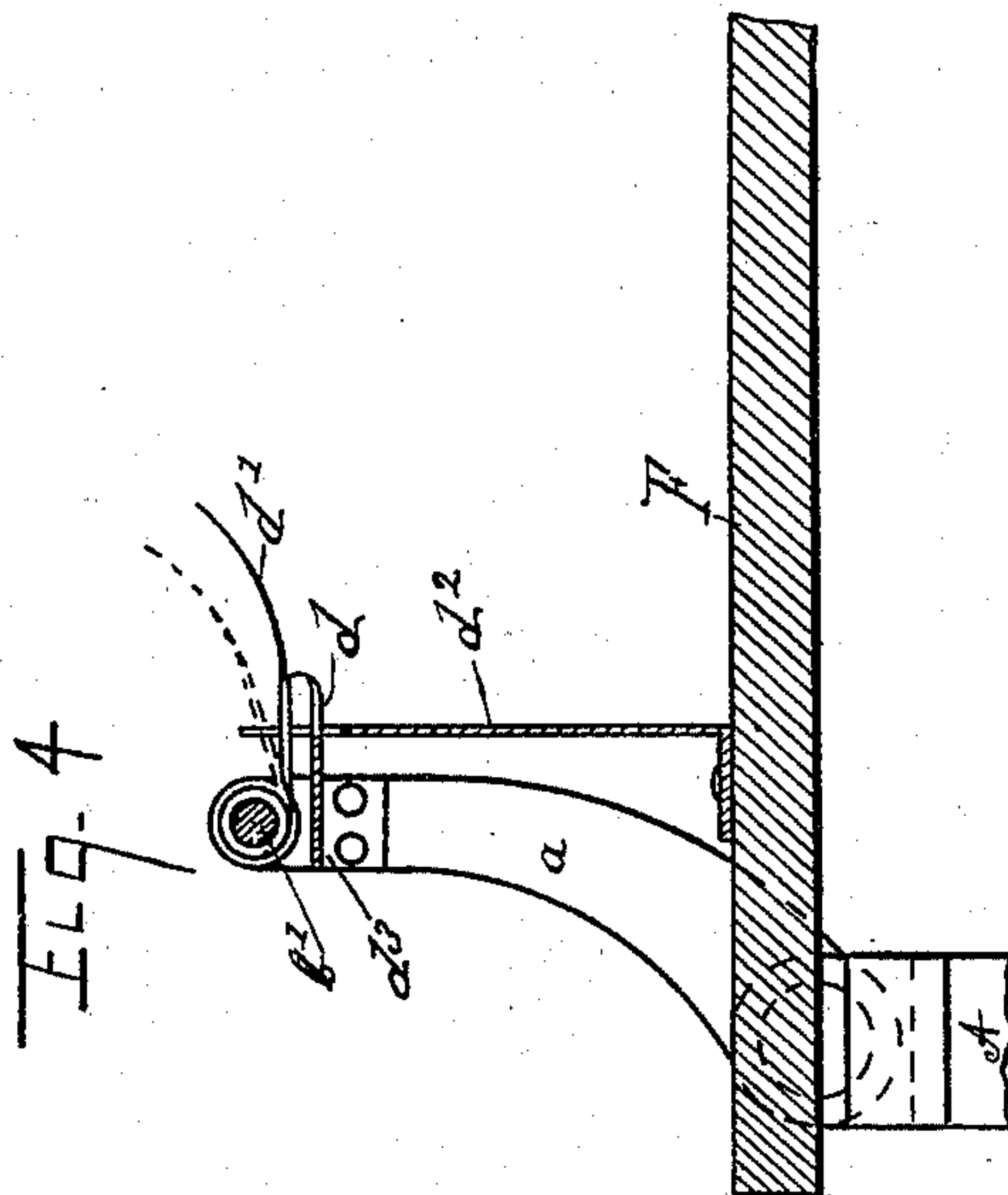
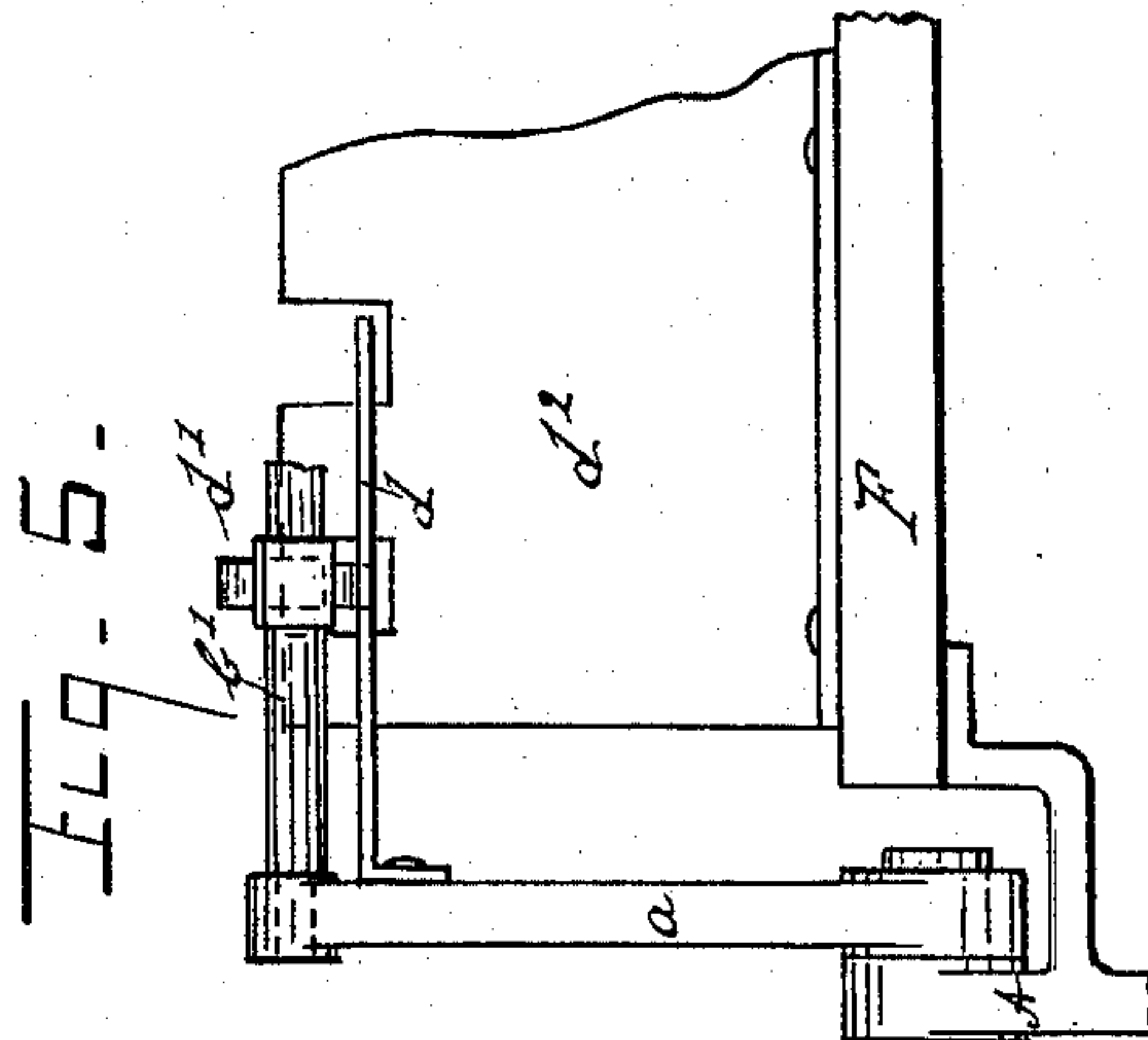
