8380X

5 Sheets—Sheet 1.

O. TUFT.

POWER PRINTING PRESS.

Patented Aug. 22, 1834.

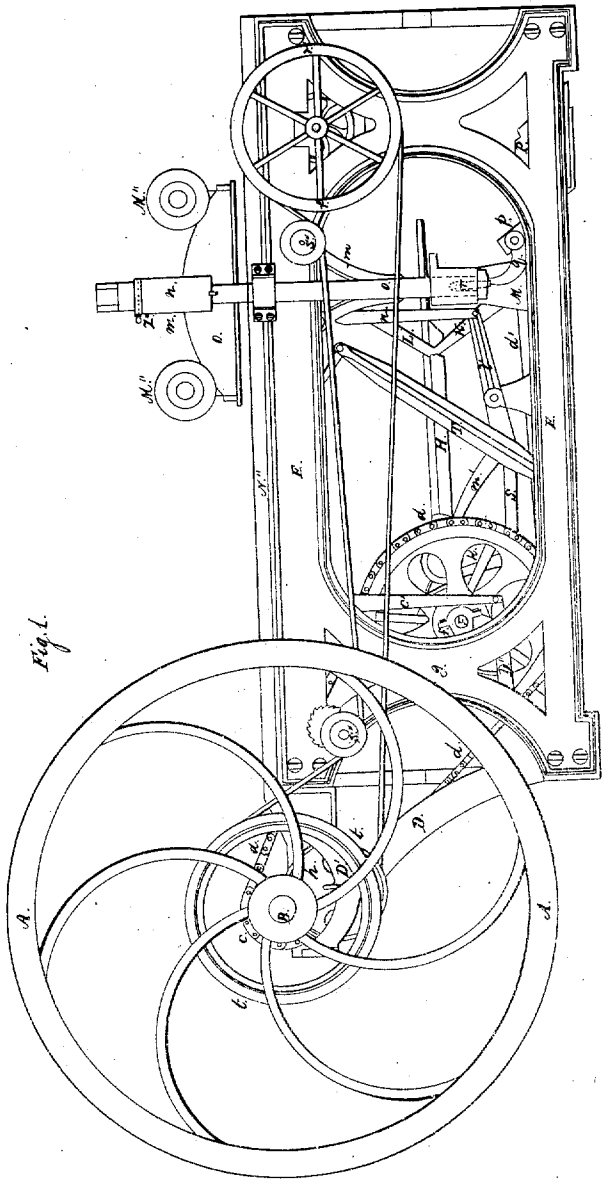


Fig. 1.

8380X

O. Tufts. Sheet 2. 5 Sheets

Printing Press

No. Patented Aug. 22. 1834.

