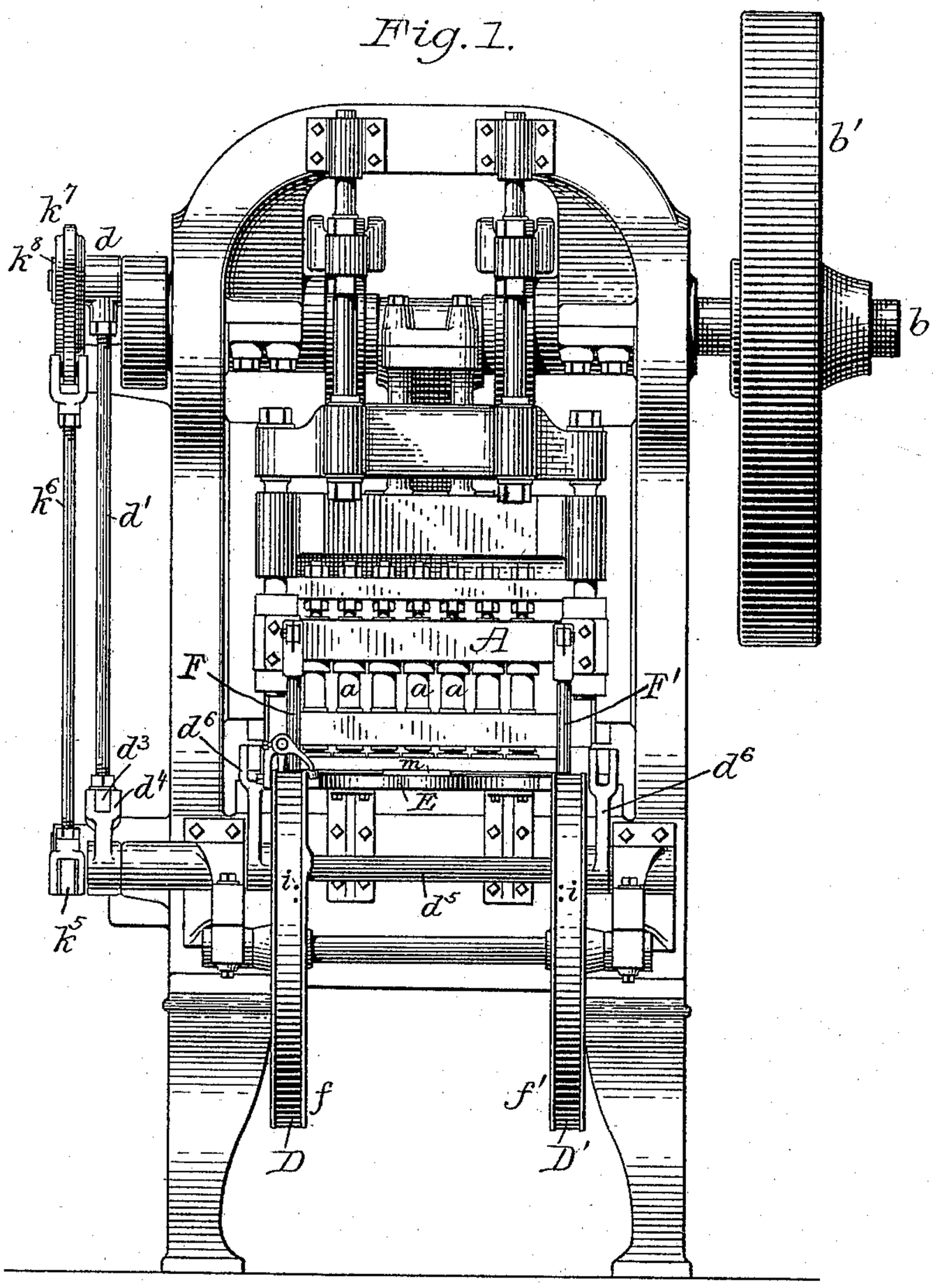
(No Model.) 5 Sheets—Sheet 1.

W. PAINTER.

SHEET FEEDING MECHANISM FOR PUNCHING MACHINES.

No. 605,334. Patented June 7, 1898.

Fig. 1.



Attest:
Howell Bartle.
Emma Marks

Inventor:
William Painter
By Wm. C. Hoyt
Attorney.

