(No Model.)

3 Sheets—Sheet 1.

J. B. HALL

APPARATUS FOR FEEDING PAPER TO PRINTING PRESSES.

No. 12,702. Patented Apr. 10, 1855.

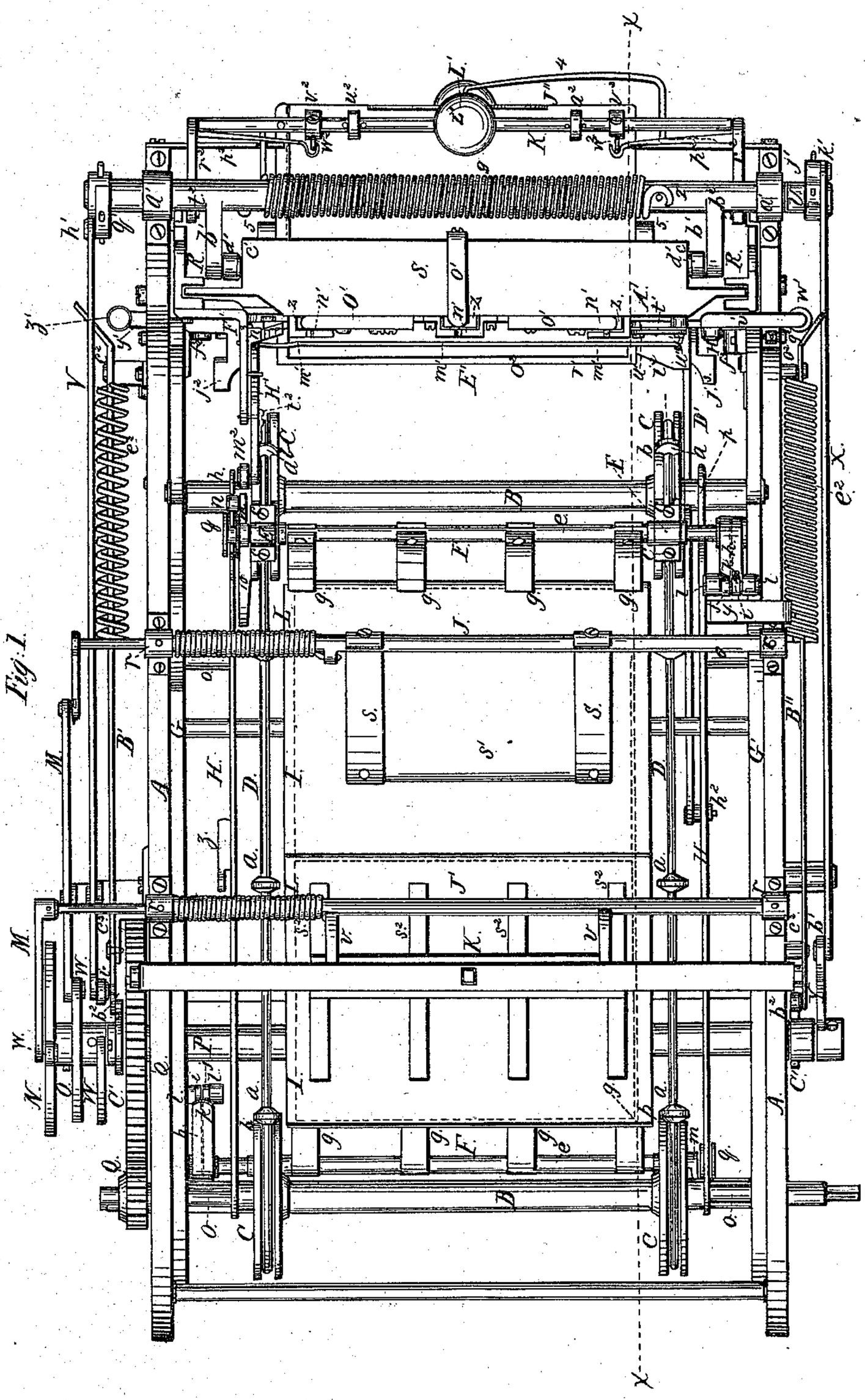

Fig. 1.