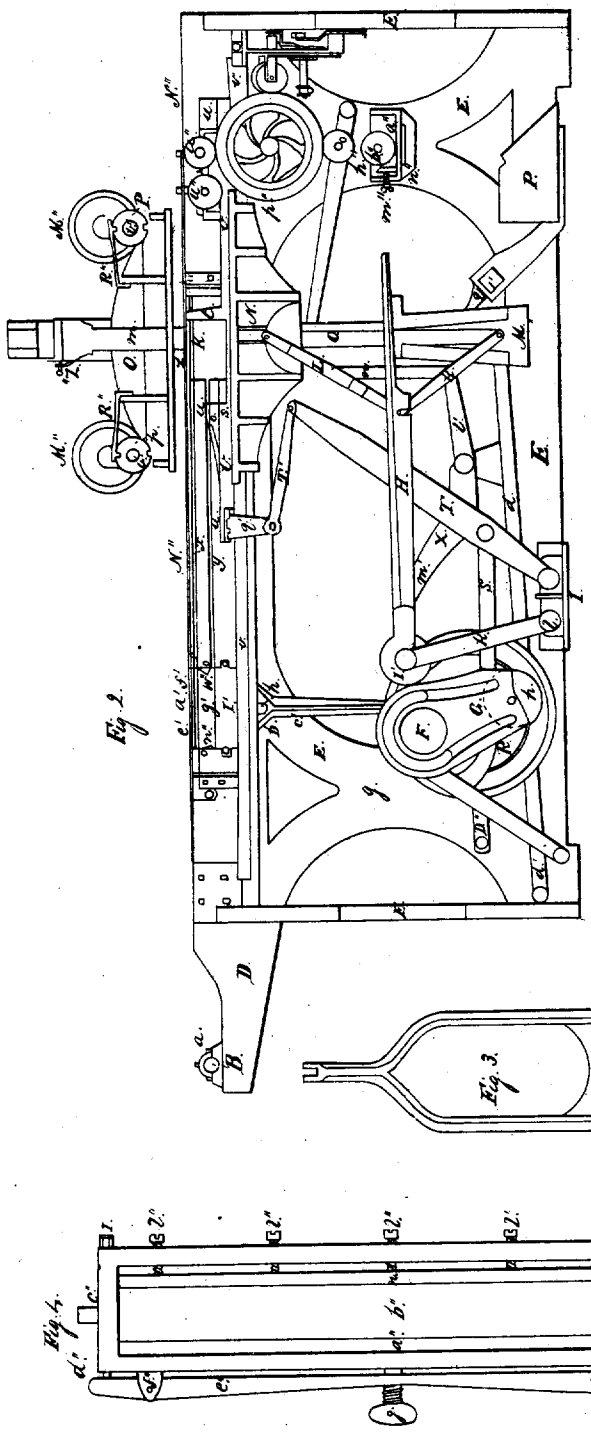


Fig. 1.

Fig. 3.

Fig. 4.

8380X

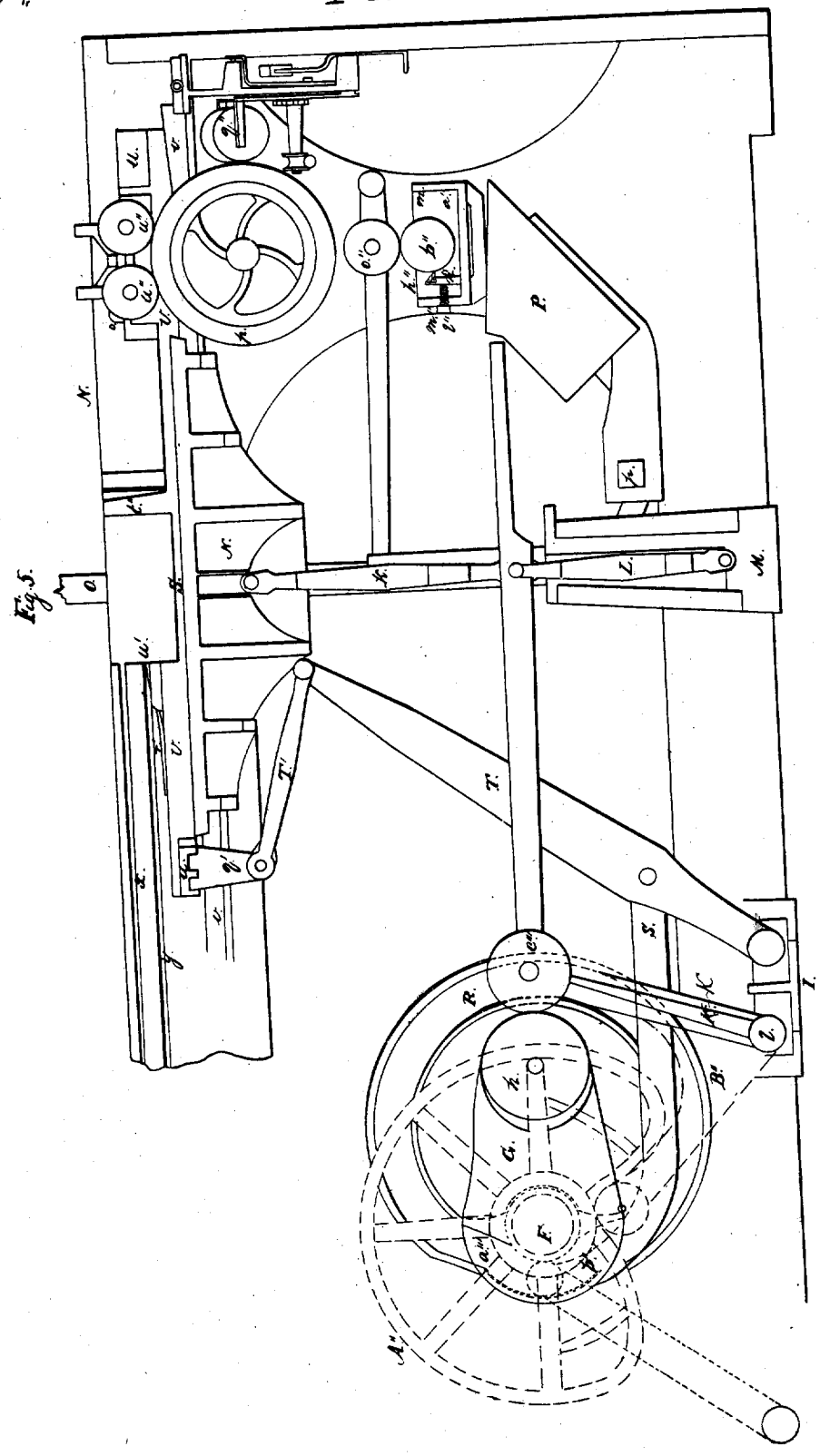
Sheet 3. 5 Sheets.