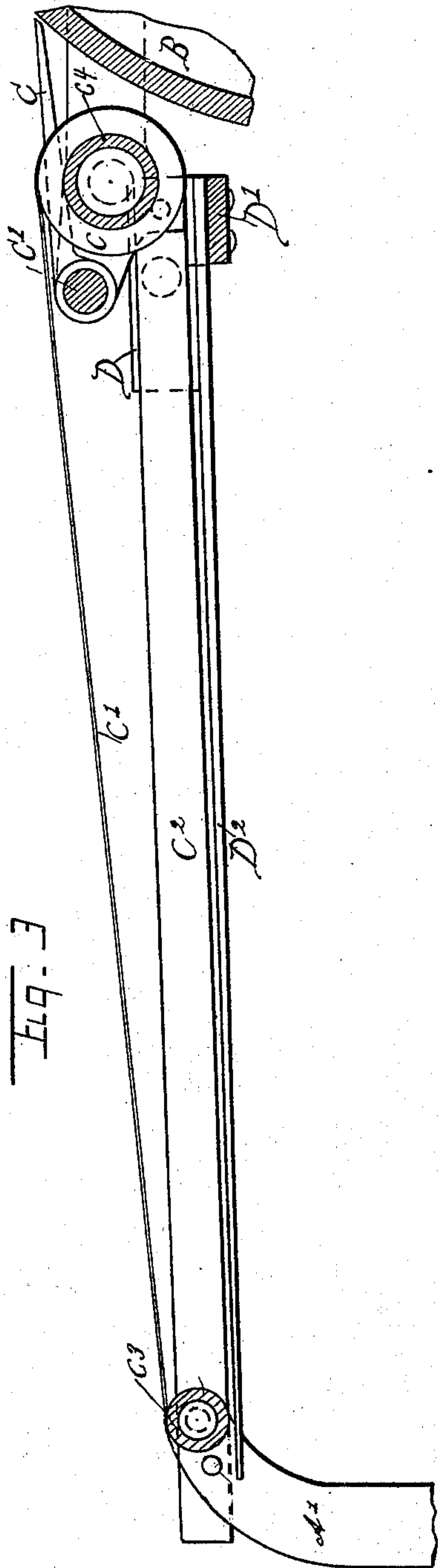
4 Sheets—Sheet 3.