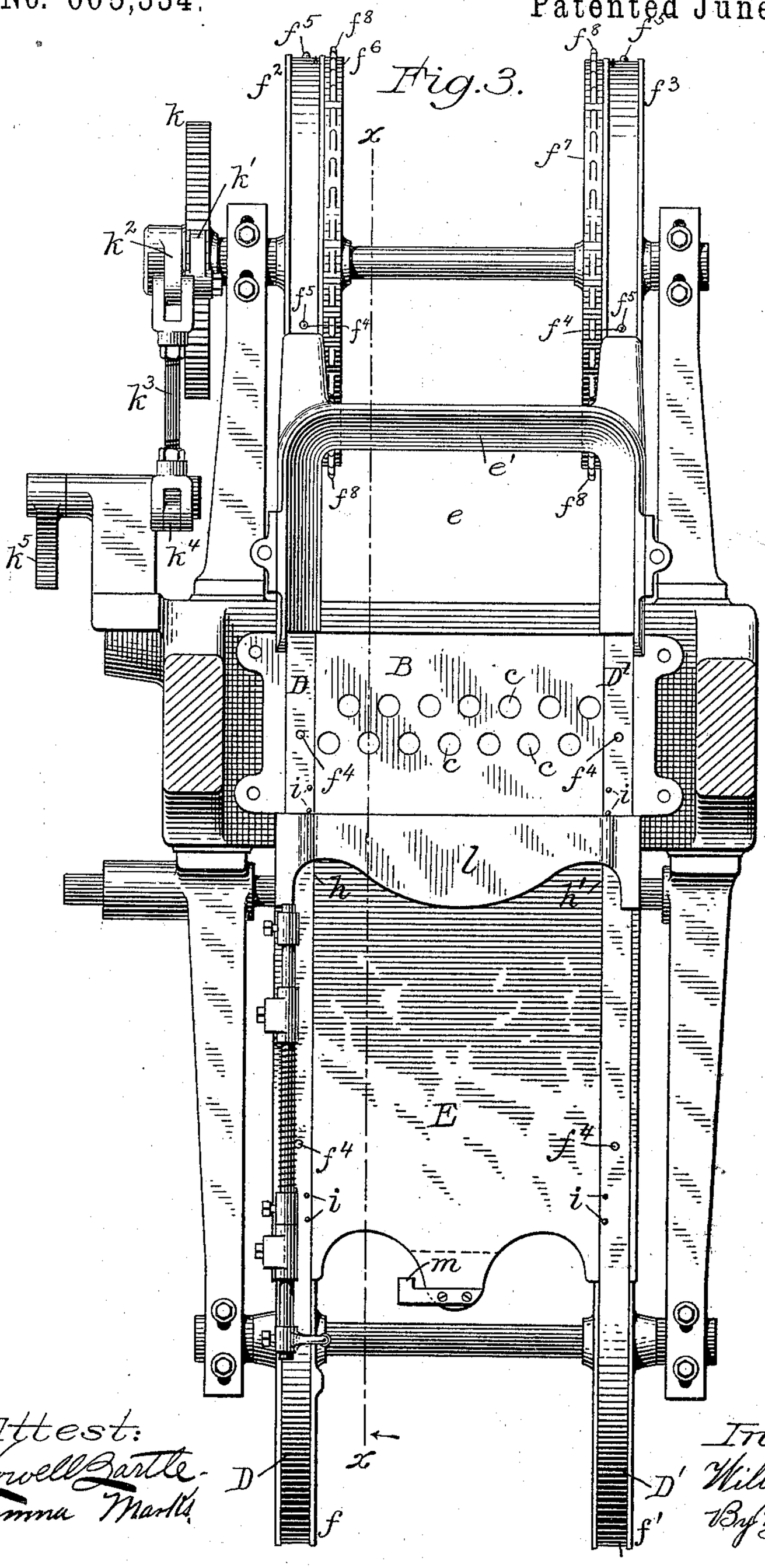
(No Model.) 5 Sheets—Sheet 3.

W. PAINTER.

SHEET FEEDING MECHANISM FOR PUNCHING MACHINES.

No. 605,334. Patented June 7, 1898.

Fig. 3.



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(No Model.) 5 Sheets—Sheet 4.

W. PAINTER.

SHEET FEEDING MECHANISM FOR PUNCHING MACHINES.

No. 605,334. Patented June 7, 1898.