O. Tufts.

Printing Press.

No

Patented Aug. 22. 1834.



8380X

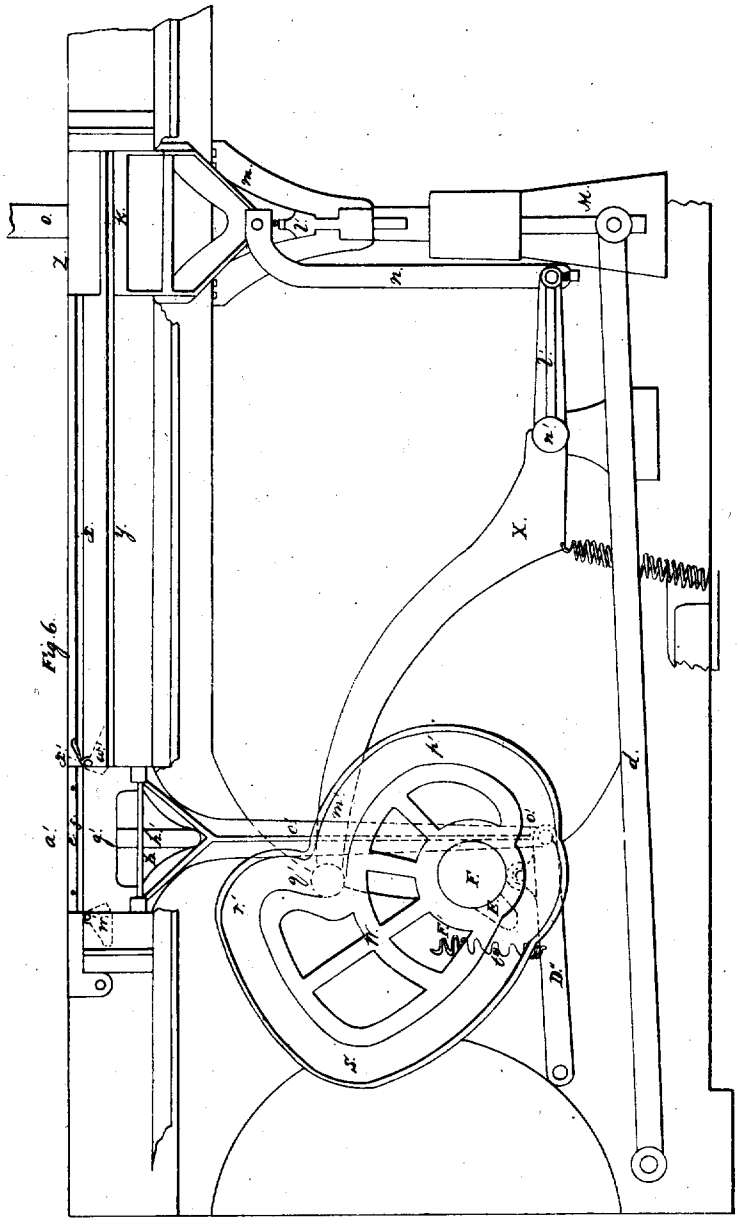
5 Sheets—Sheet 4.

O. TUFT.

POWER PRINTING PRESS.

Patented Aug. 22, 1834.