R. MIEHLE.

SHEET DELIVERY APPARATUS FOR PRINTING PRESSES.

No. 585,920.

Patented July 6, 1897.



Witnesses
W. M. More

L. Patterson

Inventor
Robert Miehle.

4 Sheets—Sheet 4.

SHEET DELIVERY APPARATUS FOR PRINTING PRESSES.

Patented July 6, 1897.



Louis M. F. Whitehead.

Inventor:-

Robert Michle.

This Attorney's

UNITED STATES PATENT OFFICE.

ROBERT MIEHLE, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MIEHLE PRINTING PRESS AND MANUFACTURING COMPANY, OF SAME PLACE.

SHEET-DELIVERY APPARATUS FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 585,920, dated July 6, 1897.

Application filed January 20, 1890. Serial No. 337,560. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MIEHLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Sheet-Delivery Apparatus for Printing-Presses, which is fully set forth in the following specification, reference being had to the accompanying drawings.

10 This invention relates to that class of printing-presses having a rotary impression-cylinder by which the sheet to be printed is carried against the type, the improvements herein shown being adapted for use in connection
15 with presses in which a flat type-bed is used, as well as those in which the type or form is held on a second cylinder. I have herein shown my invention in connection with that form of press having a flat type-bed. In
20 printing-presses of the class having impression-cylinders the sheet is delivered to the front or top of the cylinder and is removed from the cylinder by means acting on the under surface of the sheet or that in contact
25 with the cylinder in order to prevent the contact of any of the moving parts of the machine with the freshly-printed sides of the sheet. Commonly the sheet has been stripped from the cylinder by means of a series of fingers forming a fly-frame which is operated
30 by suitable means so as to turn or reverse the sheet and deposit it upon the table with the freshly-printed side downward.