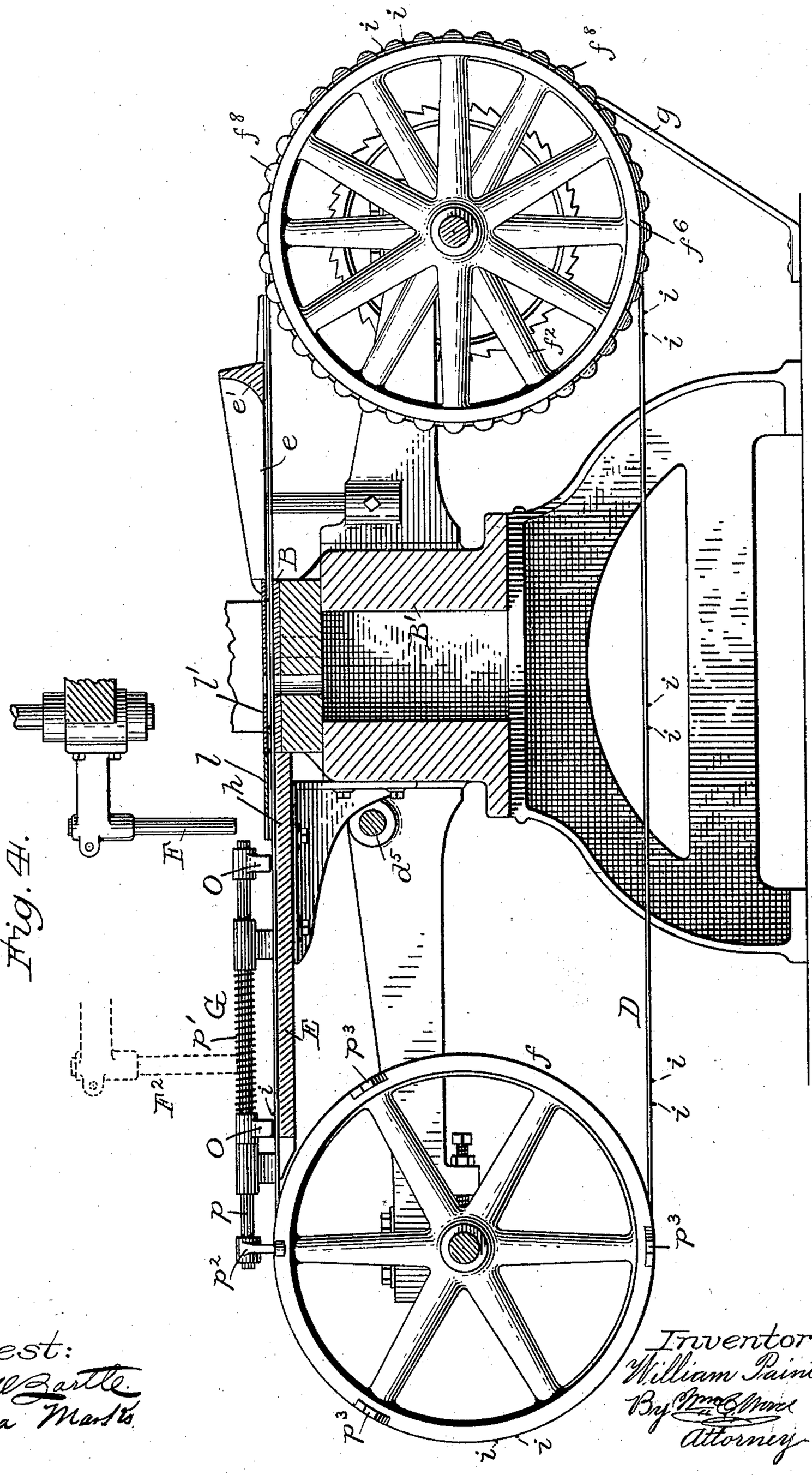

Fig. 4.

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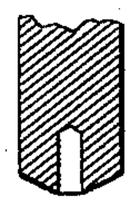
(No Model.) 5 Sheets—Sheet 5.

W. PAINTER.

SHEET FEEDING MECHANISM FOR PUNCHING MACHINES.

No. 605,334. Patented June 7, 1898.

Fig. 5.



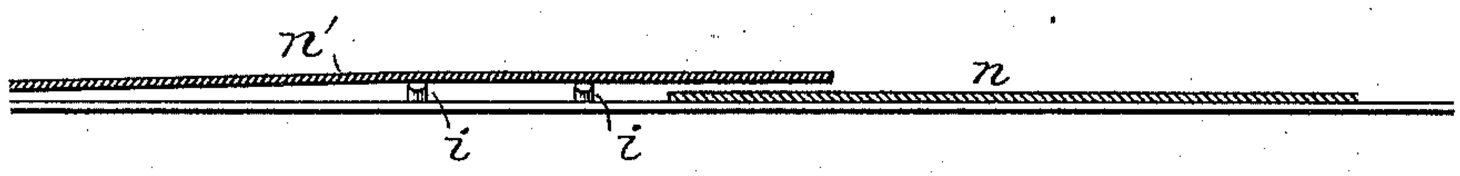


Fig. 6.

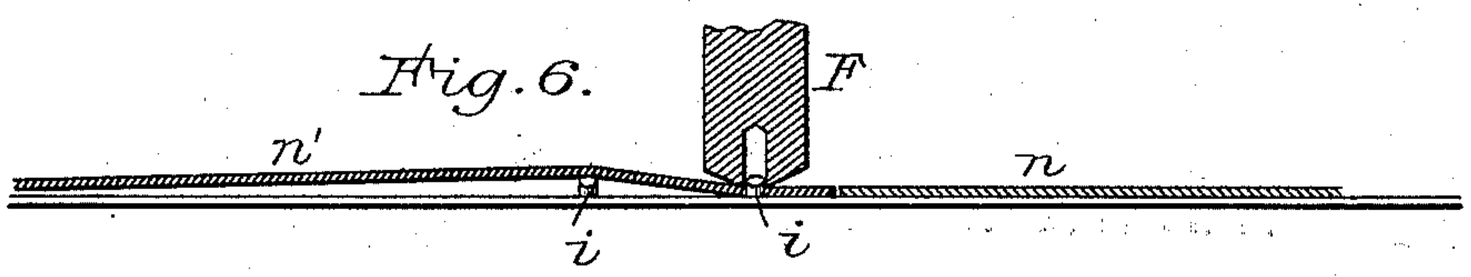


Fig. 7.

