898,445.

A. B. DICK.

PRINTING MACHINE.

APPLICATION FILED JAN. 10, 1906.

Patented Sept. 15, 1908.

4 SHEETS—SHEET 1.

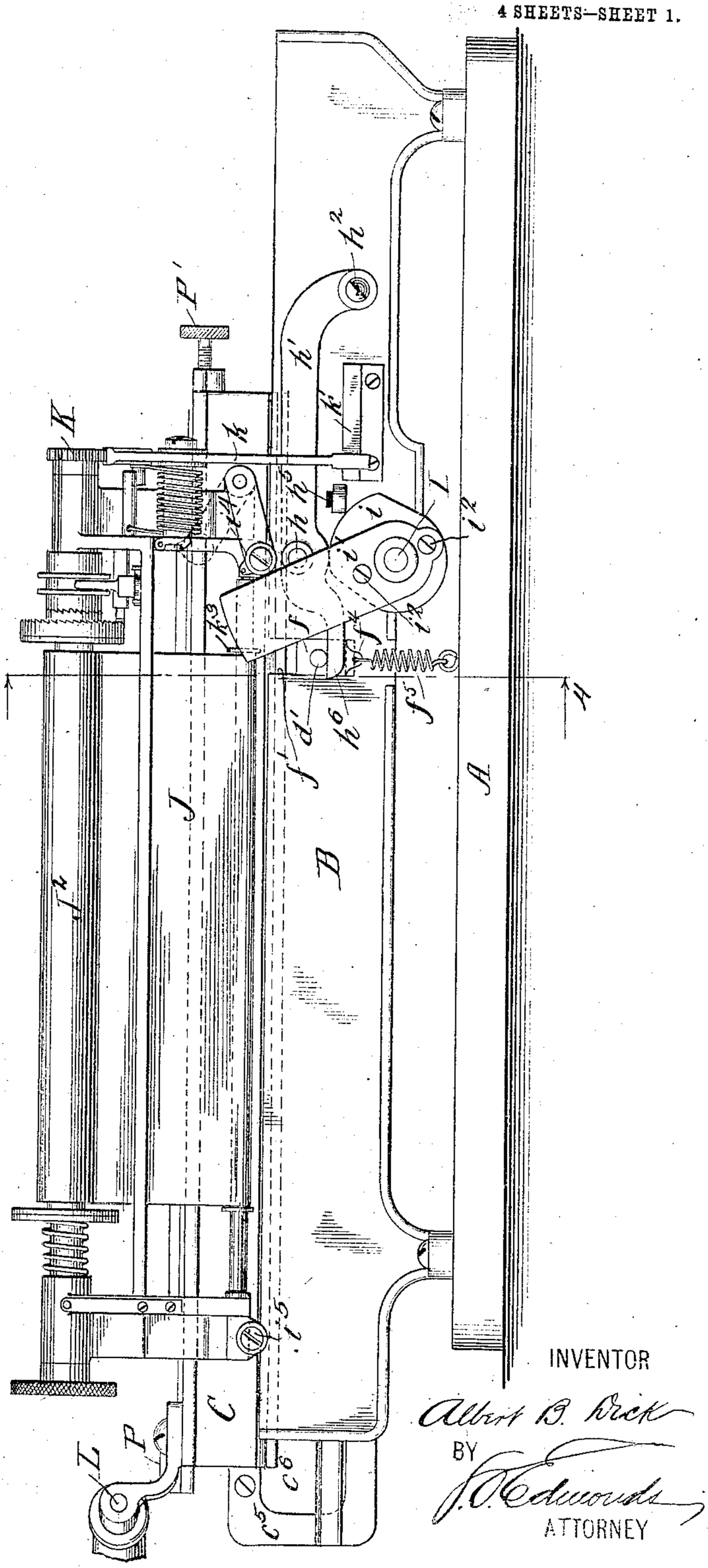

Fig. 1.

WITNESSES:

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W. J. Edwards.

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4 SHEETS—SHEET 2.