(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

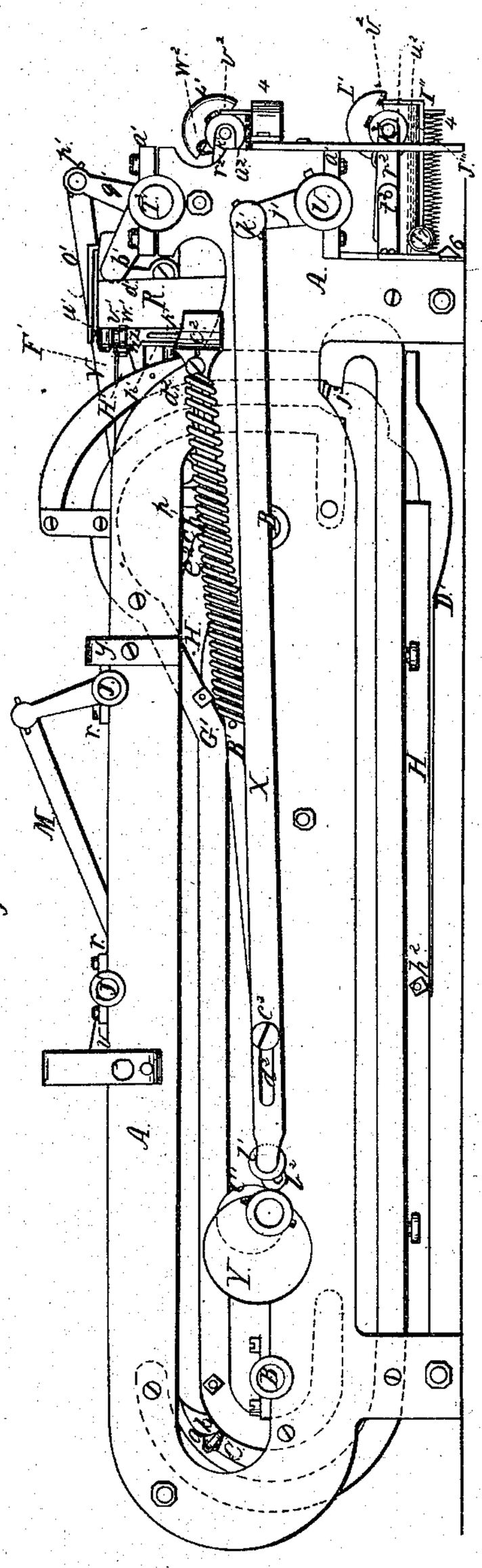

Fig. 5.

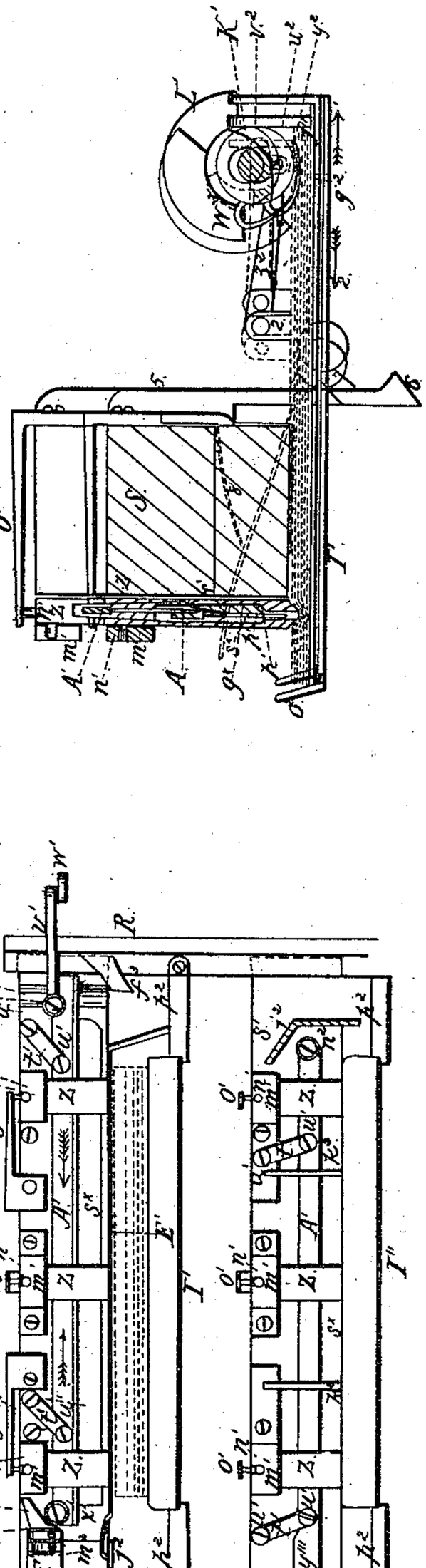

Fig. 6.

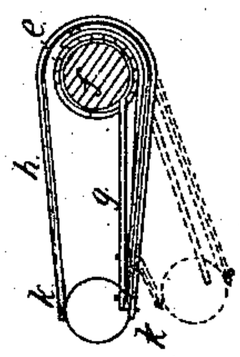

Fig. 4.

(No Model.) 3 Sheets—Sheet 3.

