

W. H. Danforth. *Sheet 2, Sheet 5*
Printing Press.

No. 15477.

Patented Aug. 5, 1856.

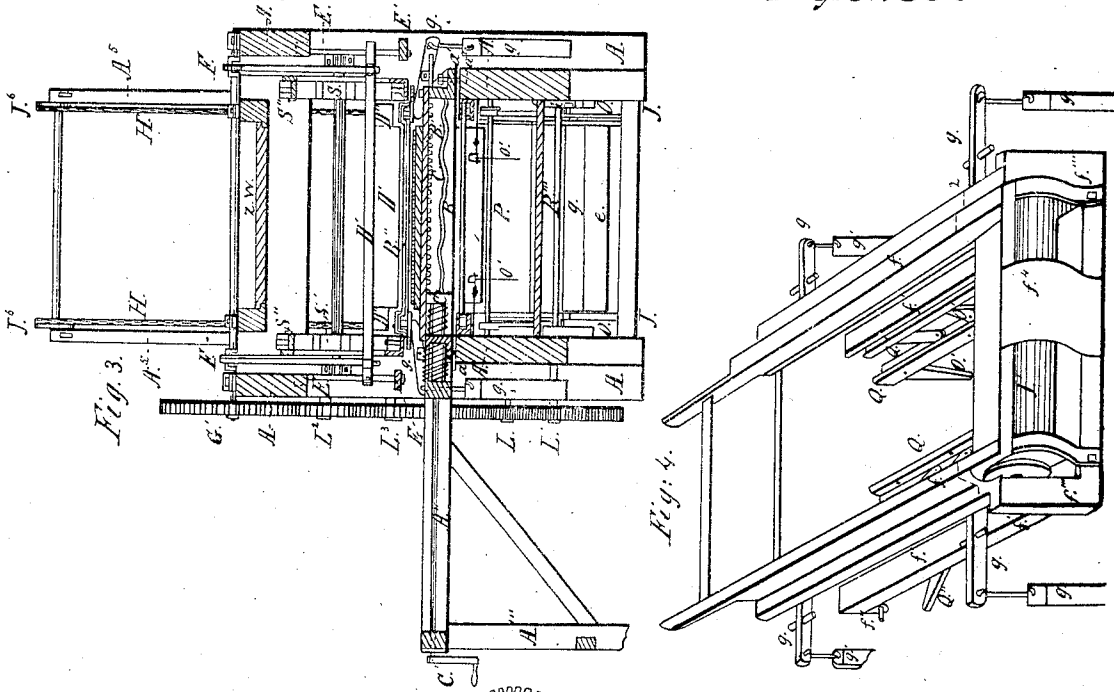


Fig. 3.

Fig. 4.