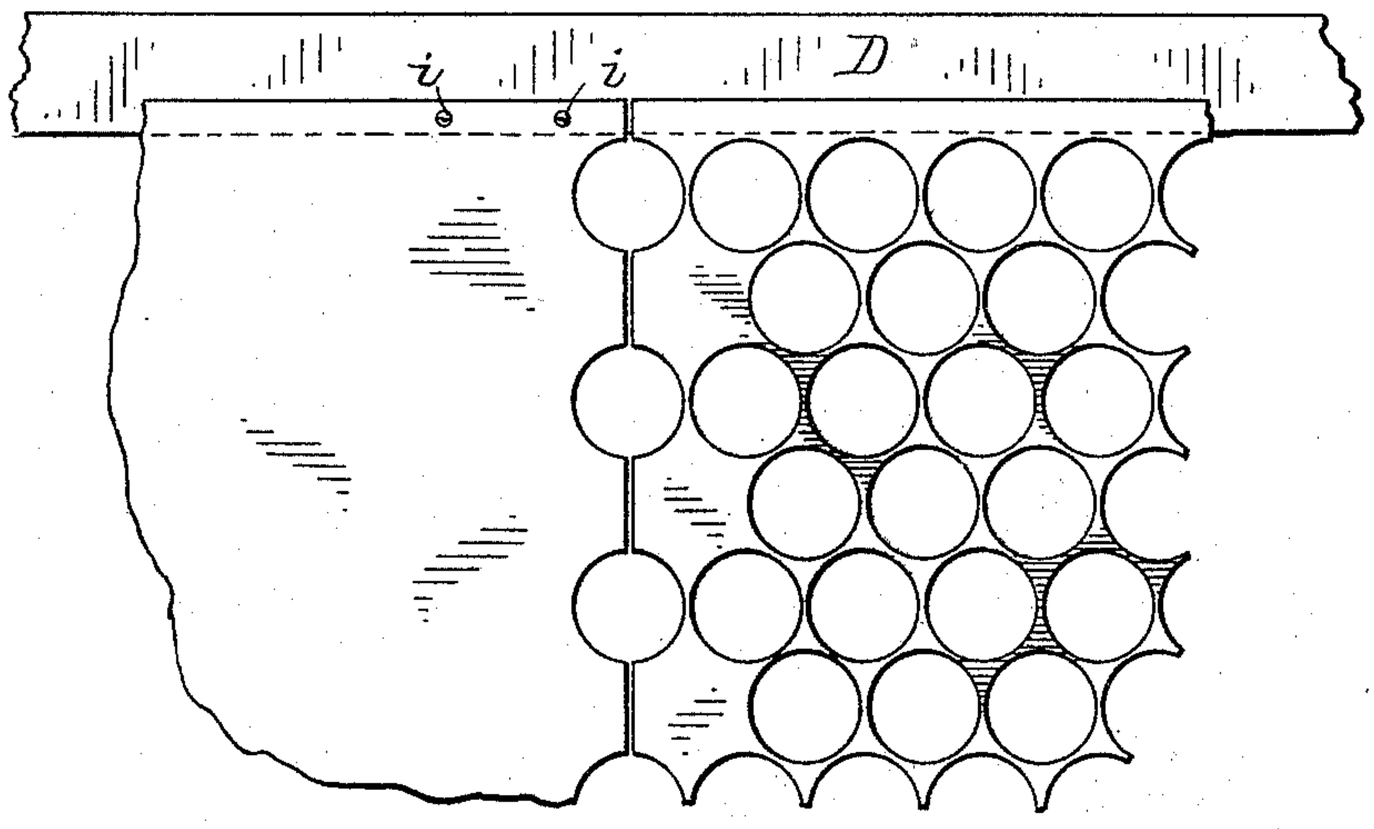


Fig. 8.

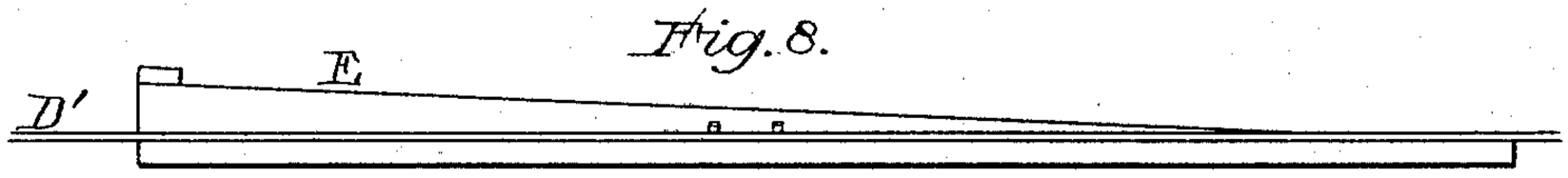
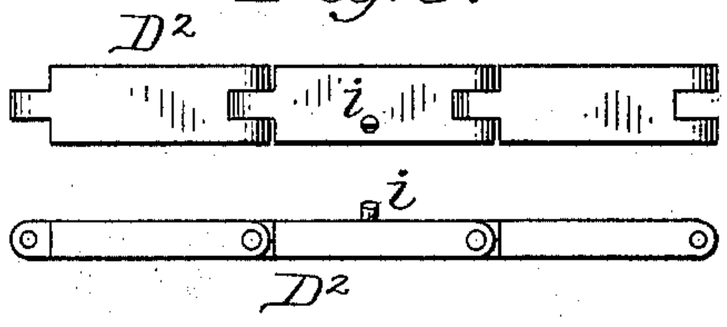


Fig. 9.



Attest:
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Emma Marks.

Inventor:
William Painter
By Wm C Ward
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM PAINTER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE CROWN CORK AND SEAL COMPANY, OF SAME PLACE.

SHEET-FEEDING MECHANISM FOR PUNCHING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 605,334, dated June 7, 1898.

Application filed May 24, 1894. Serial No. 512,313. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM PAINTER, of the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Sheet-Feeding Mechanism for Punching-Machines, &c.; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

My said improvements relate to that class of machines which are relied upon for working on sheeted materials, and especially sheet metal—as, for instance, in the cutting or punching therefrom of disks or other forms generally for use as blanks to be operated upon in other machines or in the same machine for forming them into definite shapes, and more especially to such machines as embody gangs of simple or complex dies with appropriate plungers. Sheet metal, of which tin-plate is a common type, is only available in sheets varying in size, which are usually fed by hand successively to the machines which are relied upon to perform the particular duty required. As a rule, gang-dies are "staggered" with a view to saving stock, and in the operation of such machines there is usually more or less waste in stock at the two ends of the sheet because the cutting-dies operate so nearly to the ends as to overlap at the end of the sheet and produce imperfect blanks.