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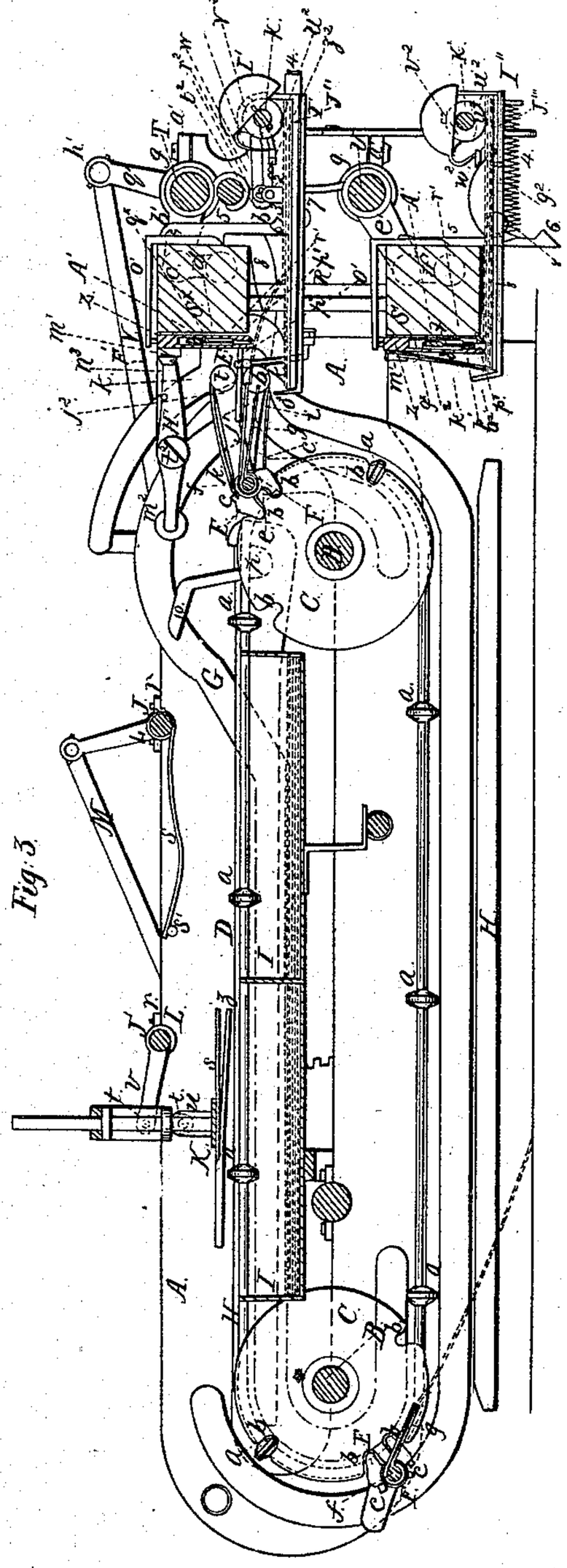

Fig. 3.

UNITED STATES PATENT OFFICE.

JOHN B. HALL, OF NEW YORK, N. Y.

APPARATUS FOR FEEDING PAPER TO PRINTING-PRESSES.

Specification of Letters Patent No. 12,702, dated April 10, 1855.

To all whom it may concern:

Be it known that I, JOHN BISHOP HALL, of the city, county, and State of New York, have invented a new and improved apparatus or device for feeding sheets of paper to printing presses and conveying them therefrom when printed and depositing them in proper receptacles; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a plan or top view of my apparatus or device. Fig. 2, is a side view of ditto. Fig. 3, is a longitudinal vertical section of ditto (*x*) (*x*) Fig. 1, being the line of section. Fig. 4, is a front or face view of the two nipper stocks. Fig. 5, is a transverse section of one of the nipper stocks, feed board and separating device. Fig. 6, is a detached view of a portion of the device which operates the fingers.

Similar letters of reference indicate corresponding parts in the several figures.

The nature of my invention consists: 1st. In the employment or use of nippers, tweezers or pincers, constructed and operating in a peculiar way as will be hereafter shown, whereby the sheets of paper are lifted or picked up from the feed boards and properly presented to fingers attached to the fly.

2nd. My invention consists in a peculiar device which I term a separator, operating as will be hereafter shown so as to prevent more than one sheet of paper from being presented to the fingers at once, and also so as to prevent the second sheet from being drawn from the feed board, when the raised sheet is drawn out by the fingers. Thereby insuring the feeding of the sheets to the press singly, or one at a time.

3rd. My invention consists in a peculiar construction and arrangement of the fly, which will be fully described hereafter, whereby the sheets of paper are conveyed from the nippers to the form, and deposited when printed in proper receptacles.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

A, Figs. 1, 2 and 3, is a frame constructed in any proper manner to support the several parts of the apparatus and of any proper material.