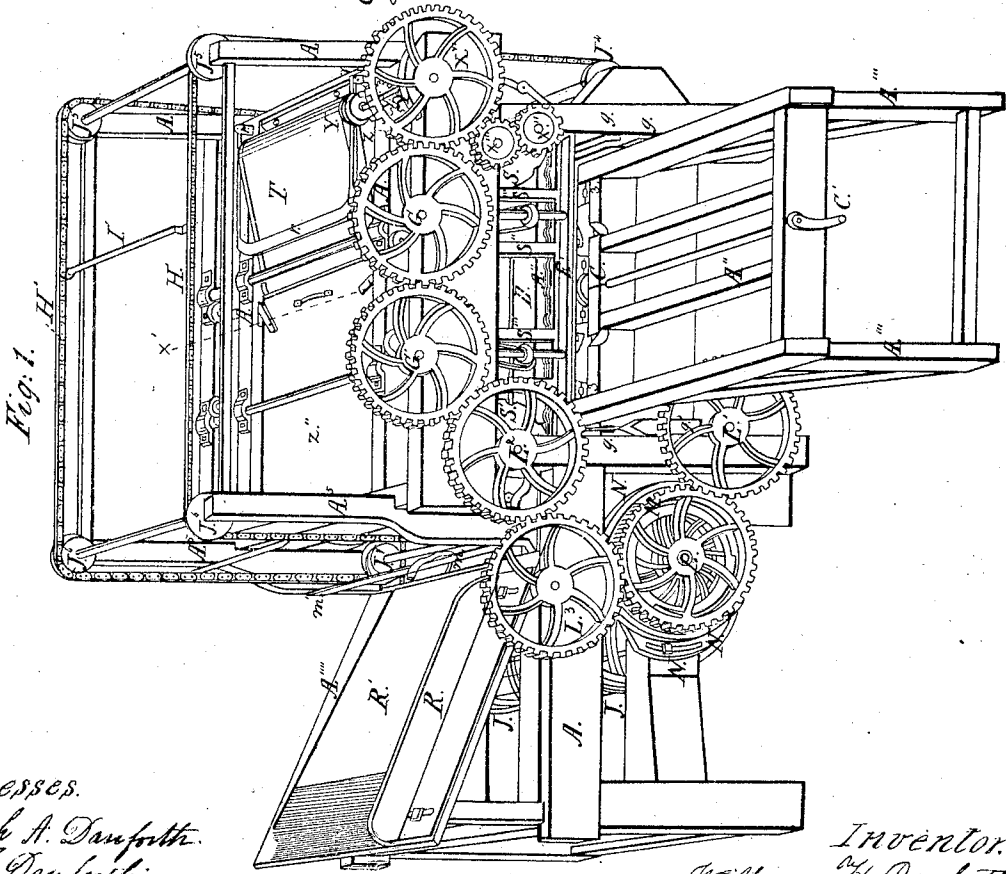


Fig. 1.

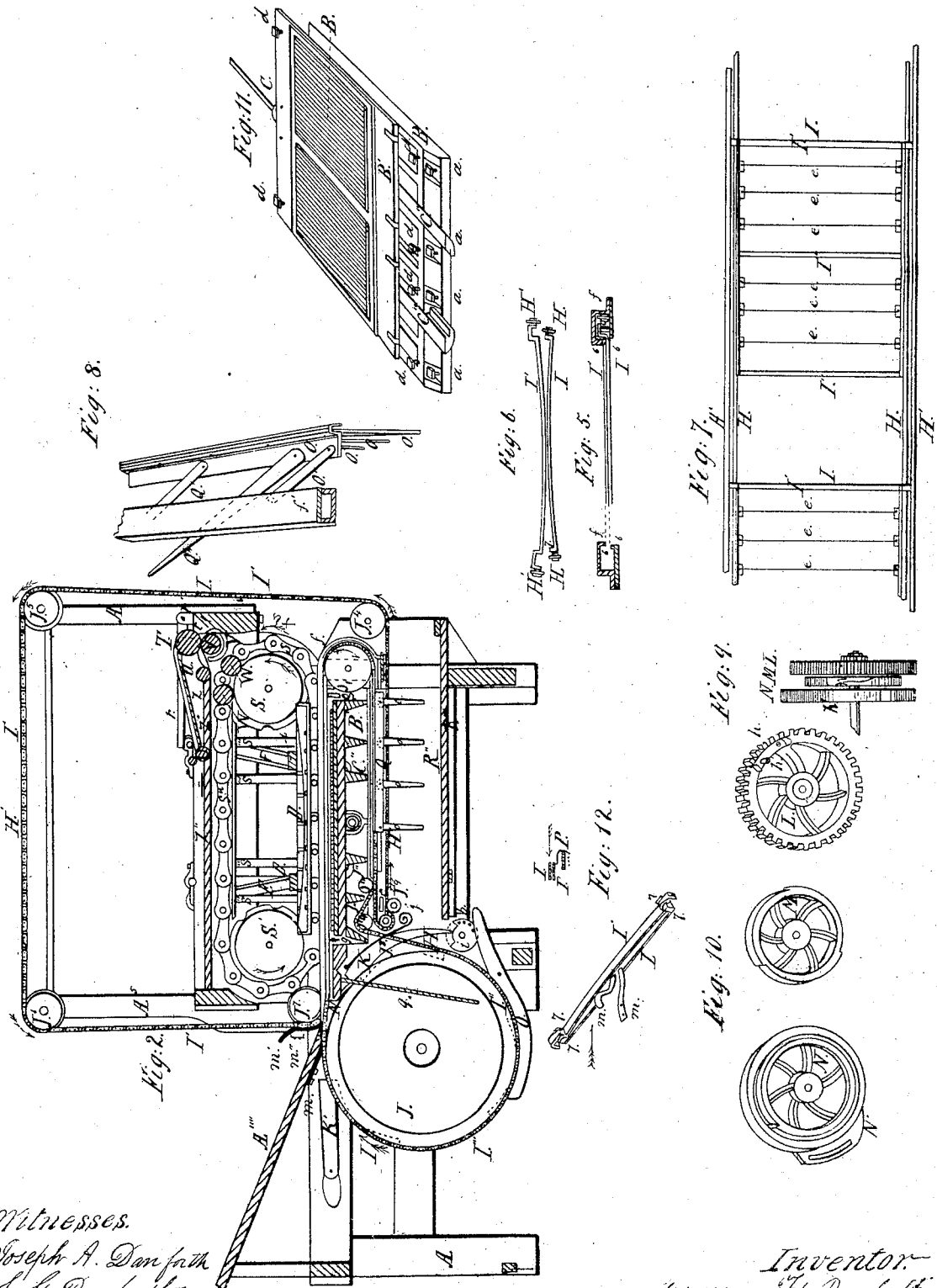
Witnesses.
Joseph A. Danforth.
S. G. Danforth.

Inventor.
William H. Danforth.