It is important for saving time that a gang of dies should, as far as may be possible, continuously operate in their regular order, notwithstanding the production of imperfect blanks, as it is well known that cutting dies and plungers are subjected to severe and objectionable strains and to undue wear whenever the metal on which they are working does not fully cover the opening in the die, and for that reason it is important that the rear end of a retiring sheet of metal should be quite closely followed by the forward end of the succeeding fresh sheet, thus so covering the opening in the die or row of dies that the several imperfect blanks will be simultaneously cut at each die from portions of both metal sheets. In machines embodying two or more rows of staggered plungers coöperating with appropriate dies it is important that the feeding movement of the sheets of metal should be positively and accurately accomplished not only in the matter of time, but also as to extent of movement, so that the waste metal may be reduced to a minimum between the several rows of holes cut in the sheet by the dies and plungers.

In many instances it is desirable that the cut or stamped tin products should be ornamented—as, for instance, by color printing—and in many cases it would be impracticable to print upon the products of such machines because of their varied surface conformation and also because of the expense incident to printing them separately piece by piece, and hence it is an important matter that such printing should be done in multiple impressions upon the entire flat surface of the metal sheet from which the desired products are to be cut and formed. In the presentation of such printed sheets to cutting and punching dies it is obvious that there must be a perfect registration of the printed portions of the sheet with the several dies and their plungers in order that the printed subject may be symmetrically located upon the finished product in each instance.

It is the object of this invention to provide in such a machine for positively feeding sheets thereto in accurate register with printed matter previously applied in repetition to the sheets and to insure the leading edge of each sheet following closely or approximately in contact with the trailing edge of a previous sheet for the purposes described. I previously prepare the sheets by trimming the ends square with one of the side edges to a uniform length before printing upon them.

In providing for gaging the plates sidewise it will be understood that although the side edges of sheets may be of irregular contour, if some two points in one and the same edge of every sheet be uniformly taken as contact-points for side gages, first in the machine for trimming the end edges, next in the printing-machine, and finally in the punching-machine, with a single end gage in the printing and punching machines, the sheets, with their ends trimmed to uniform length, may be gaged

the sheet-metal plates control the waste stock in its passage from the machine, a stripper *g* being relied upon for releasing the waste from the lugs, as well as from certain feeding-studs, to be hereinafter described, in the event of undue retention.

At the front end of the machine, as shown in Figs. 3 and 4, there is a flat bed E, which is in the plane occupied by the surface of the die-plate B, and said bed affords near its sides bearing-surfaces for said bands, and similar practically continuous bearing-surfaces are afforded by the die-plate B, if the latter be shortened, (crosswise of the machine,) then the adjacent bearing-surfaces would be afforded either by a portion of the side frame-plates of the machine or by the base-block B′, which underlies the die-plate.

Two oppositely-located portions of the bearing-surfaces on the bed E, as at *h h′*, Fig. 3, serve as anvil-blocks in conjunction with the socket-punches F F′, which are pendent from brackets or arms extended from and attached to the cross-head A, so that they reciprocate vertically in lines which enable them to cooperate with certain more or less numerous sheet-feeding studs *i*, which are attached to the bands and are appropriately located, so that although the socket-punches may occasionally be forced upon the top of a metal sheet between said feeding-studs they will at proper times register with said studs and cause them to perforate the metal sheet and practically unite it to said bands. These feeding-studs are preferably provided with chisel-edge tips. The metal sheets, being cut to uniform length and the ends squared with one side, do not require to be thus held to and by the bands and feeding-studs at more than two points, preferably adjacent to the front corners of the sheets; but any number of such feeding-studs may be employed without in any manner departing from my invention.

The intermitting movement of the bands is effected by means of ratchet-and-pawl mechanism, the power being preferably applied to the shaft which is common to the rear band-pulleys f^2 f^3, and whereon there is a ratchet-wheel *k*, engaged by one or more pawls, as at *k′*, on a pivoted arm k^2, connected by an adjustable link k^3 to a rock-shaft with arms k^4 k^5, the latter being coupled by an adjustable link k^6 to a vibrating arm k^7, which is pivoted to the frame of the machine and is provided with a slot occupied by a sliding block k^8, swiveled on the pin of the crank *d* on the main shaft *b*.

In front of the die-plate B and crosswise of the machine above the bed E there is a head-plate *l*, between which and the bed space is provided for the endwise insertion of the sheets of metal. Should a metal sheet chance to be bent or curved laterally, the head-plate will necessitate its being flattened before its end can enter the receiving-space, and at all times said plate prevents the front edges of metal sheets from abutting against the edge of the usual stripper-plate *l′*, which overlies the die-plates and is perforated for the passage of the plungers.

At the front end of the feeding-bed E there is a detachable gage *m*, against which the rear end of each metal sheet is made to abut in order to locate the front end of the sheet in its proper position to be secured to the bands by the socket-punches and feeding-studs when they next register for coöperative action.

The metal sheets are delivered singly to the machine by hand, the front end being slipped under the head-plate and then the rear end placed in contact with the gage *m*, and this may be done at any time after the preceding sheet has been secured upon the pins *i*, thus giving the operator ample time to handle and place the successive sheets.