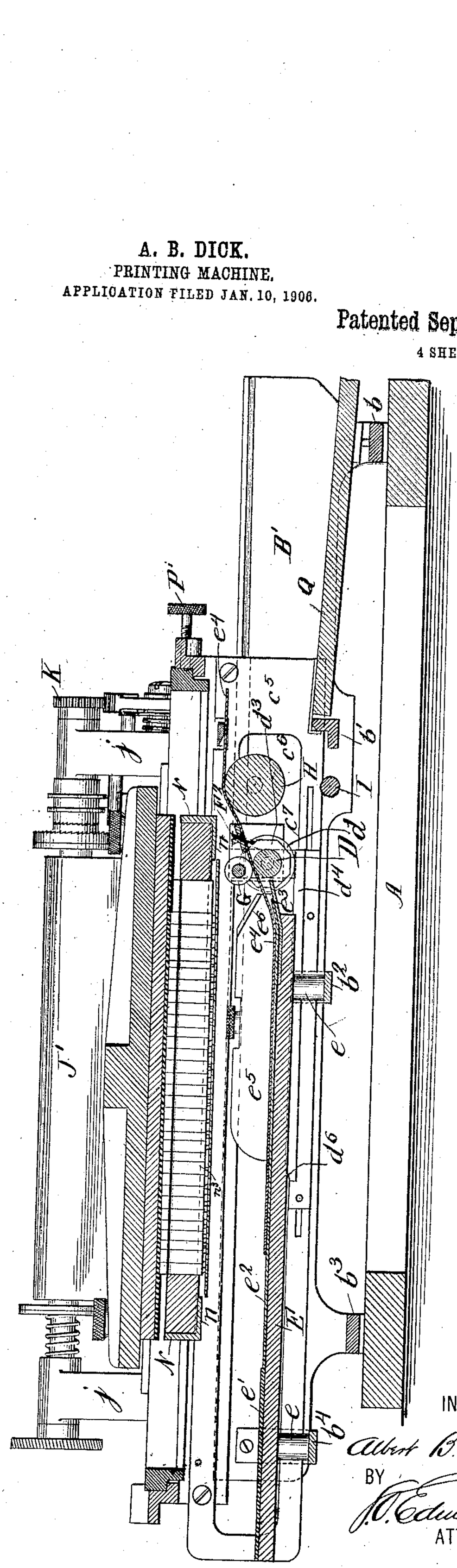

Fig. 2.

WITNESSES:

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4 SHEETS—SHEET 3.

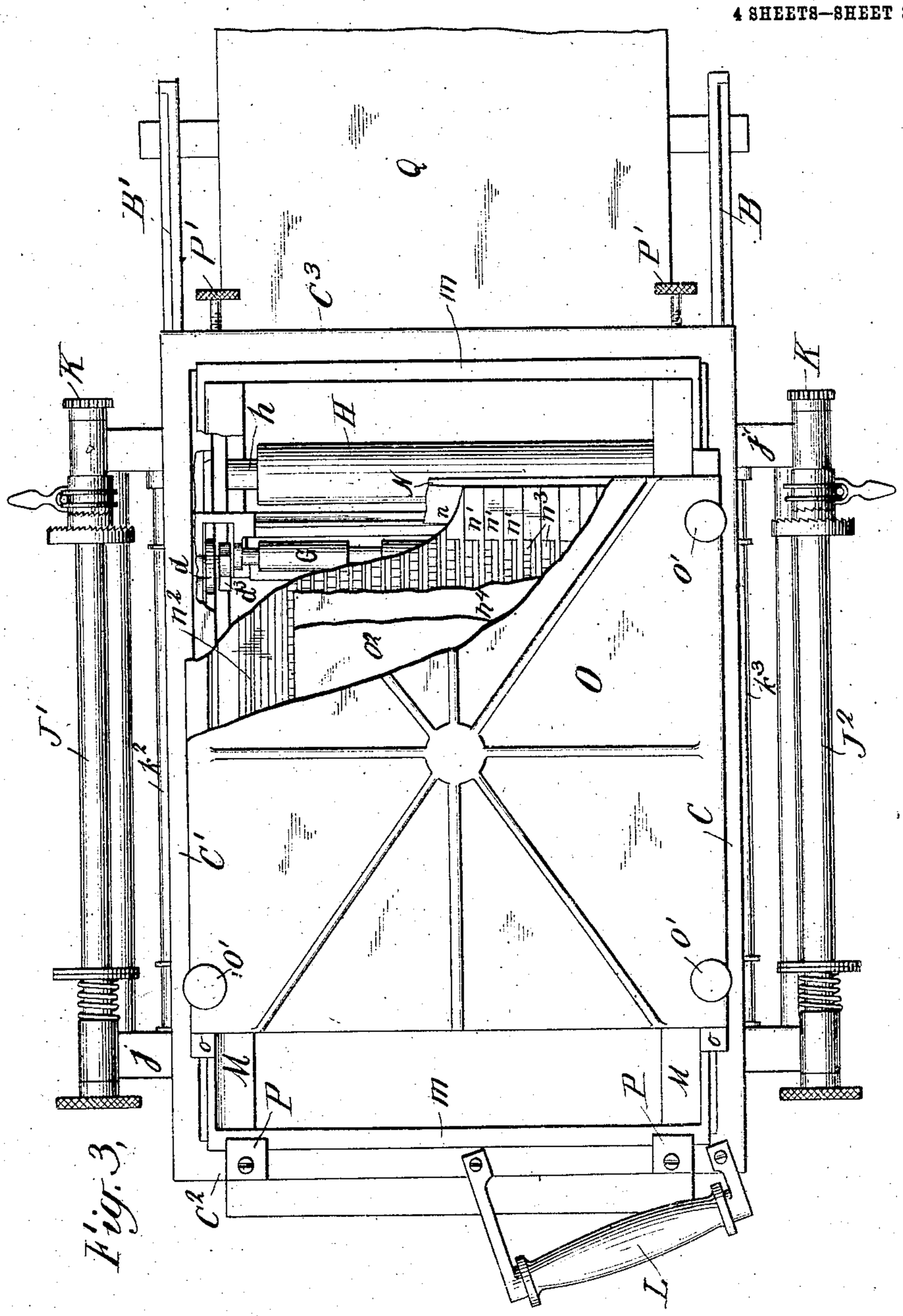

Fig. 3.

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4 SHEETS—SHEET 4.