*W. H. Danforth. Sheet 2 of 2 Sheets
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UNITED STATES PATENT OFFICE.

WILLIAM H. DANFORTH, OF SALEM, MASSACHUSETTS.

IMPROVED PRINTING-PRESS.

Specification forming part of Letters Patent No. 15,477, dated August 5, 1856.

To all whom it may concern:

Be it known that I, WILLIAM H. DANFORTH, of Salem, in the county of Essex and State of Massachusetts, have invented a new and useful improvement upon the power printing-press that was patented to me on June 21, 1853; 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 perspective view of the single-acting press. The same features carried out are as applicable to the double-acting arrangement by which two sheets can receive their impressions at one operation, as shown in my said patent specification. Fig. 2 is a longitudinal section of Fig. 1, taken, at the red dotted lines *x*, showing the operation of the feeding arrangement, &c. Fig. 3 is a transverse section taken at the red dotted line *x'*, Fig. 1, showing the manner of actuating the type-forms, &c. Fig. 4 is a perspective view of the vibrating guide and gage frame detached from the frame and drawn to a larger scale the better to show the action of the parts for the purpose of sustaining the feed-chains in line with each other, &c., when passing across over the types. Fig. 5 shows a cross-section of the top half of the guide and gage frame taken at the red line 2, Fig. 4, showing the side lips that keep the feed-chain in line laterally. The feed-chains and gripping-bars are shown in place at one side. Fig. 6 shows a pair of gripping-bars detached, and showing the manner of constructing and attaching them to the two sets of chains, &c. Fig. 7 shows a plan view of the feeding-chain, gripping-bars, &c., in the places they occupy relatively to each other, showing also the cross-strings in place which sustain the sheets in line with the cross and gripping bars, &c. Fig. 8 shows a detached perspective view of one-half of the adjustable parallel paper-guide that conducts the discharged sheet to the pile. Fig. 9 shows an edge view of the arrangement for operating the feeding-pulleys detached from the frame as they appear when the parts are in place. Fig. 10 shows a face view of the same when the parts are separated. Fig. 11 shows a perspective view of the type-bed and attachments. Fig. 12 is an enlarged view of the bar-separators and brush P detached.

The nature of my improvements consists in reversing the order of the type-bed and platen from that seen upon my said double-acting power-press, so as to permit the type-form to be used face up, so that it can be run out upon a stand placed by the side of the machine to readjust the matter locked up therein when it is required and be allowed to remain in its place under the platen in its vibrations while the entire edition is being printed, if such readjustment is not desired; in the manner of combining and arranging the discharging cross-bars and chains with the feeding cross-bars and chains, so that the two sets shall assist each other in feeding in, as well as in discharging, the sheets; in the manner of constructing the gripping-bars so that both sets of chains can run alongside of each other, so that the above effect can be attained, &c.; in the use of a movable guide and gage frame for the purposes hereinafter to be shown in the device employed for insuring precision and uniformity of action to the different sets of gripping-bars at the time that they seize and relax their hold upon the sheets; in the device employed for conducting the falling sheets to the pile after they have been set free from the gripping-bars; in the manner of operating the feeding-pulleys so as to allow the necessary intervals of rest to allow the impressions to be given, and in the method for insuring an equal deposit of ink upon all parts of the surface of the ink feeding or supplying apron.

In the following description like parts are represented by the same letters in all of the figures:

A is the frame, which may be made of either wood or iron.

B is the type-bed, Figs. 11, 2, and 3, which is to be made of cast or wrought iron, it being formed with a series of cross-bars running from side to side, connecting the two together firmly; and if made of cast-iron, the whole being cast together in one piece, the whole being generally about three and a half inches in depth, and the cross-bars not far from an inch in breadth at the top and a half inch at the bottom for the largest size machine, thus making comparatively a very light bed, so that it can be easily carried about from place to place in the hands of two ordinarily strong persons, thus allowing the press to be taken apart or set up without the employment of a mechanical power to effect the same. The

two sides of this bed B have a series of set-screws *a a a a* passing down through them, the bottom ends of which rest upon the face-plates *a' a'*, which have slight sinkages in their faces to receive them, to hold the bed in place after it has been adjusted to its proper line, so that the working of the machine shall not throw the different parts of it out of line with the other parts of the press. These sinkages are shown by the black mark terminating the dotted lines of two opposite set-screws *a* in Fig. 3, (when the frame A is made of iron these face-plates *a'* will not be required, as the sinkages can be made in it instead, as these face-plates are simply designed to protect and render the top edges of the parts A' A' sufficiently firm to resist the amount of pressure that is brought to bear upon them, when the impressions are being given upon the sheets, when these parts are made of wood,) and according to the direction these set-screws are turned the bed will be raised or lowered at pleasure to regulate the exact quantity of pressure required to give the impressions when the platen acts upon the face of the type-form which rests thereon.