In Fig. 5 a socket-punch F is shown in an elevated position. A partly-worked metal sheet *n* is about to pass its rear end beyond the overlying front end of a fresh metal sheet *n′*, this latter being stationary and in proper position because its rear end is against the gage *m*. Now when the feeding-studs *i* (or the front studs of the pairs here shown) register with the socket-punches the lower metal sheet *n* will have passed beyond the upper sheet *n′*, as shown in Fig. 6, and then the socket-punches descend and force the feeding-studs through the metal sheet, and if the feeding-studs are in pairs, (on each band,) as shown, then at the next descent of the socket-punches the metal sheet will be further fastened to the bands; but this is not at all essential because a perfect control over each sheet will be afforded by two studs, one on each band, and especially when arranged to puncture the sheet near its front corners. The arrangement of the feeding-studs and the gage, as here shown, causes the adjacent edges of each two sheets to be operated upon by one line of the die-punches, as is clearly indicated in Fig. 7.

I have devised an automatically-operated gage, as at G, which at regular intervals presents gaging contacts against the proper edge of each metal sheet and then retires said contacts, the sheet thereby having been properly located sidewise for receiving the feeding-studs in such a manner that the sheet will be carried over the dies and properly register each printed portion therewith. This gage G has two gaging-contacts O O, afforded by two short arms pendent from a rock-shaft *p*, mounted in bearings at one side of the bed E and provided with a spring *p′*, which maintains the contacts normally in a retired position. At one end of said rock-shaft there is a pendent tappet-arm p^2, which carries a roller caused by said spring p^2 to normally bear against the inner side of the rim of one of the band-pulleys, as clearly shown in Fig. 4. Said pulley has on its side rim three lugs, p^3, which in this instance are separated from each other by a space on a curved line, which

is slightly greater than the length of the metal sheets to be worked. When a metal sheet lies on the bed with its rear end against the gage *m* and the socket-punches are about to coöperate with the feeding-studs, the gage-contacts O O are swung inwardly to the exact point required for properly locating the sheet, whereupon the socket-punches effect the union of the sheet to the bands. It will of course be understood that these gage-contacts O O correspond as to the distance from each other and in their relative positions to the gage *m* with similar gaging and contact points in the sheet-printing machine, and hence an exactly-duplicated registration is accomplished.

It is now to be understood that although continuous steel feeding-bands are in every way superior to jointed or endless chain-like bands the latter may be employed without departure from certain portions of my invention—as, for instance, when constructed as shown in Fig. 9. In this case the band D^2 is composed of flat links hinged together and having the feeding-studs *i* appropriately located upon some of the links. It will be obvious, however, that the use of the continuous or jointless bands obviates such progressive variations in length as would be incident to wear at each of the several joints of a sectional link-band.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a sheet-feeding mechanism, the combination substantially as hereinbefore described, of a feeding belt or belts provided with upwardly-projecting feeding-studs, capable of puncturing the material to be fed, and a reciprocating socket punch or punches coöperating with said studs for forcing them through, and into controlling engagement with each sheet of the material.

2. In a sheet-feeding mechanism, the combination substantially as hereinbefore described, of a pair of parallel endless bands provided with upwardly-projecting feeding-studs; means for intermittingly moving said bands; and a pair of socket-punches reciprocated toward and from said studs, the organization being such that when said studs and punches register with each other, the studs will be forced through a sheet of material resting theron thereby uniting the sheet at its side edges to said bands.

3. In an organization wherein sheets of material are to be intermittingly fed to tools adapted to operate thereon, the combination with intermittingly-operated sheet-feeding bands provided with puncturing-studs, of coöperating socket-punches, a stationary sheet-supporting bed between said bands, a stationary end gage and side edge gages, the organization being such, that when a sheet of material has been placed upon said bed, the side gage will present gaging-contacts against one side edge of the sheet, the latter will be properly located with relation to the puncturing-studs, and enable the socket-punches to force said studs through the sheet of material at precisely accurate points for assuring a proper delivery of the sheet to the tools.

4. In an organization wherein sheets of material are to be intermittingly fed to tools adapted to operate thereon, the combination with intermittingly-operated sheet-feeding bands provided with punching-studs and of coöperative socket-punches, automatically-operated side edge gages substantially as hereinbefore described, the organization being such, that when a sheet of material has been fed to said gages previously retired from their gaging position, they will be automatically restored to the gaging position before the engagement of the socket-punches with the punching-pins.

WILLIAM PAINTER.

Witnesses:
T. R. ALEXANDER,
ORRIN C. PAINTER.

(No Model.)

F. X. PAYMENT & J. C. HARTIG.

WINDOW FRAME.

No. 605,335. Patented June 7, 1898.

Fig. 1.