B, B, are two transverse shafts running in proper bearings on the frame A, and having hung upon them pulleys C, two pulleys on each shaft; said pulleys being a suitable distance apart. D, D, are gut bands or cords which pass around the pulleys C, the two cords being parallel with each other, as shown in Fig. 1. Each cord has upon it a series of collars (*a*) which as they pass around the pulleys fit in recesses (*b*) cut in the peripheries of the pulleys, as shown more particularly in Fig. 2. The ends of the cords D, D, are connected or attached by screws (*c*) which work, or are fitted in metallic sockets E, in which the bearings of the finger shafts F, are formed. The ends of the cords passing in the metallic sockets at opposite sides, see Figs. 1 and 3. The sockets E, also fit in recesses (*b*) in the peripheries of the pulleys C, as the sockets pass around them, shown clearly in Fig. 3. The finger shafts F, are formed of two parts, or rather of two shafts (*e*) (*f*) one being within the other, the outer shaft (*e*) of course being hollow or tubular, see Fig. 6. To the outer shaft (*e*) is secured a series of plates and also to the inner shaft (*f*), one set of plates being directly over the other, their ends being in contact and forming fingers (*g*) shown in Figs. 1, 3 and 6. The ends of the plates are kept together by a spring (*h*) which passes around two arms (*i*) (*j*) which are secured one to each shaft (*e*) (*f*), the two arms being side by side and one end of the spring (*h*) being secured by a pin (*k*) to the end of one arm and the opposite end of the spring to the other arm, see Fig. 3, and dotted lines in Figs. 1 and 6. To the end of each of the arms (*i*) (*j*) there is a friction roller (*l*) the roller on the outer arm (*i*) working on guides or ways G, G′, a guide or way being secured on the inner surface of each side of the frame A, see Figs. 1, 2 and 3. There are two finger shafts attached to the cords D, D, and each shaft is provided with the arms (*i*) (*j*) a pair of arms working at each side of the frame A, as shown in Fig. 1. At the ends of the finger shafts opposite to the ends to which the arms (*i*) (*j*) are attached are secured arms (*m*) (*m*) one to each finger shaft, said arms (*m*) having friction rollers (*n*) at their outer ends see Fig. 1, which run on ways H, H secured a short distance from the sides of the frame A, by rods (*o*), as shown in Fig. 1. The front ends of the

ways H, H, have semicircular recesses (*p*) in them as shown clearly by the dotted lines in Fig. 3. The front ends also of the guides or ways G, G′, are curved in a peculiar manner with considerable sweep as shown clearly in Fig. 3, and by the dotted lines in Fig. 2. On the ends of the finger shafts and adjoining the arms (*m*) there are grooved hubs (*q*), one on each shaft, said hubs fitting over the ways H, H, see Fig. 1.

Between the two gut bands or cords D, D, there are placed two boxes or receptacles I, I, said boxes or receptacles being secured permanently to the frame A, in any proper manner. Over the boxes I, I, there are two shafts J, J′, one over each box. These shafts work in suitable bearings (*r*) on the upper part of the frame A, see Figs. 1, 2 and 3. To one of the shafts J, there is secured arms or plates (*s*) (*s*) having a rod (*s′*) connected to their ends. To the other shaft J′, there is attached a frame K, having horizontal elastic slats or bars (s^2) see Figs. 1 and 3, the frame being attached to the shaft by pivots (*t*) which pass through vertical arms (*u*) attached to the frame and through horizontal arms (*v*) projecting from the shaft, see more particularly Figs. 1 and 3. Each shaft J, J′, has a spiral spring L, around it and the shafts are provided with arms M, at one end, said arms having friction rollers (*w*) at their ends, against which cams N, O, at one end of a shaft P, work, see Fig. 1. The shaft P, is connected by gear wheels Q, Q, to one of the shafts B, on which two of the pulleys C, are hung, see Fig. 1.

On one side of the frame A, and at its upper part there is secured a small bar (*y*) and a small bar (*z*) is also secured to one of the ways H, both of these bars are shown in Fig. 1, one bar (*y*) is shown in Fig. 2.

At one end of the frame A, and adjoining the front ends of the guides or ways G, G′, there are vertical guide plates R, R, see Figs. 1, 2, 3 and 4, one secured at each side of the frame. Between these guide plates are placed two stocks S, S′, the ends of which are fitted and work freely in grooves in the plates. The stocks are placed one directly over the other as shown in Figs. 3 and 4. Directly back of the upper stock S, there is a shaft T, see Figs. 1, 2 and 3, running in suitable bearings (*a′*) on the frame A. This shaft is provided with two arms (*b′*) (*b′*) the outer ends of which are attached by pivots (*c′*) to arms (*d′*) (*d′*), an arm (*d′*) being attached by a pivot to each end of the stock S, see Figs. 1 and 2, and dotted lines in Fig. 3. U, is a shaft directly back of the lower stock S′, and the stock S′, is attached to the shaft U, by arms (*e′*) (*e′*) (*f′*) (*f′*) precisely similar to the attachment of the upper stock S, to the upper shaft T. At one end of the upper shaft T, there is an arm (*g′*) the outer end of which is secured by a pivot (*h′*) to a rod or bar V, having a friction roller (*i′*) at its outer end against which a cam W, on the shaft P, works, see Fig. 1. At one end of the lower stock S′, and at the side of the frame A, opposite to the side at which the arm (*g′*) on the upper shaft T, is secured, there is attached an arm (*j′*) the outer end of which is secured by a pivot (*k′*) to a rod or bar X, having a friction roller (*l′*) at its outer end against which a cam Y, on the shaft P, works, see Figs. 1 and 2.