B' is the traveling bed-plate, to which the type-form B'' is attached and upon which it rests. This bed-plate has a rack *c* upon its under side, (this is seen in Fig. 3, where one of the cross-bars of the bed B is shown with the top part broken out, so that this rack may be seen,) which rack meshes into the worm C, which has its shaft fitted to work in bearings upon the type-bed B, so that when this worm is made to rotate either way by turning the crank-handle C' upon the outer end of its shaft to act upon the rack *c* to cause the type-form and bed-plate to be taken out upon the composing-table A'', or from it into the machine. This worm cannot get out of place by receiving an end-to-end motion by this act.

The composing-table A'' is supported by the two posts or standards A''' upon its outer side, while the inner side rests upon and is connected to the type-bed by means of links or straps 3 3, (one end of each seen in Fig. 1.) which have one of their ends secured to the table A'' and the other to the bed, so as to secure the two together, so that when the type-bed is raised or lowered by turning the adjusting-screws the inner side of this table will be also as much, so that its top surface shall be always in line with the top surface of the type-bed to prevent any obstacle to the free passage of the bed-plate B' from one to the other being formed by this act.

C'' C'', Fig. 11, are two gage-bars attached to the bottom of the traveling bed-plate B'. These bars have one edge rabbeted so as to form a tongue or lip when they are in place, which fits closely under a corresponding one upon the side of two of the cross-bars of the type-bed B, so as to guide the bed-plate in a direct line when it is in motion, and at the same time prevent the action of the revolving worm against the teeth of the rack *c* from

lifting the bed-plate and type-form so as to throw these teeth out of gear. The bed-plate and form are secured, when they are in place under the vibrating platen, by the set-screws *d*, which hold them in place while the operation of printing is going on, or until some slight or other alteration in the matter locked up in it is required, when it will be seen that by loosening the screws *d* a few turns and turning the crank-handle C' round a few times the traveling bed-plate and form will be brought out upon the table A'' in a rapid manner, and can be readily performed by a lad or girl of ordinary strength, instead of requiring the united strength of two strong men to effect this, as now required upon other presses of this class.

D is the platen. This is to be made of cast-iron, as light as it can be, having suitable strength of parts in view. It may be cast hollow—*i. e.*, like a box—having one side to it, which side forms the face, and which part may be made very thin and strengthened upon its back by a series of very thin arched flanges cast upon it, which arches spring both ways from the sides and ends, crossing each other at right angles, as seen in Fig. 2, the whole being cast together in one piece, making as stiff a platen upon its face as if it were cast solid, with but a very small part of its weight to be overcome.

D' D' are two cross-bars or arms, which are to be secured firmly to the top side of the platen by screw-bolts. These arms have their ends fitted round the stationary guide-rods E E, (seen in Fig. 3,) that guide the platen in a vertical line in its vibrations. The ends of these rods are secured to the frame A at the top and to the cross-bars E' at the bottom, which bars are secured to the framing at their ends, so that these rods shall be firmly fixed in their places.

F F F F are four connecting-rods, which connect the ends of the platen-arms to the cranks on each end of the shafts of wheels G G', so that when these shafts revolve the platen will be guided up and down by the rods E to give the impressions.

The feeding of the sheets into the machine is to be done as follows: II II', Fig. 7, are two sets of endless chains, one set arranged alongside of the other, so as to travel upon the same surface of pulley the one as the other, to insure both sets traveling at the same speed at all times. The inner set II is divided off into three bays or divisions by means of the gripping-bars I, (which, being under the bars I' of the other set of chains, is not seen in this figure,) which are to act upon the leading edge or margin of the sheet upon its under side. (There may be more or less divisions, according to circumstances.) Each of these divisions or bays are subdivided by the cross-bars I'' I''' into two parts. The part occupied by these bars is to be covered by the sheet, which is sustained in line with the face of these bars between them by

the cross-strings *eeeeee*, which have their ends attached to the inside of the chains by means of a series of angle-links, each link having a hole drilled through it to receive the end of the string at the point that it is required to occupy or any other known manner, so that these strings can be drawn to their greatest degree of tension while passing over the type without displacing the chains from the line they are required to travel in, and thus allow them to withdraw the sheets from the type-face after they have been pressed down upon it by the platen, as will be shown hereinafter. The other half of these divisions is always uncovered to allow the inking-rolls to pass down through them sufficiently far in their revolutions to act upon the face of the type to ink them as they pass across them at the same time that the printed sheet is being removed and another blank sheet is being taken into its place by the gripping-bars of the next division. The outer set of chains *H'* has the top set of gripping-bars attached to it, so as to correspond to the gripping-bars *I* of the inner set. This set of gripping-bars has its ends crook over the inner set of chains *H*, as seen in Fig. 6, and is attached to the inside of the outer set *H'*, and are made to press upon the lower set of gripping-bars where the two sets unite, so as to cause one to straighten the other, as seen in Fig. 5, the ends of them being kept together by the guide and gage frame *f* (all parts of this frame is shown in Fig. 4 and by the dark shading in its place in Fig. 2) during the time that they are required to be, and thus grip the sheet firmly between them, so that full-width sheets or narrower are equally well gripped between these two sets of bars without any alterations of parts being required.