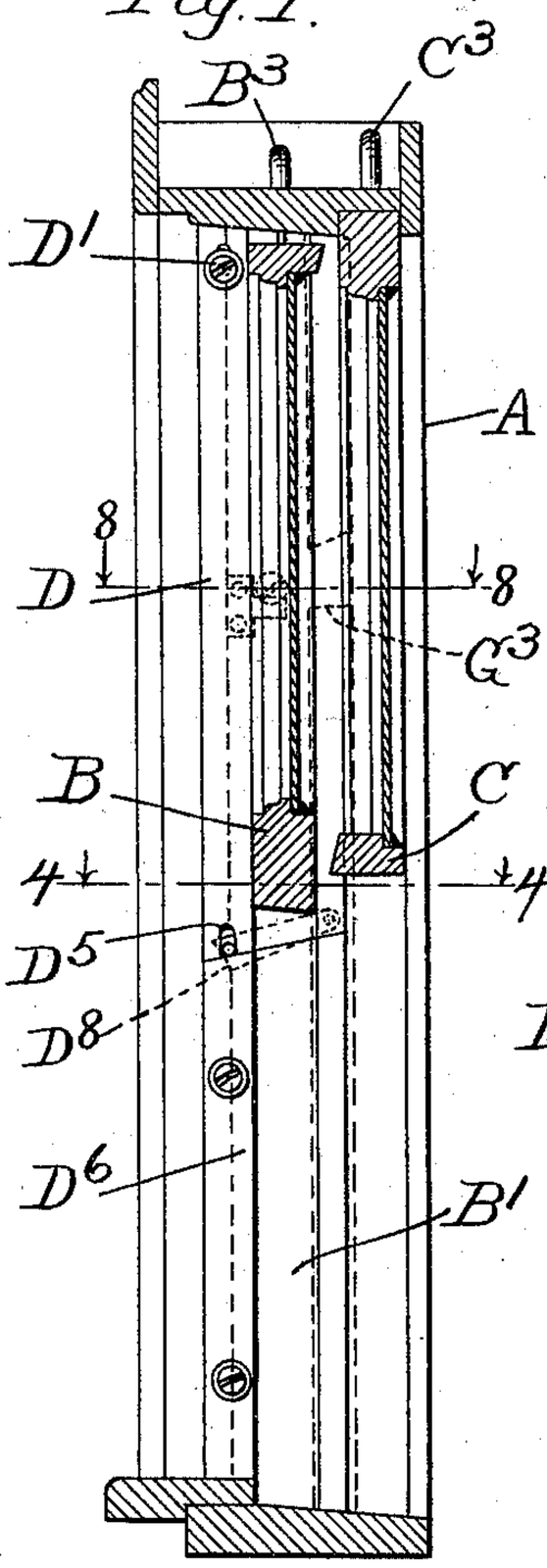


Fig. 2.

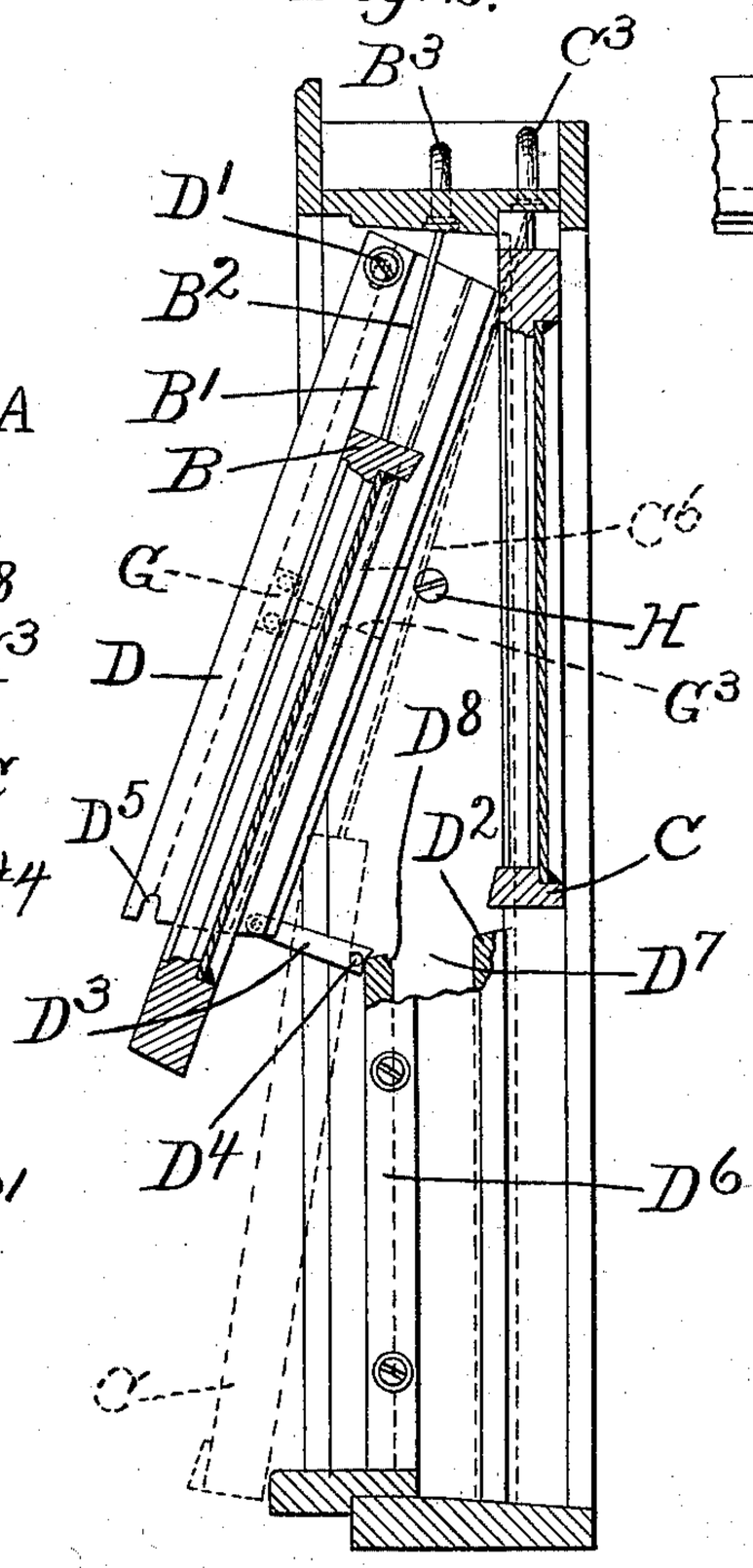


Fig. 3.