The stocks S, S′, are of rectangular form, and on the inner faces or surfaces of each stock there are secured three nippers Z, Z, Z, see Figs. 1, 2, 3, 4 and 5, three nippers are shown in the drawings but more or less may be used. The upper parts of the nippers are fitted in sockets (*m′*) secured to the upper parts of the stock, the nippers being fitted so as to move freely within said sockets and prevented from dropping from the sockets by pins (*n′*) which are attached to the nippers and rest in recesses in the top of the sockets as shown clearly in Figs. 1, 4 and 5. A spring (*o′*) attached to the stock bears on the upper surface of each nipper, see Figs. 1, 2, 3, 4, and 5. The nippers are formed of two jaws (*p′*) (*p′*) which are filed or cut on their inner surfaces so as to leave an oblong recess (q^x) between them a short distance above their edges. The edges of the jaws (*p′*) (*p′*) are in contact, except when acted upon so as to be spread apart, and have their inner surfaces for a short distance upward beveled so as to leave a V shaped recess (*r′*) between them as clearly shown in Figs. 3 and 5. The upper ends of the jaws are riveted together or the jaws may be cut from a solid piece of metal.

Through the recesses (q^x) of the nippers on each stock S, S′, a bar A′, runs said bar having a blade or flat strip of metal (s^x) secured to its under surface as shown in Figs. 3, 4 and 5. Each bar A′, is secured to its stock by arms (*t′*) (*t′*) which are attached to the bar and the stock by pivots (*u′*) (*u′*) the arms of each stock being parallel with each other as shown in Fig. 4. To the upper bar A′, there is secured at one end a horizontal arm (*v′*) which projects beyond the side of the frame A, and is provided at its outer end with a friction roller (*w′*) and at its inner end with a roller (11). At the opposite end of the bar a friction roller (*x′*) is attached see Fig. 4. The lower bar A′, is also provided with an arm (*y′*) and friction rollers (*z′*) at one end and also with a roller (*y‴*), and at the side of the frame A, opposite to where the arm and friction roller of the upper bar is attached, see Figs. 1 and 4. At the opposite end of the lower bar a friction roller (a^2) is secured.

At each side of the frame A, there is a bar or rod B′, B″, having at one end friction rollers (b^2) against which cams C′, on the shaft P, work. The outer or opposite ends of these bars or rods are flattened and inclined or beveled outward from the frame A, as clearly shown in Fig. 1, and the bars or rods work or slide on studs (c^2) which fit in slots (d^2) in the bars or rods as shown in Fig. 2. Each bar or rod has a spiral spring (e^2) around it as shown in Figs. 1 and 2.

On the inner side of each of the guides or ways G, G′, or at the sides of the frame A, there is a small projection (f^2) (f^3) the projection (f^2) being on the frame A, and the projection (f^3) on the guide or way G′, see Fig. 1, in which both the guides or ways and the projections are shown, in Fig. 4, the projections are shown but not the guides or ways. The upper surfaces of these projections are inclined as clearly shown in Fig. 4, and they may be made adjustable by screws (g^2) so as to be set further in or out from the guides or ways, the projection (f^3) on the guide or way G′, is so represented in Fig. 1.

D′, Figs. 1 and 2, is a rod or bar at the lower part of the frame A, the inner end of this rod or bar is secured by a pivot (h^2) to one of the ways H, and its opposite or outer end is curved as shown in Fig. 2 and provided with a beveled or inclined end (i^2) as shown in Figs. 1 and 4, the end (i^2) only being shown in Fig. 4.

On the inner sides of each of the guides or ways G, G′, there is attached a projection (j^2) (j^3) the projection (j^2) being secured to the guide G, and the projection (j^3) to the guide G′, see Fig. 1.

Directly in front of the nippers on the upper stock S, a rod E′, is placed the ends of said rod being properly secured to convenient parts of the frame A, or to any stationary parts secured to it. And to the lower stock S, there are attached vertical rods (k^2) (k^2) as shown in Figs. 3 and 4.

To one of the guide plates R, is secured an arm F′, having a lever H′, attached to it by a pivot (l^2) see Figs. 1, 3 and 4. The outer end of this lever is provided with a friction roller (m^2) and its inner end has a projection (n^3) which projects laterally from the lever and having its under surface beveled or inclined as clearly shown in Fig. 4. To the pulley C, underneath the lever H′, there is attached a curved or bent arm (10) see Figs. 1, 2, 3 and 4.