The object of the present invention is to
35 provide means for delivering the sheet to the receiving-table with the printed side upward. This I accomplish by providing a set of stationary stripping-fingers and in connection therewith a fly-frame which receives the sheet
40 from the stripping-fingers and has a movement toward and from the impression-cylinder, so that the fly-frame will carry the sheet bodily from the impression-cylinder and deposit it upon the receiving-table, as will be
45 hereinafter more fully set forth.

In the accompanying drawings, illustrating my invention, Figure 1 is a side view of a cylinder printing-press embodying my invention. Fig. 2 is a top plan view of the same.
50 Fig. 3 is a detail sectional view showing the

fly-frame, tapes, tape-rollers, stripping-fingers, and a part of the impression-cylinder. Fig. 4 is a detail sectional view showing the sheet-stops and the fingers which grasp the sheet and draw it from the fly-frame. Fig. 5
55 is a face view of the parts shown in Fig. 4. Fig. 6 is an enlarged view, in side elevation, of a part of the cylinder, the adjacent tape-roll, and the gearing for actuating said tape-roll from the cylinder. Fig. 7 is a plan view
60 of an end portion of the parts shown in Fig. 6.

As illustrated in the said drawings, A A designate the side frames of the machine, in which the impression-cylinder B is journaled in the usual manner. Said impression-cylinder
65 is provided with the usual grippers B' for taking the sheet from the feed-table or other feed devices. Said grippers may, however, take the sheets from a cylinder which makes the first impression, as will be the case in a
70 two-cylinder press which prints both sides of a sheet, or from a delivery-cylinder, as in presses for printing two colors.

C C designate a series of stripping-fingers arranged in an approximately horizontal position adjacent to the impression-cylinder and supported upon a horizontally-arranged rod
75 C', which is secured at its ends in brackets attached to the cylinder journal-boxes.

C² C² are strips or guideways located at the
80 sides of the machine and secured at their inner ends, which are adjacent to the impression-cylinder, to the brackets above referred to and at their outer ends to the side frames A A. Said guideways afford support for two
85 sliding boxes D D, to which are attached the opposite ends of a transverse rod or bar D', upon which are secured a series of fingers D² D², which constitute a fly-frame, said fingers being secured to the bar by means of screws
90 or otherwise. At the front end of the machine and supported upon the side frames thereof is a delivery or receiving table F. The guideways C² C² terminate at their outer ends near the inner end of said receiving-
95 table, and the fly-frame is adapted to move horizontally by the sliding of the boxes D upon said guideways in such manner that said fly-frame may be carried forward over the receiving-table or moved toward the im-
100

pression-cylinder until its inner end is adjacent to or beneath the stripping-fingers C C. C³ is a tape-roll extending horizontally across the machine near the outer ends of the guideways C² C², and C⁴ is a second tape-roll extending across the machine adjacent to and beneath the stripping-fingers. Said tape-roll C⁴ is preferably mounted at its ends in the same brackets which support the finger-rod C'. A series of carrying-tapes c' c' are trained around the tape-rolls C³ C⁴, and rotary motion is imparted by gearing or otherwise to one of said rolls, preferably the roll C⁴, in a direction to carry the upper parts of the tapes away from the impression-cylinder or toward the receiving-table. As a means for actuating the tapes c' the construction shown in Figs. 6 and 7 may be employed. In these figures a gear ring or disk H is shown as mounted upon one end of the cylinder B, and the teeth of this ring or disk mesh with the teeth of a gear-pinion H', which is journaled upon a bracket I, secured to the frame A of the press. The gear-pinion H' meshes with a gear-wheel H², carried by the tape-roll C⁴, so as to cause the roll to move the upper strands of the tape away from the cylinder B. Said tape-roll C⁴ is, as before stated, located beneath the stripping-fingers, and said roll is provided with enlargements or collars extending upwardly between the said stripping-fingers and around which the carrying-tapes c' c' are placed. By this construction the tapes are held somewhat above the stripping-fingers, so that the forward edges of the sheets directed outwardly by the stripping-fingers will come in contact with the said tapes and the sheets will be moved or carried forward by the same.