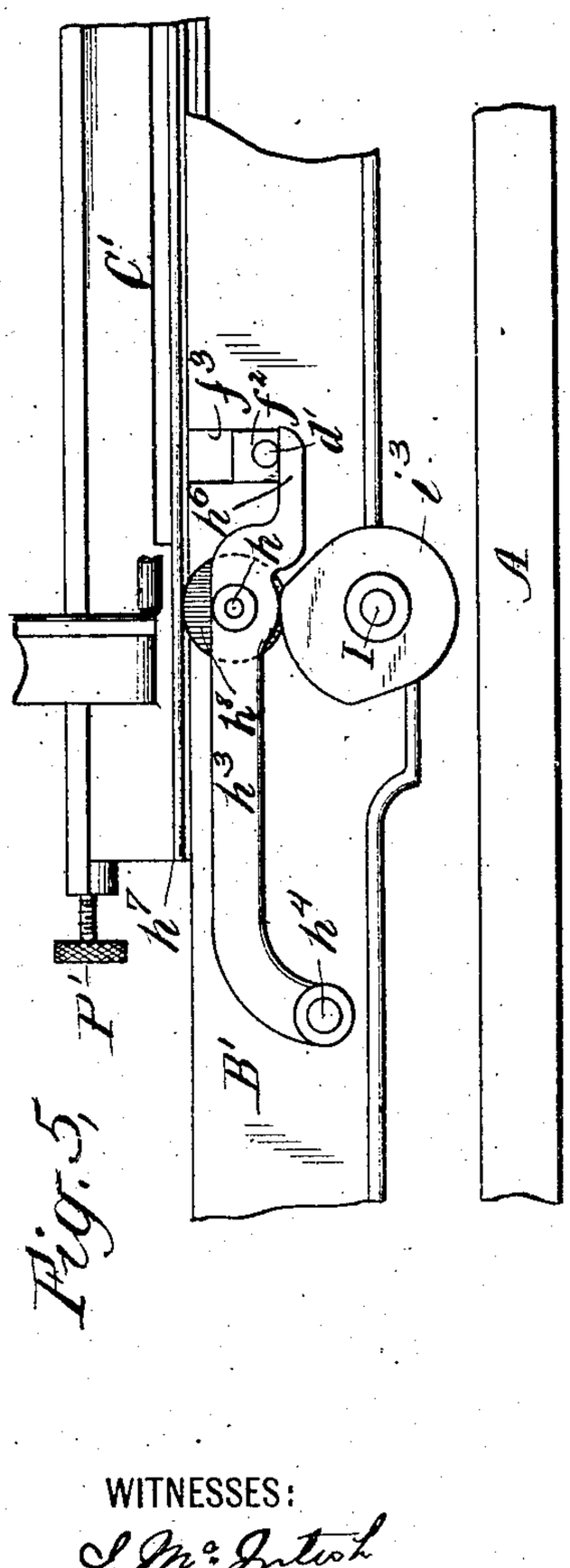

Fig. 5.

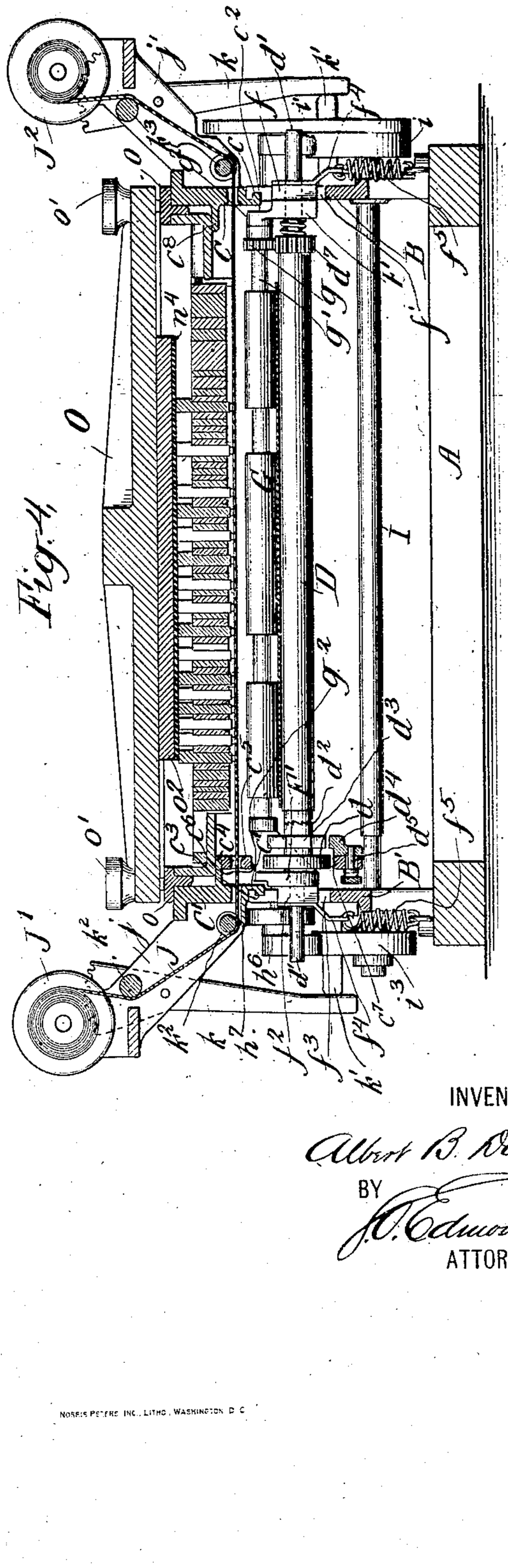

Fig. 4.

WITNESSES:

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H. E. Edmonds.