Directly underneath each stock S, S′, there is a platform I′, I″, the inner ends of which are bent upward forming a ledge (o^2) as shown in Figs. 3, 4 and 5. These platforms rest or work in grooves in the ends of horizontal bars (p^2) attached to the frame A, or to any stationary parts connected thereto, see Figs. 1 and 4. Upon the platforms I′, I″, are placed feed boards J″, J‴, which are secured to the platforms by pins (q^2), as shown by dotted lines in Figs. 3 and 5, or in any other suitable way.

K′, K′, are shafts which have their bearings in arms (r^2) attached to each side of the frame A, by pivots (t^2) as shown in Fig. 1, the outer ends of the arms (r^2) and consequently the shafts being allowed to vibrate or move up and down. There is a shaft K′, directly over each feed board J″, J‴, and upon each shaft there are two rollers (u^2) (u^2) fitting loosely thereon, see Figs. 1, 2, 3 and 5, and also two eccentrics (v^2) (v^2) having hooks (w^2) (w^2) attached to them, one to each. There is also attached to each shaft K′, at about its center a weight L′.

To the under side of each shaft K′, there is secured a small stud or projection (y^2) to the outer end of which a rod (z^2) is secured by a pivot (1), shown by dotted lines in Fig. 5, the opposite end of this rod being attached by a pivot (2) to a stud or small upright projection (3) permanently attached to each platform.

To the back part of each platform I′, I″, there are attached springs (4) (4) both of which are shown in Figs. 2 and 3.

To the back parts of the stocks S, S′, are secured vertical bars (5) (5) two on each stock and one at each end. The lower ends of these bars are provided with double inclined surfaces meeting at a point and projecting laterally outward, as shown at (b) in Figs. 3 and 5. The outer surfaces of these bars are in contact with friction rollers (7) attached one at each side of each platform, see Figs. 2, 3 and 5.

Underneath each stock S, S′, there is a small spring (8) see Figs. 3 and 5. And upon each of the shafts T, U, directly back of the stock spiral springs (9) (9) are placed one on each shaft.

Operation: I will first proceed to show the operation of the fly, by which the sheets of paper are conveyed from the nippers to the form and when printed deposited in the boxes or receptacles. The shaft B, to which one of the gear wheels Q is attached is the driving shaft. Motion being given this shaft, the gut bands or cords D, D, of course rotate around the pulleys C, on the shafts B, B, and are prevented from slipping thereon in consequence of the collars (a) on the cords fitting in the recesses (b) in the pripheries of the pulleys. The ends of the cords are firmly secured in the sockets E by the screws (c) (c) which sockets also fit in recesses (b) as they pass around the pulleys. The finger shafts F, which have their bearings in the sockets E, of course pass around the pulleys with the cords, the grooved hubs (g) at one end of the shafts

running on the ways H, and the friction rollers (l) on the outer arms (i) at the opposite ends of the finger shafts running upon the ways or guides G, G′, see Fig. 1, keeping the finger bars steady while moving over the ways. The friction roller (l) that runs upon the guide or way G, follows of course the curve at the outer end of said guide or way and as the friction roller ascends the curve the finger shaft is gradually turned in its bearings and the friction roller (n) at the end of the arm (m) at the opposite end of the finger shaft is consequently depressed and catches against the curved end of the way H, and fall into the recess (p) and as the finger shaft still moves forward it is turned about one half of a revolution the roller (l) on the arm (i) at the opposite end of the shaft following the guide G, which is so curved as shown in Fig. 3, so as to present the fingers properly to the edge of the sheet of paper shown in red and which is raised up by the nippers Z. When the fingers are in this position, the roller (l) attached to the inner arm (j) comes in contact with the projection (j^2) and the arm (j) is kept nearly in a horizontal position while the roller (l) on the outer arm (i) follows the curve of the guide which projects nearly horizontally a short distance forming a "jog," the two arms (i) (j) are consequently expanded and the fingers (g) are opened and when the roller has passed off the projection (j^2) the fingers grasp the edge of the sheet presented to them by the nippers Z, in consequence of the spring (h) and carry it downward around the front pulleys C, and upward around the back pulleys C, on the driving shaft B, the sheet of paper during its travel from the front to the back pulleys underneath or during any other portion of its travel receiving the impression of the form, which may be placed upon a cylinder, or flat bed arranged in any proper way. The sheet of paper after passing upward around the back pulleys C, passes along toward the front of the machine till the roller (l) on the inner arm (j) at the end of the finger shaft comes in contact with the small bar (z) attached to one of the ways H, said bar causes the roller (l) to pass underneath it and consequently depresses the inner arm (j) and the fingers (g) are opened. At this point the prominent part of the cam N, at the end of the shaft P, passes the friction roller (w) at the end of the arm M, attached to the shaft J′, and the arm M, being freed from the action of the cam the spiral spring L, is permitted to throw down the frame K, which being directly over the box or receptacle I, presses the sheet snugly therein, the sheet being freed from the fingers (g) when directly over said box. The frame K, is then raised to its original position by the action of the cam N, and the finger shaft still moving as before to act upon a succeeding sheet.