Devices are provided for giving reciprocatory motion to the fly-frame, as follows: G G are swinging levers located at opposite sides of the machine, outside of the side frames thereof, and rigidly secured to a transverse rock-shaft G⁴, which is mounted in bearings at the lower parts of the side frames in the manner illustrated. The upper ends of said levers are provided with longitudinal slots, which are engaged with outwardly-extending studs g g, carried by the sliding boxes D D, these parts being so arranged that when the said levers G G are swung or oscillated by the turning of the rock-shaft in its bearings the said sliding boxes and the fly-frame carried thereby will be moved back and forth along the guideways C² C².

G³ is a cam-shaft arranged horizontally at the lower part of the machine and mounted at its ends in suitable bearings in the side frames A A. Said cam-shaft is provided at one end with a rigid crank-arm G², the outer end of which is pivoted to a connecting-rod G', which reaches to and is connected with one of the levers G, so that as the cam-shaft is revolved oscillatory motion is given to said levers, motion being transmitted from that lever with which the connecting-rod G' is di-

rectly connected to the lever on the opposite side of the machine through the medium of the rock-shaft G⁴, to which said levers are rigidly attached.

The fly-frame is arranged in an approximately horizontal position below the tapes c' c' and rests beneath said tapes when adjacent to the impression-cylinder, as clearly seen in Fig. 3. The tapes are driven at a speed approximately equal to that of the fly-frame when the latter is moved outwardly or away from the impression-cylinder, so that sheets of paper resting upon and carried forward by the tapes will, as they pass the outermost tape-roll C³, fall and rest upon the fly-frame and will be supported entirely thereby when said fly-frame reaches the rearward limit of its movement. The said stripping-fingers C C extend to a point near the surface of the impression-cylinder with their ends in position to pass beneath the sheet and strip the same from the cylinder as the latter revolves. Owing to the stationary character of these stripping-fingers they are not subject to vibration such as would render them liable to tear the advancing edge of the printed sheet or cause them to rise above said sheet and thus fail to strip the sheet from the cylinder. Consequently certainty and reliability of operation may be obtained with great rapidity of action of the fly-frame, inasmuch as the stationary strippers are always in position for coaction with the impression-cylinder, which is not the case with stripper-fingers carried by the fly-frame itself.

The cylinder will of course be provided with the usual sheet-lifters or other devices for throwing outwardly the advance edge of the sheet into position to engage or pass over the stripping-fingers when the grippers B' are lifted to release the sheet. In the operation of the parts above referred to, therefore, the sheet which is stripped from the impression-cylinder by the stripping-fingers is carried forward by the tapes c' c' until the forward edge of the sheet reaches the tape-roll C³. At this time bodily motion is imparted to the fly-frame through the action of the crank G² and arms G G in a direction to carry the fly-frame toward or over the receiving-table, and as the fly-frame passes beneath the tape-roll C³ the sheet passes from the tape-roll to the fly-frame and finally rests entirely upon the same. The sheet is thus carried from the impression-cylinder to a point over or above the receiving-table. At the outer end of said receiving-table is located a sheet-stop d², formed in the particular construction illustrated by means of a flat metal plate secured vertically to the said table. Said sheet-stop is provided in its upper part with a series of apertures or perforations, through which pass a number of horizontally-arranged fingers d d. Said fingers are formed upon or attached to a bar or plate d³, which is arranged horizontally outside or forward of the sheet-stop and is supported by attach-