INVENTOR

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H. E. Edmonds

ATTORNEY

UNITED STATES PATENT OFFICE.

ALBERT B. DICK, OF LAKE FOREST, ILLINOIS, ASSIGNOR TO A. B. DICK COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PRINTING-MACHINE.

No. 898,445. Specification of Letters Patent. Patented Sept. 15, 1908.

Application filed January 10, 1906. Serial No. 295,423.

To all whom it may concern:

Be it known that I, ALBERT B. DICK, a citizen of the United States, residing at Lake Forest, in the county of Lake and State of Illinois, have invented a certain new and useful Improvement in Printing-Machines, of which the following is a specification.

This invention relates generally to printing mechanism for producing multiple copies, and although not limited thereto is designed more particularly for that type of printing mechanism in which is employed a type-form, the type faces being arranged in a single plane and such form being supported in a suitable carriage which is reciprocated, as the paper is fed, to bring the same into coaction with the face of said form.

The object of the invention, broadly stated, is to produce a simple, durable and highly efficient apparatus of this general character.

In carrying out the invention, I employ a suitable stationary frame, upon which operate a carriage supporting the type-form, and in addition an inking device, of which an inked ribbon is a convenient form. Supported in the frame, is a pressure-roller, movable to operative and inoperative positions, and intermediate of said roller and the reciprocating carriage I employ mechanism, preferably controlled by the operation of the latter, for moving said pressure-roller to operative position during the operative movement of said carriage and its type-form, and to inoperative position upon the return of such carriage and its type-form to the original point. Supported also preferably by said frame, I employ means for successively giving to the impression-sheets to be imprinted upon an initial movement, such movement terminating at the point where, due to the coaction of the type-form and the pressure-roller, the sheets are successively fed through the machine while being so imprinted upon.

A preferred form of the invention is illustrated in the drawings, in which

Figure 1 is a side elevation; Fig. 2 is a central longitudinal section; Fig. 3 is a plan view; Fig. 4 is a cross-section on the line 4—4 Fig. 1, certain parts being omitted for clearness; and Fig. 5 is a detail view, hereinafter to be referred to.

Referring to these drawings, A designates a suitable base, upon which the machine may be secured. The frame of such machine comprises the side members B, B′, and these may be connected, if desired, by cross-bars b, b', b^2, b^3 and b^4. Coacting with the side members B, B′, is the carriage which supports the type-form and ink-ribbon, and which carriage includes the side members C, C′, provided with downwardly and outwardly turned ribs c, c', which coact with grooves or rabbets c^2, c^3, formed on the internal faces of the side members B, B′, of the frame, near their upper edges.

c^4 designates an inwardly extending bracket secured to or formed integral with the member C′ of the carriage, and to this is secured a depending plate c^5 provided with an elongated slot c^6. That portion c^7 of the plate c^5 bounding the lower extremity of the slot c^6 serves as a driving rack or other surface for the sheave d presently to be described, the same being preferably milled or otherwise roughened for coaction with said sheave, the surface of the latter being preferably of an elastic material such as rubber.

E designates a feed-board, here shown as mounted upon studs e carried by the cross-bars b^2, b^4, and preferably faced with rubber at e' at its outer end and with a smooth and non-elastic material e^2 forward of such rubber facing. The extreme forward end of the feed-board is preferably provided with a slightly upturned lip e^3 for coaction with the impression-sheet e^4. Said feed-board may be provided with adjustable side-guides e^5 having inturned forward edges e^6.

F designates a bracket arranged close to the internal face of the side member B of the frame and having a journal bearing f operating in a vertical plane within a suitably-shaped slot f' in said member. F′ designates a generally similar bracket arranged adjacent to the internal face of the side member B′ of the frame and having a journal bearing f^2 operating in a vertical plane in a suitably shaped slot f^3 in said member. Each of said brackets is here shown as provided with an ear f^4, to which is connected one end of a coil-spring f^5, the other end whereof is secured to the base A so as to exert downward pressure upon said brackets and journal bearings.

D designates the lower feed-roll, the shaft d' whereof is mounted in the journal bearing f, f^2, and extends through the same, projecting beyond the machine on either side. Said roll is provided with a suitable clutch d^2,

whereby the same may be positively driven, as hereinafter described, for the feeding operation, but free after such positive driving to be rotated by the continued movement of the impression-sheet. The sheave d is secured upon the shaft of said lower feed-roll D, its periphery coacting, as above stated, with the milled surface c^7 of the depending plate c^5. Said shaft also carries a polygonal wheel d^3, the periphery whereof coacts with a cam d^4 adjustably secured, as by means of set-screw d^5, to the internal face of the depending plate c^5, the forward end of said cam being beveled, as shown at d^6. As, therefore, the carriage is moved toward the left (Fig. 2), the sheave d, coacting with the milled surface c^7, is positively driven thereby until the beveled end d^6 of the cam d^4 comes in contact with the polygonal wheel d^3, when said wheel, riding on said cam d^4, raises the sheave d out of contact with said milled surface c^7, thereby bringing said sheave and the shaft on which it is mounted to rest except to such extent as said shaft may thereafter be rotated by the pull of the sheet which has been fed over the same. Said lower feed-roll D or its shaft d' is here shown as provided with a pinion d^7, which meshes with a similar gear g on the shaft g' of upper feed-roll G, which may be sectional (as shown) or continuous from end to end. The roll D is preferably of metal or metal-covered, while the roll G is preferably of rubber or rubber-covered. The shaft g' is journaled in ears g^2, preferably formed integral with the brackets F, F'. For greater rigidity, I prefer to connect the brackets F, F' by means of cross-bar F^2, below which the impression-sheet e^4 may pass after it has been fed between the rolls D and G.