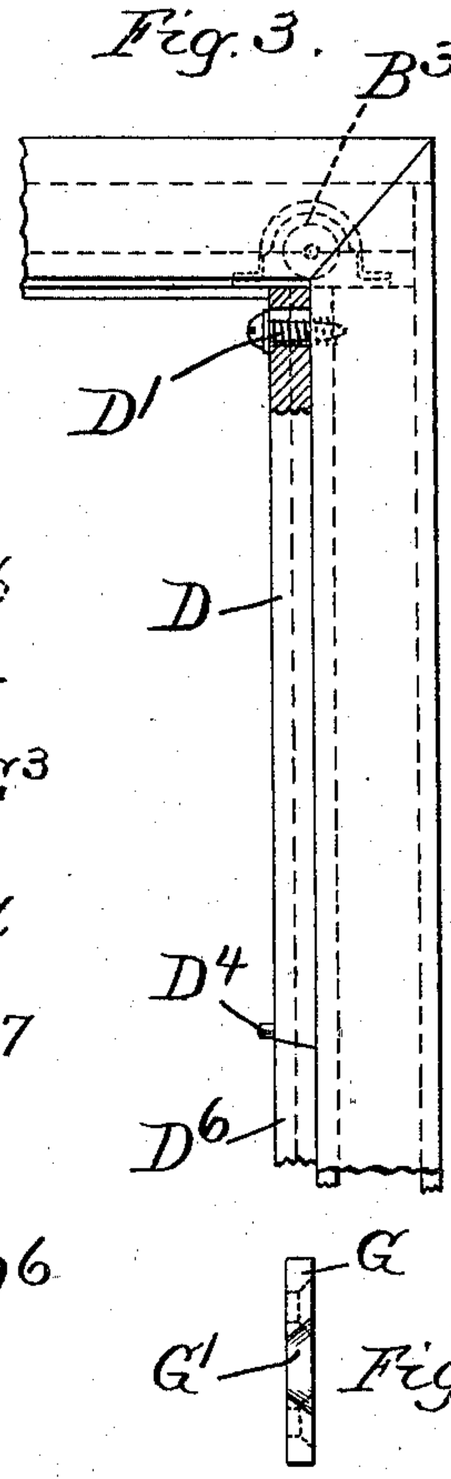


Fig. 9.

Fig. 4.

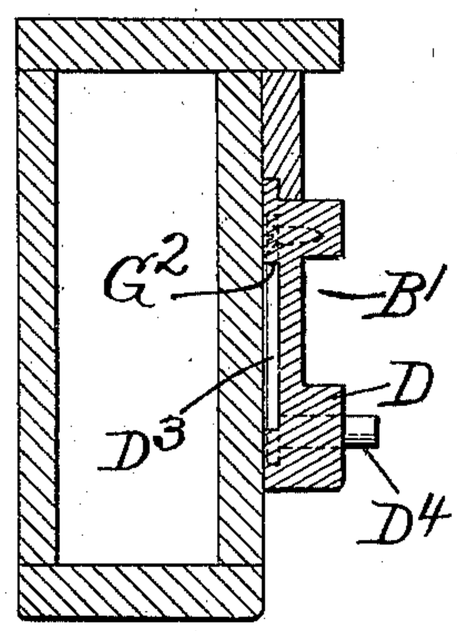


Fig. 5.

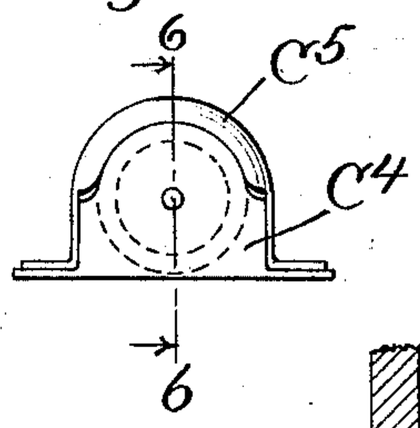


Fig. 6.

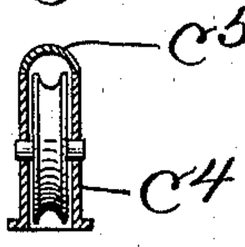


Fig. 7.

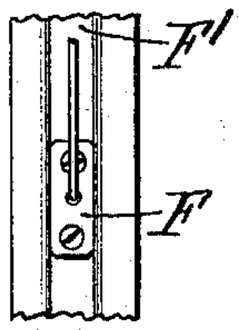
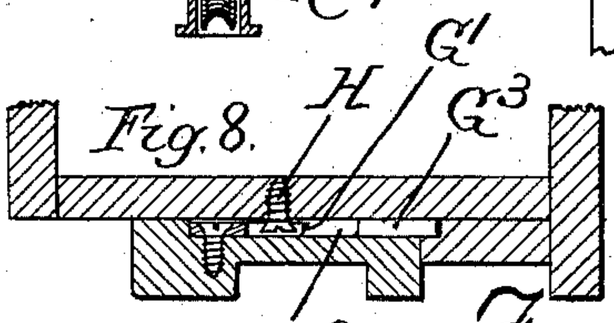


Fig. 8.



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