ment at its ends to two swinging brackets a , which are mounted at their lower ends upon horizontal studs attached to the side frames in such manner that the upper ends of the said brackets, together with the bar or plate d^3 , may be swung horizontally toward and from the sheet-stop. Over the fingers d are arranged a second set of fingers d' , which form, with the said fingers d , a series of sheet-grippers or clamps. The fingers d' are attached to a transversely-arranged rock-shaft b' , which is mounted in the upper ends of the swinging brackets a above the bar or plate d^3 . Said fingers d' are movable toward and from the fingers d when the rock-shaft b' is oscillated in its bearings, said fingers being adapted to bear or press upon the fingers d , so as to hold or grip the edge of a sheet of paper inserted between them when the rock-shaft is turned in a direction to carry the said fingers d' downwardly. The opposing fingers d and d' , constituting the gripping device, are arranged in line with the path of the fly-frame and in position to engage the forward edge of a sheet resting upon said fly-frame when the latter is carried forward over the receiving-table, the general object of said gripping device being to grip and hold the edge of a sheet resting upon the fly-frame, so that when the latter is withdrawn or carried toward the impression-cylinder the sheet will be held from movement with the fly-frame and will remain in position over the receiving-table as the fly-frame passes from beneath it.

The rock-shaft b' , which carries the gripper-fingers d' , is provided at one end, adjacent to one of the swinging brackets a , with a lever a' , which is rigidly attached to said rock-shaft. Said lever is attached at a point between its ends to the rock-shaft, and at its upper end is connected with a rod b , by means of which motion is transmitted to the gripping device, and at its lower end the lever is provided with a stud a^2 , which extends laterally from the said lever into position to engage the swinging bracket a , adjacent to which the lever is located. The said rod b extends downwardly and rearwardly from its point of attachment to the lever a' , and at its lower end is forked or provided with two prongs which extend at either side of the cam-shaft G^3 . Said cam-shaft is provided with a cam b^2 , arranged to act upon a stud or friction-roller b^3 upon said rod in such manner as to give endwise reciprocatory motion to the rod. The lower end of the rod b is sustained in position by engagement of its prongs with opposite sides of the shaft G^3 , as clearly seen in the drawings, Fig. 1. Oscillatory movement is given to the rock-shaft b' for the purpose of actuating the upper gripper-fingers d' by means of the endwise reciprocation of the rod b acting upon the lever a' . Bodily movement of the brackets a in such manner as to advance the fingers d through or to withdraw them from the sheet-stop d^2 is pro-

duced by the action of the stud a^2 , which, after the rock-shaft b' has been turned to lift the fingers d' , strikes the brackets a , and thereby enables the further movement of the rod b to swing both of said brackets backwardly a distance sufficient to withdraw the fingers d from the slots or apertures in the sheet-stop d^2 .

It will of course be understood that a suitable stop is provided to limit the movement of the swinging brackets a in a direction toward the sheet-stop, so that after the lower gripper-fingers d have reached their advance or working position further movement of the rod b will operate to turn the rock-shaft b' , and thereby carry the upper gripper-fingers into contact with the lower gripper-fingers to grip the sheet. This bodily movement of the fingers forming the gripping device away from the delivery-stop is for the purpose of withdrawing the lower fingers clear of the sheet after the sheet has been released in order to allow the latter to fall without obstruction upon the receiving-table.

The operation of the several parts described is as follows: The sheet, after having been gripped and carried around with the cylinder and in contact with the type, is discharged upon the stripping-fingers C and carried forward upon and by the tapes c' , and is delivered from the same to the fly-frame, which is then moving in a direction away from the impression-cylinder, such motion of the fly-frame being continued until the outer ends of the fingers D^2 reach a position adjacent to the sheet-stop, as shown in dotted lines in Fig. 1. At this time the upper gripper-fingers d' , which were lifted during the approach of the fly-frame toward the sheet-stop, are allowed to drop toward the lower gripper-fingers d through the action of the cam b^2 , thereby gripping the advanced edge of the sheet which in the outward movement of the fly-frame has been carried over said lower fingers. The sheet now being gripped by the fingers d and d' will be held from movement with the fly-frame as the latter is drawn backwardly, so that the sheet will be drawn from the fly-frame, and when the fly-frame passes beyond the sheet the latter will no longer be supported by said fly-frame and will be free to fall upon the receiving-table F . As the fly-frame is moving backwardly from over the delivery-table the cam b^2 acts upon the stud b^3 , and thereby moves the rod b in such manner as to turn the rock-shaft b' and lift the upper fingers d' , so as to release the sheet. The turning or rocking of the rock-shaft b' is continued until the stud a^2 acts against the swinging bracket a , and the further turning of the rock-shaft in the brackets a then being arrested the brackets themselves will be swung backwardly until the lower fingers d are drawn through the openings in the sheet-stop d^2 . The lower fingers will thus be withdrawn from beneath the edge of the sheet, and when the fly-frame has passed clear of the sheet the latter will