H designates the pressure-roller, the shaft h of which projects through vertical slots in the side members B, B', of the frame. One end of said shaft h is journaled in a suitable bearing in the arm h' hinged at h^2 to the side member B, the other end of said shaft being journaled in a suitable bearing in the arm h^3 hinged at h^4 to the side member B'. One or both of said hinged arms h', h^3, may be provided with a buffer h^5. Each of said arms is provided with a toe h^6 directly underlying the extremities of the shaft d' of the lower feed-roll D, the purpose whereof will presently be explained.

Underlying the shaft h of the pressure-roller H, is another shaft I, journaled at its ends in fixed bearings in the side members B, B', of the frame and projecting therethrough. Outside the side member B of the frame, there is keyed to said shaft I a cam i, and in addition a cam-lever i', which may also, if desired, be secured to the cam I, as by screws i^2. Outside the side member B' of the frame, said shaft I is also provided with a cam i^3 (see Fig. 5). Both these cams i and i^3 coact with the hinged arms h'. h^3, in the manner indicated in Figs. 1 and 5. As the cam arm i' is thrown toward the left (Fig. 1), the cams i, i^3, operate to raise the hinged arms h', h^3, and therefore the pressure-roller H carried thereby. And through the engagement of the toes h^6 with the ends of the shaft d' the lower and upper feed-rolls D, G, and their brackets and other mechanism are correspondingly elevated. This throwing of the cam-arm i' and consequent elevation of the several parts referred to is effected by means of a stop i^4 borne by the type-carriage. Said type-carriage is also provided with another stop i^5 at its opposite end, which also coacts with said cam-arm i'. It will thus be seen that as the carriage is moved toward the right, Fig. 1, the coaction of the parts i^5 and i' causes the depression of both the feed device and the pressure-roller, while the movement of the carriage toward the left, Fig. 1, and the consequent coaction of the parts i^4 and i' causes the elevation of said pressure-roller and feed device, as above indicated.

I prefer that the shaft h of pressure-roller H be positively driven, and also that the movement of the same commence prior to the moment of coaction of the type-form (presently described) therewith, in order that such movement may be under way at the time it is actually utilized. I, therefore, provide said shaft h, outside the side member B' and between the same and the hinged arm h^3, with a sheave h^8, the periphery whereof engages with a rib h^7 supported upon the side member C' of the carriage. As the carriage is moved toward the left, Fig. 1, and as the coaction of the stop i^4 with the cam-arm i' raises the pressure-roller H to operative position, the sheave h^8 (which may be of rubber or rubber-covered) is brought into coaction with said rib h^7, so that from the start of the return movement of the carriage (toward the right) this coaction will result in positively driving said pressure-roller until the same has again been depressed by reason of the coaction of the stop i^5 with the cam-arm i'.

Turning now to the construction of the carriage above referred to, this is here shown as a rectangular frame, comprising the side members C, C', and end members C^2, C^3, said side members having the inturned brackets or flanges c^4 and c^8, upon which the type-form is carried. Extending laterally across said carriage and over the type faces is an ink-ribbon J, the ends whereof are mounted upon spools J', J^2, the former carried by brackets j and the latter by brackets j'. Each of said spools is connected, preferably detachably, with a pinion K, K, and coacting with each of said pinions is an operating sector k, k, and the lower ends of these sectors are here shown as coacting with cams k' carried by the side members B, B' respectively of the main frame.

As the particular construction of the spools and their operating mechanism forms no part of the present invention, it will suffice to say in general that the ribbon is wound upon one and fed therefrom to the other, this being accomplished by the coaction of one of the sectors k with one of the cams k' at the limit of forward or reverse movement of the carriage. Said spools may be provided with suitable clutches, so that either may be driven to take up the ribbon while the other is loose so as to permit the ribbon to be so taken up. With these spools may be combined an automatic reversing mechanism, so that when after moving in one direction, the end of the ribbon is reached, the return movement of the ribbon in the opposite direction may be effected without additional manipulation. Said ribbon is here shown as running from spool J' over idler-rolls k^2, k^2, past the type faces, then over idler-rolls k^3, to the spool J^2.

The carriage may be operated in any suitable manner. I have here shown the same as provided with a slightly offset handle L, adapting the carriage for manual operation.

The type-form is here shown as a rectangular frame, comprising the side members M, M (right angular in cross-section) and end members m, m. Extending transversely of this frame and secured either permanently or detachably thereto, are cross-bars N, N, right angular in cross-section, and extending between these and resting upon the horizontal portions n, n, are separable type-channels n', and, on either side of the series of type-channels n', spacing material n^2. Each type-channel n' has its greatest thickness adjacent to its ends, the portions between the ends being cut away in order to form the channels through which the type n^3 may project. Preferably said type will be provided with shoulders, see Fig. 4, in order to prevent the same from being passed entirely through said channels. Such type on being passed into the channels may be brought to a stop by means of such shoulders, leaving their printing faces in substantial alinement. It is preferred that said type be loosely mounted and not locked rigidly in this position, and also that during the printing operation the same be free to move in a vertical plane within necessarily small limits. To this end I provide a pad n^4 extending over the upper ends of the type, and over this a pressure-plate O, which may be secured to flanges o, o, formed integral with or secured to the side members of the type-form frame, as, for instance, by means of set-screws o'. Said pad is preferably of rubber or other compressible material, and if desired I may interpose between the same and the under surface of the plate O a sheet or sheets or block of other material, o^2, such, for instance, as paper.