The two parts of the upper half *f* of the guide and gage frame have lips *6* upon one side (seen in Fig. 5) to hold the chains in place while they are acted upon by the cross-strings *eee* when they are removing the printed sheet from the types, as above referred to, the two sides of this frame being so placed that the inner set of chains, on the contrary, will be drawn a little farther apart by the action of said lips than the chain naturally assumes when free from their influence, which will draw the strings as tight as may be desired while passing across over the types and keep all parts of the sheet from touching the inky surface, &c. The top part of the lower half *f'* of the guide and gage frame may or not have lips upon them, as their office being simply to hold the ends of the bars together until they arrive at the point where they are required to separate, this is not absolutely necessary.

To one end of the movable guide and gage frame *f'''* the movable or vibrating pulley or cylinder *J'* is attached by its shaft, so that it will play up and down with it when it is made to vibrate by the action of the stops *D''* *D''*, Fig. 3, upon the sides of the platen, act-

ing upon the top of it to press it down to give the impression upon the sheet, or by the four weighted levers *g g g g*, upon which the top half of this frame rests when it is elevated to lift the printed sheet up from the face of the type to the line that it travels in above it preparatory to being removed to the pile. The inner ends of the lower part *f'* of this movable frame vibrates upon a pin *f''*, (one seen in Fig. 4,) by which they are attached to the parts *A' A'* of the frame of the machine, Fig. 3, the connection of the lower parts *f'* with the end *f'''* being such by means of joints as to allow the top half to adapt itself to the position of the platen while it is acting upon it. By the use of this vibrating frame the sheets can be elevated farther above the face of the type than is common in printing-presses in common use, by which greater security can be attained against soiling the sheets while they are passing across over them.

The outer set of chains *H'* are somewhat longer than the other set. It has five bays or divisions. (There may be more or less, according to circumstances). This set passes round outside of the machine in the direction of the arrows, Fig. 2, round the pulleys *J⁴ J⁵ J⁶ J⁷*, and thence across the machine inside, round the vibrating pulley or cylinder *J'*, and thence across again round the pulleys *J⁸ and J⁹*, (which run upon stationary bearings,) back round outside the pulleys *J¹*, &c., again, while the inner set *H* plays round the feeding-pulleys *J* and thence passes across inside of the other set, round the vibrating cylinder *J'*, and thence back again across the machine under the pulley *J''*, and up over the pulley *J'''* (each of these latter run upon stationary bearings) to the feeding-pulleys *J* again, and as this latter set operates the other, I will describe the different parts relating thereto before finishing the description of the action of these feed-chains, gripping-bars, &c.

The feeding-pulleys *J J* (there are two on one shaft on opposite sides of the machine, as seen in Fig. 1) are to be made as light as possible, having suitable strength of parts in view and of such dimensions that by turning them two-thirds round they will throw the feed-chain along the length of a bay or division, after which they will become pawled by the two sets of pawls *K K'* acting upon them in opposite directions to each other. (One set seen in Fig. 2.) The pawl *K'* is to prevent any rebounding of the pulleys when the pawls *K* act upon them to bring them to a stop. These pulleys may be made of such dimensions as to be turned half round instead to accomplish this, which on some accounts may be preferred for some sizes of the press, in which case two instead of three sets of notches upon their peripheries will be required to be used for the pawls *K K'* to act upon. The peripheries of these pulleys and also the vibrating cylinder *J'* will have the usual studs or points for the chain to act

upon to prevent their slipping upon them. These feeding-pulleys are operated so as to remain stationary during the time that the impressions are being given, as follows: L is a gear-wheel that is loose upon one end of said pulley's shaft. This wheel carries a pawl h (seen in Figs. 9 and 10) upon one side of it, which pawl acts against the notches in the periphery of the ratchet-wheel M. This wheel is fast upon said shaft, so as to couple the two together for a part of every revolution, and thus throw the feed-pulleys J round until the two become unpawled, which is accomplished as follows: N is a disk-wheel which has the shaft of the pulleys J playing loosely through its center, and is secured to the frame of the machine by the adjusting-screw that passes through a slot in the flange N' at its side, so as to allow this disk to turn on its axis, so that the exact time of unpawling that may be desired may be obtained. This disk-wheel has a groove in its face to receive the stud or pin h' , that projects out from the side of the pawl h near its outer end to keep said pawl in place, acting against a notch in the ratchet-wheel M while it is being carried round by the revolving feeding-wheel L, until said stud slides up an inclined plane u , placed in said groove, which part is brought round to the point where the unpawling is required to take place, and the disk-wheel secured rigidly to the frame of the machine at this place, the groove being enlarged at this part to allow this unpawling, when the ratchet-wheel will be free from its action and be allowed to be carried round by its own momentum and that acquired by the feed-pulleys until they become pawled, and remain stationary afterward until the pawl h has traveled round and acts against the next notch. As it is evident that when the press is driven at a rapid rate there will be much more momentum accumulated by the feed-pulleys than when operated slowly by hand-power, it follows that by graduating the time between the unpawling of the ratchet-wheel and the pawling of the feeding-pulleys J J to correspond to the speed that these pulleys are driven, then a sufficient amount of time can be had to rob them of their velocity before the pawls K act against the notches in their peripheries.