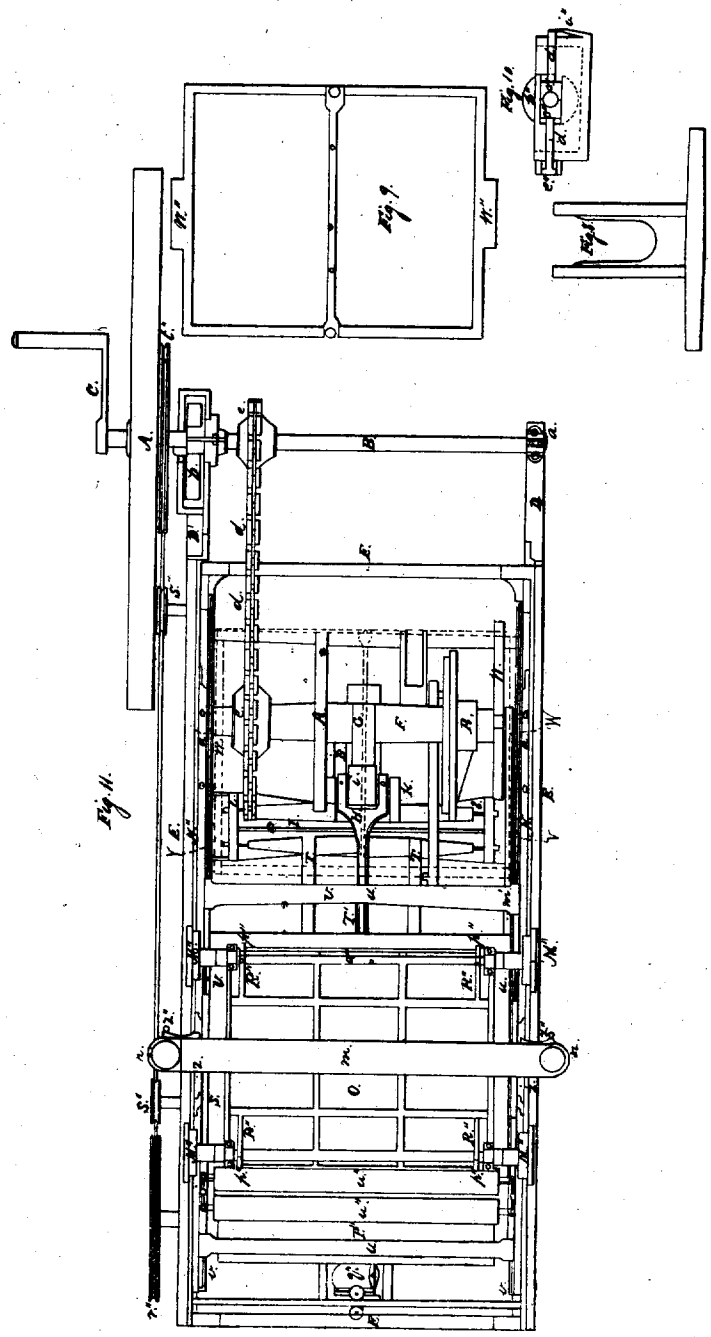
8380X

5 Sheets—Sheet 5.

O. TUFT.

POWER PRINTING PRESS.

Patented Aug. 22, 1834



Aug 22 1834 34

Otis Tufts
Letters Patent

The schedule referred to in these Letters Patent and making part of the same containing a description in the words of the said Otis Tufts himself of his improvements in the "Power Printing Press"

To all persons to whom these presents shall come Otis Tufts of Boston in the County of Suffolk and State of Massachusetts sends greeting Be it known that I the said Otis Tufts have invented made and applied to use certain improvements of machinery for the purposes of printing paper or other substances generally used for receiving impressions from types. Which improvements when all combined together with other parts constitute and are commonly known by the appellation of a "Power Printing Press" The disposition arrangement and use of the several parts I have fully described and set forth in the following and annexed drawings which taken in connection form my specification. The main or principle difference between this Power Press and others now in use consists in supplying it with paper to be printed from one side of the frame by using two frisket one of which is under the operation of an impression from the platten while the sheet of paper last printed is being removed from the second frisket and another sheet supplied. As soon as the frisket last mentioned has received an imprint from the types it is withdrawn by the operation of the machinery from between the platten and frame and the second frisket caused to pass in between the platten and frame in order to be acted on in its turn. So on in succession each passes out from between the platten and frame with its printed sheet while the other with the sheet to be printed is made to pass in between the platten and frame. A represents the fly wheel of the press constructed in the usual form and suitable size being attached to the driving shaft B. The shaft is operated on and caused to turn round by man-