The type-form frame may be supported in the carriage in any suitable manner. In the drawings, a convenient means is shown, comprising the ears P, P, secured to the carriage and below which one end m of the type-carrying frame may be placed, the other end being secured in position by means of set-screws P', P' (see Figs. 2 and 3).

The apparatus may be provided with any suitable form of delivery-board or tray designed to receive the imprinted sheets. I have shown in the drawings a portion of a delivery-board Q, one end whereof is carried by the cross-bar b', said board resting upon and being secured in any suitable manner to the cross-bar b, in order to receive the sheets after they have been printed and fed beyond the pressure-roller H.

The operation of the apparatus has been to some extent indicated in the foregoing description, and need therefore only be summarized. In order to prepare the apparatus for the printing operation, the type are set up, the pad n^4 and pressure-plate O adjusted, and the latter secured, and the type-holding frame locked in the carriage. The sheets are fed forward over the feed-board E successively, a sheet being passed to the bight of the feed-rolls D and G when the carriage is at the end of its excursion toward the right, Fig. 1. At this time, the coaction of the stop i^5 and cam-arm i' has resulted in depressing both the pressure-roller and the feed-rolls, as above indicated. The sheave d of the feed-roll D is, therefore, in coaction with the milled surface c^7 at the edge of the slot c^6. Therefore, as the carriage is moved toward the left, said feed-rolls are operated in opposite directions to seize the forward end of the sheet and to pass the same rearwardly and over the (preferably hard) surface of the pressure-roller H. This action takes place so long as the feed-rolls are operated, which is until the coaction of the polygonal wheel d^3 with the cam d^4 breaks the engagement between said sheave d and milled surface c^7. The continued movement of the carriage toward the left brings the stop i^4 into contact with the cam-arm i', moving the same to the position shown in Fig. 1. This raises the pressure-roller as well as the feed-rolls D, G, the former, however, to a higher plane than the latter, the periphery of said pressure-roller being in close juxtaposition to the ribbon J, which in turn is either in contact or almost in contact with the type faces. The moment the forward movement (toward the right, Fig. 1) commences, the engagement of the sheave h^8 with the rib h^7 sets the pressure-roller in operation, and when therefore the first type of the type-form reach said roller they find the same moving at substantially the same surface speed. This feature is deemed to be of importance, as the feed-rolls D and G having fed the impression-sheet for-

ward over the pressure-roller and the same having been brought to rest, the sheet is, in effect, gripped between the type-form and the pressure-roller (the ribbon J being stationary relative to the type-form) and the further movement of the impression-sheet depends entirely upon this coaction. As, therefore, the carriage and type-form are further moved toward the right, the characters of the type faces are imprinted upon the sheet, through the ribbon, and the sheet passed on with the carriage until free from the coaction thereof with said pressure-roller, when it falls upon the delivery-tray Q. As this occurs, the coaction of the stop i^5 with the cam-arm i' again depresses the pressure-roller and the feed-rolls, whereupon another sheet may be passed to the latter and the operation just described repeated.

The impression received by the sheet is evenly printed and all the characters are sharply defined. This results to a large extent from certain features of the arrangement of the coöperating parts of the printer as shown herein and which are considered of great importance. I have found that much superior results are obtained by so supporting the type upon the carriage that the lines thereof extend in the direction of movement of the carriage and by mounting the pressure-roller so that it extends across the lines of the type, preferably with its axis transverse to the lines of type. This arrangement of the parts with type that are loosely mounted so as to yield somewhat, gives a uniform and reliable coaction of the type and pressure-roller with the sheet over the entire impression and results in sharp definition and even printing of all of the characters. If the lines of type extended across the machine at a right angle to the direction of movement, the printing movement of the carriage would bring practically a continuous edge of type into engagement with the ink-ribbon and sheet along the line of contact with the pressure-roller, and as a consequence, the forward edge of the characters at that edge of the sheet which was first printed might be somewhat blurred; and if the several lines of type were separated by considerable space, the forward edge of the succeeding lines of type might also be blurred and slight blurring might occur at their rearward edges. When the type are arranged in lines extending in the direction of movement of the carriage, the type first engaging the pressure-roller through the sheet and ink-ribbon are those at the end of the lines which, instead of forming a solid edge of type are spaced apart by the distance between the lines. These move longitudinally backward the slight amount permitted by the backing, and press against the roller with the required pressure. and the following type in the several lines hold all the parts in the same relation so that there is no jarring or other movement such as would cause blurring and uneven printing. Blurring of that portion of the sheet which is first printed is further avoided by the provision of mechanism for starting the rotation of the pressure-roller before the printing of the sheet is actually begun since this prevents the slight amount of slip and consequent blurring of the impression which would take place if the rotation of the pressure-roller were started by the engagement of the type therewith through the ink ribbon and sheet, particularly when the carriage is rapidly operated. For the same purpose, I consider it important to have the pressure-roller supported positively in its operative or elevated position so that there will be no movement thereof during the printing operation. This is effected by the cams i which support the pivoted arms h' carrying the pressure-roller.