be free to fall upon the receiving-table F. The drawing or sliding of the sheet from the fly-frame can also be accomplished by the means shown in a separate application, Serial No. 144,070, filed September 26, 1884, upon which Letters Patent No. 419,593 were issued January 14, 1890. So far as the devices for carrying or moving the sheet from the impression-cylinder to the receiving-table are concerned, therefore, I do not desire to restrict myself to the particular construction shown in the guideways or strips for guiding the fly-frame in its motion toward and from the cylinder or to the means illustrated for giving movement to the said fly-frame, as other means for producing the same result may be obtained by the substitution of other features of construction for those named—as, for instance, the fly-frame may be moved by means of levers so arranged as to give a parallel movement or nearly parallel movement thereto.

The fly-frame may be made of either wood or metal, or a square frame having strings extending across it, or other form of fly-frame may be employed in place of the particular form shown in the drawings.

The impression-cylinder B will be provided with the usual sheet-lifters, such as are commonly used on such cylinders for lifting the advance edge of the sheet at the time the sheet-grippers release the same, so as to bring such advance edge of the sheet in position to be caught by the stripper-fingers C. Such lifting-fingers are not herein shown, the impression-cylinder being indicated in its main outline only and without the tympan-clamps, sheet-lifters, and other details ordinarily attached to such cylinder. As far as the employment of the reciprocating fly-frame in combination with the receiving-table and sheet-gripping devices thereon to hold the advance edge of the sheet and insure its delivery to the table is concerned I do not wish to be limited to the construction embracing the tape-carrying device, as in some instances the sheet may be transferred directly from the strippers to the fly-frame through the impetus given to it by the rapid motion of the cylinder. The construction which embraces such tapes is, however, in itself an important

and valuable one, because in many instances such tapes will be found necessary to secure the transfer of the sheet from the cylinder to the fly-frame—as, for instance, when the sheets are large or of thin paper—it being obvious that small and thick sheets might easily be delivered to the fly-frame directly from the cylinder when this could not be done with sheets which were larger or thinner and therefore more flexible.

I claim as my invention—

1. In a printing-press the combination with a reciprocating fly-frame and receiving-table, of a sheet-stop and a gripping device comprising horizontally-movable lower gripping-fingers adapted to extend through apertures in the stop, and vertically-movable upper fingers acting against said lower fingers, substantially as described.

2. In combination with a receiving-table and reciprocating fly-frame, of a sheet-stop, and a sheet-gripping device comprising horizontally-movable lower fingers and vertically-movable upper fingers opposed to the same, a horizontally-movable support for the said lower fingers, and a rock-shaft sustaining said upper fingers mounted upon said movable support, substantially as described.

3. In a printing-press, the combination of a receiving-table, means for delivering the printed sheets thereto, a sheet-stop, a gripping mechanism comprising horizontally-movable lower gripping-fingers adapted to extend through apertures in the sheet-stop, vertically-movable upper fingers, pivotally-supported brackets sustaining said lower fingers, a rock-shaft for supporting the fingers mounted in said brackets, a lever rigidly attached to the rock-shaft and provided with a stud adapted to engage one of said brackets when the shaft is turned in a direction to lift the upper fingers, and means acting on said arm to actuate the rock-shaft and brackets, substantially as described.

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

ROBERT MIEHLE.

Witnesses:

L. PETTERSON,
W. M. MORSE.