Drawing of the frame

and labor operated on a crank C. by means of a steam engine, fore connecting former acting on a drum or pulley affixed on its end. The shaft B. revolves at one end in a composition or other suitable metal box or attached to the extremity of the stunt D. of the cast iron frame E.E. The opposite end rests on the periphery of a friction wheel b. in the stunt D. A pinion c. is fastened on the driving shaft B. whose teeth act in the interstices or links of a chain belt d. passing around it and the cogged wheel c. on the main shaft F. The frame E E. of the press is of cast iron but may be constructed of wood or other suitable material shaped and formed as seen in the drawings or otherwise shaped and formed to answer the intended purposes of supporting the bed platten and machinery for the operations connected with the same. The main shaft F. has journals at each extremity revolving in composition or other suitable metal boxes f. f. attached to the upright posts g. g. of the frame work E. E. as seen and represented in the drawings. To the centre of the main shaft F. is secured in a proper manner a cam G. constructed of the form seen in Figs 2, 5. having a roller h. in its small end for the purpose of diminishing the friction at the time of the impression and which also turns round a certain distance at every revolution of the cam. thus presenting a new surface for the roll in the end of the pitman to move over by which the abrasion of the roll is greatly diminished. The opposite end of the cam the axis of a circle. the centre being in the centre of the shaft. (Drawing the revolution of the cast mentioned part on or against the roller i in the end of the pitman H. it produces the motion of the pitman rather backwards or forward but as soon as the side of the cam came in contact with the roll it presses it forward until it arrives at the extreme end of the roll on the cam when the impression ceases and the opposite side of the cam forces the pitman to recede until the roll in the end of the pitman meets the greater surface of the opposite

of

of the cam and again becomes stationary during the revolution of the said surface. The pitman H. is supported during its back and forth movements by the upright vibrator K. (of the form seen in Fig. 8.) to which it is attached at the top by a joint.

The lower end of the upright K. revolves on bearings b, b, attached to a bar or connecting piece of iron I. of the opposite sides of the frame B B. The opposite end of the pitman H. rests on the centre pin of the toggle joints K. L. and causes them to be brought together or into a straight line with each other by the centre pin bearing against the side of a circular space cast in the lower side of the pitman as more clearly represented in Fig. 3. That part of the pitman from where it rests on the centre pin of the toggles (when in motion) to the extreme end of the same is formed flat on the lower side so that when the pitman is raised this part offering no projections but a plain surface throughout its length to the centre pin of the toggles moves over the said centre pin without producing any back or forth motion of the joints.

The lower end of the toggle K. rests on a pin in slope in the large iron angle beam M. The upper end of the toggle L. plays on a similar pin or slope in the lower side of the bed N. The platten O has a large iron beam m. cast or attached to its upper side. the ends n, n. projecting over the sides of the frame B B. Strong wrought iron bolts o, o. having keys and nuts at their tops to admit of them being lowered to the projecting ends of the angle beam of the platten, pass downwards through guide boxes in a vertical direction and are secured by heads at their opposite ends to the cast beam M. The platten O angle beam m. and connecting bolts o, o. are balanced by a counterpoise weight P. attached to a lever formed of projections from a triangular shaft p. supported at its ends by pendants and boxes attached to the opposite sides of the frame B B. the shaft turning as the fulcrum of the lever. On the extremity of the triangular

horizontal shaft p2 is fixed a curve projecting from q. which end is hollowed out as a step to secure and support a small pitman r. The upper end of the small pitman r. terminates in a small ball which turns in a hemispherical socket in the lower side of the head of the upright-bolt o. The fly wheel being set in motion turns the driving shaft B. thereby causing the cogged pinion c. to turn round by the intervention of the chain belt, the cogged wheel c. on the main shaft B. The cam G. revolving with the shaft acts in the pitman which it pushes forward communicating the motion to the toggles, bringing them in a straight line at the same time drawing downwards the platten on the sheet between it and the forme of types, thus giving the impression. On the main shaft B is fixed the grooved cam R. for the purpose of operating on the frikels to produce their rectilineal motion in and out from between the platten and forme. After the impression has taken place the toggles are brought back as the platten rises by a cam A" on the main shaft (of the form seen in the drawing or otherwise shaped and formed to answer the purpose) as the shaft revolves this cam pressed down an arm or stud B" attached to the upright R. The peculiar object of this cam is to always ensure the back motion of the toggles, which as they are brought in a straight line with each other are sometimes liable in printing presses to remain so and not depart from it. A small iron or steel roller travelling on a joint in the end of the bent bar S. travels in the groove of the cam R. The bar S. at its other extremity is attached to the upright vibrator T. by a pin at a suffi cient distance from its foot or centre of motion so as to form a joint to admit the movements to and fro of the vibrator The vibrator S is formed as represented in Fig. 3. open in the centre to permit the passage through and action of the pitman and upright R. At its foot it moves on suitable bearings