Having now described my invention, what I claim as new therein and desire to secure by Letters Patent is as follows:—

1. In a printing machine, the combination of a reciprocating type-carrier, type supported therein in a plane in lines extending in the direction of movement of said carrier, and having their printing faces downward, an underlying pressure-roller, means for moving said roller relatively to the type as the type-carrier is reciprocated, said roller being adapted to support a sheet fed to the point of coaction of the roller and said type and to permit said sheet to be simultaneously imprinted upon and passed bodily beyond said point of coaction in correspondence with the movement of said carrier, and an inking device for said type, substantially as set forth.

2. In a printing machine, the combination of a movable carriage, type supported therein in lines extending in the direction of movement of said carriage, an underlying pressure-roller movable to operative and inoperative positions, means controlled by said carriage for actuating said roller and an ink-ribbon extending between said roller and the type supported in said carriage, substantially as set forth.

3. In a printing machine, the combination of a reciprocating carriage, type supported therein in a plane in lines extending in the direction of movement of said carriage and with their printing faces downward, an underlying pressure-roller, means for moving said roller toward and away from the type as said carriage is reciprocated, feed-rolls and means for operating the same to feed a sheet over said pressure-roller, and an ink-ribbon extending between said type and pressure-roller, substantially as set forth.

4. In a printing machine, the combination of a reciprocating carriage, type supported therein in a plane with their printing faces downward, a pressure-roller underlying said carriage, and mounted with its axis at an

angle to the lines of said type, means for moving said roller relatively to the type as the carriage is reciprocated, said roller being adapted to support a sheet fed to the point of coaction of the roller and said type and to permit said sheet to be simultaneously imprinted upon and passed bodily beyond said point of coaction in correspondence with the movement of said carriage, and an inking device for said type, substantially as set forth.

5. In a printing machine, the combination of a movable type-carrier, type supported therein in lines, a pressure-roller mounted below said carrier to coact with the printing faces of said type and having its axis at an angle to the lines of the type, means controlled by the carriage for moving said roller to operative and inoperative positions, and an ink-ribbon extending between said roller and the type in said carrier, substantially as set forth.

6. In a printing machine, the combination of a reciprocating type carrier, type supported therein in a plane with their printing faces downward, an underlying pressure-roller, means for moving said roller to operative and inoperative positions as said carriage is reciprocated, feed-rolls and means for operating the same to feed a sheet over said pressure-roller, and an inking device for said type, substantially as set forth.

7. In a printing machine, the combination of a reciprocating type-carrier, type supported therein in a plane in lines extending in the direction of movement of the type-carrier and having their printing faces downward, a pressure-roller below said carrier with its axis at an angle to the lines of type, means controlled by the movement of said carriage for moving said roller relatively to the type and an inking-ribbon carried by the carriage and extending between the type and said roller, substantially as set forth.

8. In a printing machine, the combination of a movable type-carrier, type supported thereby, an underlying pressure-roller, means controlled by the movement of the carriage for moving said roller to operative and inoperative positions, and means also controlled by the movement of the carriage for positioning an impression-sheet over said pressure-roller and between the same and the type while the pressure-roller is in inoperative position, substantially as set forth.

9. In a printing machine, the combination of a movable type-carrier, type supported thereby, an underlying pressure-roller coacting with the printing faces of said type, means actuated by the movement of said carrier for moving said pressure-roller to operative and inoperative positions, means controlled by the movement of the carriage for positioning an impression sheet over said pressure-roller while the latter is in inoperative position and an ink-ribbon supported on said carrier and extending between said type and said pressure-roller, substantially as set forth.

10. In a printing machine, the combination of a movable type-carrier, type supported therein, a pressure-roller mounted below said carrier to coact with the printing faces of the type, means controlled by the movement of the carrier for moving said roller to operative and inoperative positions, feed-rolls for moving a sheet over said pressure-roller, and means, also controlled by the movement of the carrier for operating the feed-rolls in coaction with a sheet when the pressure-roller is in inoperative position, substantially as set forth.

11. In a printing machine, the combination of a frame adapted to carry a form of type arranged in a plane, an intermittently-revolving pressure-roller coacting with said type and forming with the frame a printing couple, an inking-ribbon extending over the type-form and between it and said roller, means for moving the members of the printing couple relatively to cause the roller to travel over the type-form and in coaction with the type faces to effect the printing of an impression and then to assume initial relation while the roller is out of coaction with the type, and means for positively rotating said roller during such relative movement while it is approaching and entering into coaction with the type, said rotating means together with the coaction of the pressure-roller with the printing faces of the type forming the sole means for effecting the rotation of the pressure-roller, substantially as set forth.

12. In a printing machine, the combination with a movable carriage and type supported thereby in a plane with their printing faces downward, said type being movable in the direction of their length, of an inking device, a pressure-roller coöperating with said type and movable, under the control of said carriage, to operative and inoperative positions, and means, also controlled by said carriage, for setting said roller in rotation prior to its coöperative engagement with said type, substantially as set forth.

13. In a printing machine, the combination of a reciprocating carriage, type supported thereby in a plane, an underlying pressure-roller, rotatable feed-rollers, and means for rotating said feed-rollers while said reciprocating carriage is moving in one direction to position an impression-sheet over said pressure-roller and between the same and said type, substantially as set forth.