The pawls K are operated and the speed of the feed-pulleys checked as follows: L', Fig. 1, is a gear-wheel meshing into the revolving feeding-wheel L. Both of these wheels have the same number of teeth upon them, and consequently make the same number of revolutions in an opposite direction in a given time. This wheel L' carries upon its shaft two disk cams $i i$ (seen in Fig. 3) upon opposite sides of the machine from each other. Each of these disk cams has a gap in its periphery (seen in Fig. 2) of about one-fifth of its circumference to receive the bottom end of the horn that runs down below the pivot or bearing of each of the pawls K to allow

said pawls to act against the notches in the periphery of the pulleys J during the time they are required to be stationary while the impression is being given, after which the side of the gaps come round and act against the side of these horns and carries them inward and the top ends of the pawls outward, until the ends of the horns rest upon their peripheries, which will hold the pawls out of contact until the feed-pulleys have nearly completed their throw of the feed-chain, at which time the gaps arrive round again and the ends of the horns slip into them again, and thus permit the springs j to carry the top ends of the pawls in against the periphery of the pulleys J to act against the next notches that come round. The disks $i i$ have a series of holes b drilled in their sides to receive one or more pins or studs, (as may be required,) which pins are to project out, so as to act upon the top side of the inner ends of the brake-levers O at the instant that the ratchet-wheel M is unpawled, and thus press them down as these disks revolve, and the curved parts on the other side of their fulcrum-pins press upward against the bottom of these pulleys and keep them in action until the pawls take effect, after which these pins will have passed off from them, which will permit the brakes to drop out of contact, (as the outer end is to be the heaviest for this purpose,) and thus allow the feed-pulleys to move round again freely as soon as the pawl h shall have arrived at the next notch in the ratchet-wheel M.

$m m'$ are the gripping-bar separators, the object of which is to keep the bars apart when they approach each other on opposite sides of the sheet until they shall have passed within a given distance of the flexible gage n , when the two bars will instantly unite and take the sheet that had been previously entered as far as this flexible gage into the machine over the type-form. The bottom separator m is an iron strip that is secured by one end to the bottom of the tympan A''', near its center, and projects down to the line that the face of the bars travel in after the two bars become united, while the top separator m' is attached by one end to the cross-bar m'' , near its center, which bar has its ends attached to the standards A⁵ A⁵, so as to permit the chains and gripping-bars of the outer set H' to pass down inside of it, and the top separator m' , which is made to curve down under the shaft of the pulleys J', but above the line that the face of the bars travel in after they become united, and as the two are to project inward exactly the same distance it follows that the two bars will be allowed to act upon the sheet at precisely the same instant, and thus, if care be taken to enter the sheets exactly to the gage n , all of the sheets used will be fed in with great uniformity.

The flexible gage n is to be made of anything that will yield freely to the action of the gripping-bars as they pass along, and spring back again to its original position afterward,

as the top edge of it is required to project up above the line that the bars travel in. A strip of thick sheet india-rubber secured by the bottom edge to a cross-bar of the frame, as seen in Fig. 1, will answer in most cases, or a steel spring can be used in the same manner.

The second movement of the feeding-pulleys J will take the sheet that I have supposed to have received its impression while over the type-form round under the type-bed to be deposited upon the pile R'' upon the sliding platform R''' as soon as the two gripping-bars become separated, Fig. 2, by the bar I of the inner set of chains H passing up over the pulleys J''' out of the line that the other bar I' is traveling in. Before the two gripping-bars begin to separate they act against the top edge of a double thickness of hair-cloth P, Fig. 3, that is attached to a cross-bar that extends across the machine between the two chains to support this (seen in Figs. 2 and 12) and carry it back with them until the two bars begin to separate, when this hair-cloth brush will spring up and draw the sheet from between them and let it fall to the pile.

It should have been stated in the foregoing that the gripping-bars I of the inner set of chains H are to have lips 7 upon their ends projecting out on each side of them, so that when the other set I' are acting upon them the two will become coupled together to further insure a uniformity of speed to the two sets at all times. These lips are seen in Fig. 12.