bearings similar to the upright &c. The top of this vibrator is attached by a joint to the connecting rod I" whose opposite end is attached by another joint to the projection q' of the frisket carriage U. The frisket carriage U is composed of two side pieces s.t. united together at each end by a brace or iron bar u, u,. The sides of the frisket carriage are made fitted to traverse on rails v. v. similar to the bed and rail way of the common hand printing press. the rails being of a proper length and size to endure the required motion in and out from the frame. The friskets are plain rectangular iron frames as seen in Fig. 9. with wide ears or projections w. w' of suitable lengths on each end which serve to sustain them with the sheet in the grooves through which they move. They are covered and prepared in the usual way for printing with interstices or spaces cut out for the operation of the type on the paper. The projections before mentioned on the ends of the friskets move back and forth in two grooves x. y. cut in a plate of iron or other metal screwed or otherwise properly fixed to the sides of the frame E.E. Z. a' is the apparatus for changing the friskets from one of the grooves x.y. to the other as the case may be. The part denominated a is composed of composition or any other suitable metal shaped in the form as represented in Fig. 6. and more clearly shown in section Fig. 7. It is constructed of a plate b' at top to which is attached a long shank c' whose foot is attached by a joint to a bar D" vibrating on a pin at its opposite end passing into the frame. As the main shaft revolves a small cam b" strikes against the top of the bar D" moving it downwards and the plate b' connected to it. A spring F' operates to draw upward the bar D" when the action of the cam has ceased. A long bar d' vibrates at its end on a pin affixed to the inside of the frame E.E. the opposite end being attached by a joint to the cast iron piece down

beam M. The office of this bar is to prevent the lateral pressure of the pitman on the lower toggle joint from changing the cross beam M from a right line during its perpendicular motions. To the top of the plate b' is screwed or otherwise attached a straight bar c' the lower side of which is intended to form the upper side of a groove f'. The lower part of the groove f' is formed of a bent piece of metal g' attached at its lower end by a joint to the side of a space cut in the plate b'. A spring h' bears against the back of the piece g' to press it outwards during its operations. The outer fall of the straight bar c' is in the same plane with the outer face of another straight bar i' screwed or otherwise affixed to the side of the frame E, E. When the plate b' is raised to the upper groove X, the lower side of the straight bar c' coincides with the upper side of the said groove X. The spring h' pushing the curved piece of metal g' outwards causes its top to coincide with the lower side of the groove X, so as to produce a continuation of the groove X, ready to receive an ear or projection w' of the finger. While the plate b' is moving down the straight bar i' causes the curved piece of metal g' to recede inwards so as to depress the ear or projection of the finger on the upper face of the bar i' which is a continuation of the lower face of the lower groove Y, of the plate b' rises again to receive another finger the curved part g'. by the pressure of the spring, h' moves outward and receives the finger from between the plates and frame, brought out by the finger carriage. Having described a' we proceed to 2 which consists of a plain plate of composition or other suitable metal shaped somewhat similar to a' but without the curved piece g' and spring h'. It has a simple groove k. cut in it and is guided in a perpendicular direction during its motions up and down by the circular stands l. sliding through a round hole in a piece of iron m

m. screwed or otherwise attached to the side of the frame E.

The proper motions and times of ascent and descent are regulated by the form and revolution of the frisket cam W. on the main shaft E. A long lever X formed of two projecting bars l' m' form a horizontal shaft to' suspension by suitable bearings attached to the sides of the frame E E. has a roller turning on a pin at n, and m'. which roller moves in the grooved surface of the cam W. The opposite arm l' has connected with it by a joint the foot of the upright bar n' whose top is attached by a joint to the crank l' of the moveable plate x. The plate x being supported so that its groove shall coincide with the long groove X while the part of the cam W from o' to p' Fig. 6. is operating on the roll in the end m' of the lever X. it moves the plate x. downwards so as to bring the groove in it in a line with the lower groove Y. to receive the frisket from the groove Y. While the roll moves over the curved surface from q' to r' the plate x is brought down still further. until it meets the bed of type when the impression is taken on the paper in the frisket during which time the roll is moving over the space from r' to s.' which is an arc of a circle the centre being in the centre of the main shaft. The impression having taken place the platen moves a short distance inward before the frisket in order to clear itself from the paper. The roll then begins to move over the curved surface of the cam from s' to t''' which raises the frisket up to the upper groove X. through which it is moved by the frisket carriage into the groove in the plate a with the printed sheet to be removed and another sheet substituted.