14. In a printing-machine, the combination of a reciprocating carriage, type mounted thereon in a plane with their printing faces downward, an underlying pressure-roller movable to operative and inoperative positions in correspondence with the move-

ment of said carriage, rotatable feed-rollers, and means controlled by said carriage when moving in one direction for positioning an impression-sheet over said pressure-roller and between the same and said type, substantially as set forth.

15. In a printing machine, the combination with a movable carriage and type supported thereby, of a pressure-roller, sheet-feeding apparatus for giving an impression-sheet an initial movement, leaving the forward portion thereof overlying said pressure-roller and between the same and said type, and means controlled by said carriage for imprinting upon said sheet by said type and simultaneously feeding the same from said machine, substantially as set forth.

16. In a printing machine, the combination with a movable carriage and type supported thereby, of an underlying pressure-roller movable, under the control of said carriage, to operative and inoperative positions, sheet-feeding apparatus in juxtaposition to said pressure-roller and operating, also under the control of said carriage, to give an impression-sheet an initial movement, leaving the forward portion thereof overlying said pressure-roller and between the same and said type, and means, under the control of said carriage, for throwing said sheet-feeding apparatus to inoperative position and said pressure-roller to operative position, for imprinting upon said sheet by means of said type and for simultaneously passing the sheet so imprinted upon from said machine, substantially as set forth.

17. In a printing machine, the combination with a movable carriage and type supported thereby, of sheet-feeding rolls and a pressure-roller, both said rolls and said roller being movable to operative and inoperative positions under the control of said carriage, and means, also controlled by said carriage, for setting said pressure-roller in rotation in one direction of movement of said carriage and for setting said feed-rolls in rotation in the other direction of movement of said carriage, substantially as set forth.

18. In a printing machine, the combination of a movable type-carrier, type mounted therein so as to be movable one independently of another in the direction of their length, a pressure-roller underlying said carrier and coöperating with the printing faces of said type, means for moving said roller relatively to the type in correspondence with the movement of said carrier, said roller being adapted to support a sheet fed to the point of coaction of said roller and said type and to permit said sheet to be simultaneously imprinted upon and passed bodily beyond said point of coaction also in correspondence with the movement of said carrier, and an inking device for said type, substantially as set forth.

19. In a printing machine, the combination of a reciprocating carriage, type mounted therein so as to be movable one relatively to another in the direction of their length and having their printing faces downward, an underlying pressure-roller movable to operative and inoperative positions as said carriage is reciprocated, and an ink-ribbon mounted on said carriage and extending between said type and said pressure-roller, substantially as set forth.

20. In a printing machine, the combination of a reciprocating carriage, type mounted therein so as to be movable one relatively to another in the direction of their length and having their printing faces downward, an underlying pressure-roller, means controlled by the movement of said carriage for moving said roller to operative and inoperative positions, an inking device for said type, and means for feeding a sheet over said pressure-roller and between the same and said type substantially as set forth.

21. In a printing machine, the combination of a reciprocating carriage, type mounted therein so as to be movable one relatively to another in the direction of their length and having their printing faces downward, an underlying pressure-roller, means controlled by the movement of said carriage for moving said roller to operative and inoperative positions, an ink-ribbon for said type, and feed-rolls for feeding a sheet over said pressure-roller and between the same and said type, substantially as set forth.

22. In a printing machine, the combination of a movable carriage, type supported therein so as to be movable in the direction of their lengths one independently of another, a pressure-roller having a substantially unyielding periphery, and means for rigidly supporting said roller during the printing operation, substantially as set forth.

23. In a printing machine, the combination with a movable carriage and type supported thereby so as to be capable of movement in the direction of their length, of an underlying pressure-roller in coöperative relation to said type, pivoted arms carrying said roller and means for positively holding the roller during such coöperation, substantially as set forth.

24. In a printing machine, the combination with a movable carriage and type supported thereby so as to be capable of movement in the direction of their length, of a pressure-roller underlying said type and movable to operative and inoperative positions under the control of said carriage, and means for positively holding said pressure-roller when the same is in operative position, substantially as set forth.

25. In a printing machine, the combination of a frame adapted to carry a form of type arranged in a plane, a pressure-roller

coacting with said type and forming with said frame a printing couple, an inking ribbon extending over said type-form and between it and said roller, means for reciprocating one member of said printing couple to cause the roller to travel over the type-form and beyond the same, means for rotating said roller during such relative movement while it is approaching the type-form, and devices for rendering said last-named means inoperative, substantially as set forth.

26. In a printing machine, the combination of a frame adapted to carry a form of type arranged in a plane, an intermittently-rotating pressure-roller coacting with said type and forming with said frame a printing couple, an inking ribbon extending over said type-form and between it and said roller, means for reciprocating one member of said printing couple to cause the roller to travel over the type-form and beyond the same, means for moving said roller to operative position during such reciprocating movement in one direction and to inoperative position during the movement in the opposite direction, and means for rotating said roller when in the operative position during the portion of the relative movement of the printing members in one direction in which the roller is carried into engagement with the type-form, the rotation of said roller being discontinued during the relative movement of the printing members in the opposite direction, substantially as set forth.

This specification signed and witnessed this 6th day of January, 1906.

ALBERT B. DICK.

Witnesses:
W. G. ARNOLD,
M. J. BENDER.