In the drawings two finger shafts F, F, are represented and two boxes or receptacles I, I, and also two nipper stocks S, S′, but the operation of both devices is precisely similar one being a duplicate of the other, with the exception that the guide or way G′, passes downward directly from its curve at its outer end, see dotted lines Fig. 2, so as to enable the fingers on the other shaft, to present themselves properly to the sheet held by the nippers on the lower stock S′.

I will now proceed to show the operation of the nippers Z, confining myself to the operation of those on one stock only, as one is merely a duplicate of the other. The stock S, has an up and down motion given it the upward motion is obtained by a cam W, the prominent parts of which act against the friction roller (i') at the end of the bar or rod V, and throws the shaft T, backward the arms (b') (b') on the said shaft elevating the stock, when the friction roller (i') is freed from the cam W, in consequence of the prominent part of the cam passing it the stock descends by its own gravity assisted by the spiral spring (9) on the shaft T. Suppose the stock S, to be elevated as shown in Fig. 3, the nippers Z, then hold a sheet of paper so as to be grasped by the fingers (g) and while in this position the curved or bent arm (10) on one of the pulleys C, acts against the roller (m^2) at the outer end of the lever H′, raising the outer end of the lever and causing the beveled or under side of the projection (n^3) at the inner end of said lever to bear against the roller (x') attached to the bar A′, and force said bar in the direction indicated by the arrow, see Fig. 4, the blades (s^x) of the bar of course descends into the V shaped recess (r') at the lower end of the jaws (p') (p') and owing to the curvilinear motion of the arms (t') (t') and forces the jaws apart and the sheet of paper therefrom just after its edge is grasped by the fingers (g) the lower edge of the blade descending a trifle below the edges of the jaws so as to clean them from any fibrous portions of the sheet which by chance may stick to them, see blue lines in Fig. 5, the lower edge of the blade (s^x) being shown below the jaws by dotted lines. The sheet of paper is now withdrawn from underneath the stocks the stock meanwhile descending by its own gravity and the action of the spring (9), the roller (i') being relieved from the action of the cam W. As the stock S, descends the roller (11) on the bar A′, comes in contact with the inclined surface of the projection (f^3) and the bar A′, is then moved in a reverse direction as indicated by the red arrow Fig. 4. The bar A′, and blade (s^x) is consequently

moved upward a certain distance and the jaws (p') (p') are pressed upon the uppermost sheet of paper, the pile or sheets of paper, shown in red in Figs. 1, 2, 3, 4 and 5, being placed upon the feed board J'', which rests upon the platform I'. The jaws (p') (p') are pressed upon the uppermost sheet by the weight of the stock S, and spring (9) in a distended state as shown clearly in Fig. 5, and with a force equal to the power of the springs (o') which transmit the requisite pressure to the nippers. These springs (o') render the pressure of the nippers upon the sheets constant, and also compensate to a sufficient extent for any deviation of the feed board from a level position. The jaws (p') (p') by being pressed upon the sheet in a distended state, or when slightly open cause the portion of the sheet directly between them to raise to a certain extent, see Fig. 5, and when the portion of the sheet between the jaws is thus raised the bar or rod B' is moved sideways in consequence of the cam C', at the end of the shaft P, acting against the roller (b^2) at the inner end of the bar or rod B', and the beveled outer end of said rod or bar acts against the roller (w') at the end of the horizontal arm (v') and moves the bar A', and blade (s^x) still further in the direction of the red arrow shown in Fig. 4, till the lower edge of the blade is entirely out of the V shaped recess (r') the jaws (p') (p') gradually approaching each other by their own elasticity as the blade rises and finally grasping the fold or ridge of the sheet formed by their pressure firmly between them when the blade is out of the V shaped recess. The stock S, now ascends the cam W, acting against the roller (i') at the end of the bar or rod V, and the nippers of course raise the upper sheet of paper, the outer edge of which is brought against the rod E', as shown in Fig. 3, and is thereby presented to the fingers in a horizontal position when the stock is fully raised. The small spring (8) underneath the stock merely bears upon the rising sheet and keeps its center bent downward so as to insure its outer edge bending upward.

The nippers cannot grasp more than one sheet at a time, because the jaws (p') (p') are distended more or less to suit the thickness of the paper used. If thin sheets are used the jaws when pressing upon the paper are not much distended, and consequently a fold or ridge on the upper sheet only will be formed between them. If thick paper is used the jaws are distended to a greater extent so as to insure the forming of a ridge or fold between them. The jaws are distended to a greater or less extent by graduating the movement of the bar A', which is effected by adjusting the projection (f^3) so that it may act more or less against said bar.