The discharged sheet is guided in its descent to the pile by having its edges act against the series of pendants $o' o' o'$, which are suspended to the adjustable top pieces Q Q, Figs. 4 and 8, in grooves in the under side, so that when the top gripping-bars I' are returning back round the pulleys J⁴, &c., to pass again through the machine, these bars will act against these pendants and fold them up into said groove until they have passed, when they will all drop perpendicularly. The sides of the grooves (when made full size) will prevent the pendants receiving lateral motion by their fall. The grooved top pieces Q have a flange at their side to which the links Q' Q' are pivoted at one end, while the other ends are pivoted to the under side of the bottom part f'' of the gage-frame, so that these top pieces will swing inwardly and both keep always parallel to each other, carrying the pendants with them, and thus narrow the space to adapt it to the width of narrower than full-sized sheets that may be required to be printed, and are held in this position by the catch-bar Q'', which has one end pivoted to the flange in the same manner as the connecting links, while the opposite end acts against notches cut in the frame, or the teeth of a rack placed there for this purpose.

f^4 is a curved fender, which has its ends attached to the cross-bars of the vibrating

frame outside of the vibrating cylinder J' to restrain the sheets from being thrown out by the centrifugal action when the direction of motion is reversed to allow the sheet to pass round underneath the type-bed over the pile R''.

q is a screen, which is intended to fill up the space between the two feeding-pulleys j to prevent a current of air drawing through and acting upon the falling sheets to prevent their being piled uniformly.

R is an adjustable gage, against which one edge of the pile of sheets R', Fig. 1, are to be laid previous to their being entered into the machine to insure a uniformity of action upon all as they are fed in.

The arrangement for keeping the inking-rollers supplied with ink in their revolutions I will now refer to to show the improved manner of arranging and operating the parts. S S', Fig. 2, are the wheels that operate the endless chains S'', to which the shafts of the inking-rollers W W are attached so as to be carried along with them in the direction of the arrows, the horizontal parts of chain S'' being kept in line as it passes across by the supporting-frame S''', which causes them to act with a uniform pressure upon the parts, to take up a supply of ink while passing across in the top half of their revolution, while the platen is passing down to give an impression, and to deposit it uniformly upon the face of the type while passing across underneath said platen in the bottom half of their revolution in the open space between the sheet just printed that is being removed and the next sheet that is to follow, the feeding arrangement having started along at the instant that the inking-rollers entered said open space to permit this to be done. T is a revolving endless ink-feeding apron from which the inking-rollers take their supply in passing across under it, as above stated. This apron is to be made of india-rubber cloth or some other suitable substance that shall receive the transfer of ink readily, and will permit it to be washed off after the press shall have completed its work without contracting it. This apron plays round the pressure-roller U and the two friction-rollers U' U'', which rollers are connected together by the iron frame or case Z, which forms the bearings of their shafts, while the ends of the shaft of roller U'' pass through and find bearings in the frame of the machine, and thus forms a pivot for this case, &c., to turn upon when the pressure-roller end is elevated to get at the ink-fountain or to take it out altogether, as may be desired. The shaft of the pressure-roller U has a coupling-disk Y'' upon one end, which attaches it to a corresponding one upon the end of the shaft of the small gear-wheel Y', which meshes into another Y, having the same number of teeth upon it, which is fast upon the shaft of the fountain-roller beneath it, (seen in Fig. 1,) from which it takes its motion, so that when on

revolves the other will also, each making the same number of revolutions in a given time; but as the fountain-roller V is smaller in circumference than the pressure-roller U (both seen in Fig. 2) it follows that the periphery of the pressure-roller will travel faster than that of the fountain-roller, and consequently will cause the ink-feeding apron to receive, while it is being fed through between these rollers, a drawing or wiping motion, which will wipe the ink from the fountain-roller as it passes. The roller U is kept pressing down upon the apron as it feeds it along by means of its own weight and the weighted lever-frame *r*, which has its outer end pivoted to the rods *r' r'*, and then extends inward across over the shaft of said roller and rests upon it, thus allowing any amount of pressure that may be desired to permit the requisite quantity of ink to pass between the apron and the surface of the fountain-roller V to be had, and as this pressure is equal, it follows that an equal quantity of ink will be deposited upon all parts of this apron at all times alike, and as the apron is kept in line while the inking-rollers W are acting upon it by the bed *z'* of the case Z it follows that if this surface that is acted upon is equal to the surface of each of these rollers that each roller will receive as much ink upon one part of its surface as another; but as the difference between the speed that the inking-rollers travel as compared with that of the apron is such that the first roller that passes across it will receive more in quantity than the next that is to follow, and as each of these rollers has to act upon the distributing-surface of the portable platform Z'' before they pass down across the types it follows that the quantity of ink upon all of the rollers will have become equal before this is done. The area of the surface of the part of the apron that is acted upon by the inking-rollers may be extended, so as to allow the rollers to complete two or more revolutions before leaving it for the equalizing-surface, if it should be found desirable, when more than two inking-rollers are employed. — is an adjustable knife to graduate the quantity of ink that is carried up by the fountain-roller in its revolutions to prevent the ink accumulating at the junction of the apron with said roller. The principal object in view in this ink-feeding arrangement is to provide an inky surface for the traveling inking-rollers to act upon that shall deposit an equal quantity of ink upon all parts of their surface by once passing across it, so that at the first starting of the machine all parts will be in readiness to receive and print the sheets, instead of first having to get the inking-rollers equally covered with ink, as is commonly done, and thus cause an unnecessary delay at the commencement of operations. The power is applied (in the direction of the arrow) to the pulley X V, (a part of it seen in Fig. 2.) which is upon one end of the shaft of the chain-wheels S, which will set the inking-rollers W to re-