The plate a' having received the frisket is carried downwards by the next revolution of the cam and the curved pieces of metal g' g' on which the ends of the frisket rest recede and deposit the frisket on the tops of the straight bars l' l' there being a slot in the plate a to plate x. for each bar of the frisket that is a slot in the middle of each of the sides of the frame E. E. The frisket is then operated on by the frisket carriage and carried in between the platen

m.

ten and forme for an impression. That part of the fusher carriage which produces the movements back and forth of the fushers in the grooves X. Y. is represented at t' t'. t' is an upright projecting piece of iron on the top of each side of the fusher carriage. Its office is to push the fusher out from between the platten and forme through the groove X. into the groove in the plate x'. t'' is a small catch vibrating on and connected to the fusher carriage by a joint at its end and always pressed upward by a small spring t'. When the fusher carriage passes outward from the platten with a fusher the small catch t'' strikes against the under surface of the cam on the lower fusher and is pressed down during its motions under the said surface. As soon as it leaves the surface it flies upward. When the fusher carriage is carried inward the ends of the catches t''t''. come in contact with the cam or projections of the fusher thus pushing it through the lower set of grooves Y. Y. into the groove in the plate x when it is received and caried downward by the cam W. to receive an impression from the platten. Afterwards it is raised by the action of the said cam W. to the upper groove X. The fusher carriage then moving outward the projections t' t' on each of the sides of the carriage strike against the ears of the fusher and push it through the upper grooves X into the groove in the plate x'. The above arrangement of the machinery is considered fully sufficient for the operation of the fushers but to guard against any accident which might happen by the cam's pressing against and lifting the ears of the fusher during its upward movement two small pieces of iron t''t'' are so hung at an upper corner of each that the action of gravity will cause them always to stand outward to prevent the fusher ears from rising. The ears during its downward motion presses the small catches t''t'' into the notches as shown in the plate of iron in which the grooves X. Y. are cut as seen in Fig. 6. but as soon as the fusher is depressed to the lower edge of the lower groove the small catches are retained a

fly outward, thus rendering it impossible for the curved piece g' to raise the frisket so as to prevent it being pushed through the lower slot of grooves y. y. Furthermore should the frisket after the carriage has left it on the top of the curved pieces of metal g' g' by a pair of the machinery or any other cause, slide forward in the upper groove x. there is danger when the plate b' goes down, of the ears of the frisket being injured. In order to prevent an occurrance of this nature a small a small spring x' is affixed to either the upper or lower side of the end of the groove so that when the ear of the frisket moves through the groove it shall pass over the surface of the spring and press it into a space adapted to receive it. As soon as the ear leaves the spring it flies outward thus effectually closing the end of the groove against a receding motion of the frisket. The grooved cam R. is so formed and placed on the main shaft that while the roller on the end of the bar S. is moving from a''' to b''' Fig. 5. it produces no motion of the vibrator or in other words the vibrator remains stationary during the time the platten is giving the impression to the sheet but when the impression ceases the roll travels in that part of the groove from b''' to c''' which brings the frisket carriage out from the platten with the frisket on which is the printed sheet returning the carriage while it travels from c''' to a''' with the other frisket carrying the sheet of paper to be printed. Having described the machinery for producing the impression and change of the frisket from one set of grooves to the other together with the situation and arrangement of the several parts in and about the frame, we next proceed to explain that part of the press whose office is to distribute the ink and impart it to the forms of type on the bed. In many respects the number of ink rollers and general arrangement of the same are as has been heretofore used but the combination of the ink fountain is various. Figs 4 & 5 represent different views of the fountain in which a is a cast iron box of the usual construction seen in Figs 5. a'' is the space for the