To prevent two sheets from being presented to the fingers (g) at the same time, and also to prevent the second sheet from being drawn off the pile of paper by the top sheet when it is withdrawn by the fingers, in consequence of their sticking together by moisture or other causes, the separating device is employed. The operation of this is as follows.

When the edges of the nippers Z, are pressing upon the uppermost sheet of paper the points of the hooks (w^2) (w^2) which are attached to the eccentrics (v^2) (v^2) on the shaft K', just bear upon the back part of said sheet and also the rollers (u^2) (u^2) on the same shaft and the hooks and rollers remain in this position till the sheet of paper is elevated by the nippers Z, a certain distance when the upper inclined surfaces of the projections (6) at the lower end of the bars (5) bear against the rollers (7) at each side of the platform I', and force the platform I', and feed board J' outward as indicated by arrow (1) see Fig. 5, and the shaft K', is turned simultaneously with the moving of the platform by means of the rod (z^2) so that the points of the hooks pass through the upper sheet which is grasped by the nippers and consequently does not move outward with the other sheets on the feed board, the hooks being somewhat inclined merely make perforations without tearing or disfiguring in any manner the sheet through which they pass. After the points of the hooks have passed through the upper sheet the outer edges of the hooks owing to their curved form rest upon the second sheet or the one immediately below the upper one, the points of the hooks not passing through the second sheet as it moves with the platform and in the same direction with the hooks. The second sheet of paper therefore and those underneath it have the weight of the shaft K', with its rollers (w^2) and weight L', upon it for the hooks in turning, elevate the shaft K', with its appendages, see blue lines Fig. 5. The platform I', after the upper inclined surfaces of the projections (6) have passed the rollers (7) moves inward in consequence of the spring (4) as indicated by arrows (2), see Fig. 5, and the shaft K', is then of course turned in a reverse direction and also the hooks (w^2) (w^2) which pass out from the perforations their points made in the uppermost sheet leaving the rollers upon the second sheet and the weight of the shaft K', just previous to the withdrawal of the raised sheet by the fingers (g) of the fly.

The red dotted lines in Fig. 5, show the last position of the hooks. The hooks therefore pass through the uppermost sheet leav-

ing it free to be fully raised by the nippers and at the same time prevent the displacement of the sheets underneath by bearing upon them till the points of the hooks have been withdrawn from the upper sheet when the rollers (u^2) rest upon them instead. It will be seen therefore that the upper sheet is left free to be acted upon by the nippers, while the under sheets are kept properly in place at all times, either by the pressure of the hooks or the rollers upon them.

The ball L′, is attached to the shaft for the purpose of giving it additional weight. The platform and hooks are brought in the position as shown in black Fig. 5, by the under inclined surface of the projection (6) during the downward motion of the stocks.

Two sheets cannot be presented to the fingers (g) at the same time in consequence of the nippers grasping them, this cannot be done as has been previously explained. The separating device obviates the difficulty which would often occur by the sheets sticking together in consequence of their moist state or other causes. The second sheet, if the separator were not used, would often adhere to the first or upper sheet grasped by the nippers and follow it although not actually held by the nippers and the same difficulty would be experienced as if the nippers really grasped it.

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

1. Lifting or picking up the sheets of paper from the feed boards or piles of paper to be printed by means of nippers, pincers, or tweezers Z, constructed as herein shown or in an equivalent way, and operated by any suitable mechanism so that the jaws of said nippers may when slightly open press upon the sheets of paper in such a manner that when closing they may grasp or nip the upper surface of the top sheet, or the ridge of the sheet formed between them by their pressure, as herein described, and for the purpose as set forth.

2. I claim separating or detaching the uppermost sheet of paper on the feed board, or pile of paper to be printed, so as to prevent the removal therefrom of more than a single sheet at a time by means of the hooks (w^2) (w^2) or by pins, or points, so constructed and operated as to answer the same purpose, and rollers (u^2) (u^2) attached to a shaft K′, or other suitable fixtures, and in connection with said hooks, and rollers, by means of a reciprocating motion of the platform I′ feed board and pile of paper; the said hooks, pins, or points acting conjointly with the said movable platform substantially as herein shown and described.

3. I claim conveying the raised sheets of paper from the feed boards to the form to be printed and also from the form when printed to the proper boxes or receptacles, by means of the fingers (g) attached to the tube and shaft F, which is secured to endless bands or cords D, D, which are provided with collars, or teeth, to prevent them slipping, in passing around suitable pulleys C, or by means of other fixtures which would be equivalent to the above named parts, when they are used in connection with a vibrating or movable frame K, or its equivalent, for properly adjusting the printed sheets in the boxes or receptacles I, when released from the fingers, as set forth in the body of the specification.

JOHN BISHOP HALL.

Witnesses:
S. H. Wales,
I. G. Mason.