volving round the platen, while the gear-wheel X'' upon the opposite end of said shaft, (seen in Fig. 1,) by means of the connecting-wheel X''', will set in motion the gear-wheels G G' upon one end of the shafts of the cranks to which the platen D is suspended, causing said platen to vibrate up and down alternately as they revolve, and thus allow it to be adapted to the requirements of the revolving inking-rollers W, while at the same time the same connecting-wheel X''' will set in motion the wheel X I V, which is on the end of the shaft of the ink-fountain roller V, and thus cause the ink-feeding arrangements to be set in operation, while the sheet-feeding arrangement is set in operation at the proper time required by means of the two connecting-wheels L² L³, communicating the motion of the wheel G' to the revolving feeding-wheel L on the shaft of the feeding-pulleys J J, as has been sufficiently set forth in the foregoing.

Having now finished the description of my improvements, I wish to say, further, that I do not wish to confine myself to the exact form and arrangement of the parts specified, as long as the principle involved is adhered to, as there are other forms and arrangements of parts that I have in view that will not conflict with the foregoing.

I do not wish to be understood as claiming the broad use of a type-form when it is required to be run out upon a stand placed outside of the platen between every impression to allow the types to be inked; but

What I do claim as of my invention, and desire to secure by Letters Patent, is—

1. The traveling bed-plate and its attachments, as described, substantially, in combination with the bed B, worm C, shaft, and crank C', (or their mechanical equivalents,) and table A'', the whole being arranged and operated substantially as described, and for the purpose shown.

2. The improved manner that I have designed forming the two sets of gripping-bars I I' for insuring an equal grip upon the sheets throughout their whole length, as set forth, and in the manner of arranging the two sets of endless chains to which they are attached, so as to allow the two sets of gripping-bars to act together continuously upon the leading edge of the sheet from the time that they seize upon it until it is discharged printed from the machine, and also in the manner of insuring precision and exactness of action to the gripping-bars at the time that they seize upon and relax their hold upon the sheet, by the employment of the bar-separators *m m'* and brush P, the whole being arranged and operated in a manner substantially as described and shown.

3. The movable or vibrating guide and gage frame *f*, constructed, arranged, and operated in a manner substantially as described, for the purpose of holding the ends of the curved gripping-bars together while they are

required to grip the sheets, and for giving to the cross-strings *e e e*, by means of the side lips or flanges *g g*, &c., their required degree of tension to enable them to hold up the center of the sheets between the cross-bars while passing them across over the types, and also enable them to withdraw the printed sheet from off the face of the types by not allowing the chains *H H* to be displaced from the lines that they are required to travel in by this act, and for guiding the two sets of chains *H H'* and their attachments across in a line above the face of the types and pile of discharged sheets, substantially as described, for the purpose shown.

4. The employment of a series of pendants *O'*, suspended from movable top pieces *Q*, so that they can be moved in or out to adapt them to the various widths of sheets required to be printed and keep them always in lines that are parallel to each other, substantially as set forth, for the purpose of uniformly

guiding the discharged sheets as they fall to the pile.

5. The device employed for giving the necessary interval of rest to the feeding-chains, gripping-bars, &c., at the time that the impressions are to be given, consisting of the feeding-pulleys *J J*, feeding-wheel *L*, ratchet-wheel *M*, pawl *h*, stud *h'*, adjustable grooved disk-wheel *N*, wheel *L'*, cam-disks *i i*, pawls *k k' k'*, pins *b b*, and brake-levers *o o*, as herein specified.

6. Feeding the ink-supplying apron between the pressure-roller *U* and the periphery of the ink-fountain roller *V*, in a manner substantially as shown, for the purpose of insuring a graduated and an equal deposit of ink upon all parts of its surface, for the purpose shown.

WILLIAM H. DANFORTH.

Witnesses:

JOSEPH A. DANFORTH,
S. G. DANFORTH.