the reception of the ink in which the lower side of the fountain roll b" is immersed. The fountain roller b" is supported at its ends by journals in compensation boxes c" Fig. 10. The boxes are placed in a square space adapted to receive them and allow sufficient play for the movements back and forth of the ink roller against one of the sides of each of the boxes a pin d" rests the other extremity resting against the short arm of a lever e" whose fulcrum is at f." A screw g" common to both of the ends of the long arms of the levers e" e" on being turned presses out the long arms of the levers e" e" thus causing the fountain roller in the boxes c" c" to be carried up nearer the edge of the plate h" at pleasure. The springs i" i" operating against the pins k" k" resting against the opposite sides of the boxes c" c" and thus when the screw is turned in the other direction cause the inking roller to depart from the edge of the plate h". The object of the above is to regulate the thickness of the surface of the ink on the fountain roller. The proper breadth of ink on the surface is obtained by a number of screws l" l" l" in the side m" all at suitable distances apart which when screwed up (by their pressure on any particular part of the side n" of the ink space) spring that part of it on which they act enough to cut off or prevent any portion of ink from adhering to the surface of the fountain roller as it leaves the plate h"— The edge of the plate h" is accurately ground to coincide with the edge of the fountain roller in order when necessary to shut off the ink perfectly. o" is the roller for receiving the ink from the fountain roller and imparting it to the main distributing roller p"— q" is the small roller commonly denominated the "vibrator" for lateral distribution. This and the before mentioned rollers are cylindrical and not dissimilar to others heretofore used in printing presses of this description. The main cylindrical roller p" is turned around by a belt or cord passing over a pulley r" on its axis and moves the small guide pulley

pulleys S"S" over the pulley C" on the axis of the driving shaft or attached to the arms of the fly wheel. The rollers for applying the ink to the types are R" R" and revolve in bearings attached to the finished carriage which when it goes out from the frame carrying a sheet with the printed sheet applies these rollers to the surface of the types passing over the frame twice, when the carriage returns it deposits the rollers on the main distributing cylinder P" — All the above parts of the printing apparatus with the exception of the fountain are constructed and act similar to those heretofore used with only a little variation of form and size to adapt them to the particular shape of the frame of the press and machinery connected to it. M" M" are rollers for supporting the platten on rails N" N" affixed to or making a part of the frame. Two horizontal shafts O" O" revolve in boxes connected to the platten as seen in the drawings.

On the extremities of each are cranks on which are placed the rolls M" M" During the time the press is in action these cranks with the rolls are turned up in the position in Figs 1 & 2. but when it becomes necessary to slide the platten away from the frame on the bed they may be turned downwards so that their circumferences shall touch on the tops of the rails N" N"

A circular plate P" having two notches opposite to one another is fixed on each shaft. When the rolls M" M" are turned up or down a projection from a spring R" enters into one of these notches and confines the shaft to the position in which it may be placed. What is usually termed by printers the strength of the impression is regulated by dividing the circular plate of the nuts on the tops of the bolts A. A. into equal distances and countersinking or drilling holes at each division into which an index pointer on the end of a spring X" enters and confines the nuts to any position on the screw in which it may be placed. Both nuts are divided alike so that by turning around each the same number of divisional distances the

the face of the platten will always be parallel to the faces of the types in the bed according as they are turned at pleasure in the most known presses. the "tympan sheet" is moved outward from under the platten with the printed sheet of paper but what I consider a great advantage in my press over others consists in making the tympan sheet stationary. It is stretched over the blanket on the under side of the platten in any convenient manner. When the impression has ceased the platten rises a short distance before the friskit begins to ascend in order that the tympan sheet shall effectually clear itself from the paper. This is effected by a proper formation of the cam K so that while the roller is moving over a certain part of it it shall produce no motion of the friskit. The difficulty generally apprehended in other presses consists in the adhesion of the sheet of paper to the tympan sheet so that it becomes necessary that the tympan sheet and the paper be brought out from between the platten and forme at the same time. By thus raising the platten before the friskit the above difficulty is successfully obviated. I have herein above described many improvements in printing press machinery which I believe to be new and useful, but there to which I shall confine my claim are as follows viz. First. the application of two friskits at one end of a forme to move in grooves parallel with the faces of the types in such manner that on the arrival of either friskit at the opposite ends of one set of the grooves it shall be received in grooves in plates of metal moving in a perpendicular direction to the face of the types and lowered and raised to another set of grooves either below or above the first mentioned set of grooved and parallel with the same as to be moved in an opposite direction either in between the platten and forme or out from the same. Second the combination of the whole machinery herein described for preventing the above motion of two friskits applied to the same side of a forme and separate

K

by and singly. I claim as part of this combination. The mode of alternately changing a frisket from one set of the grooves to the other set. by grooves in moveable plates z. a' Also the construction of the plate a with curved pieces of Metal g' g'' and springs h' h' to push the said curved pieces outward and further the small gravitating pieces n'' n'' and springs x' x'. for the object and to act as herein above mentioned. Instead of sets of long grooves x. y. for sustaining the ears or projections of the frisket. I substitute long ledges situated in regard to each other as the different sets of grooves above described. These ledges are also attached to the plates a' z. in the situation of the grooves in each and being attached to a projecting from the sides at the tops of the curved pieces of metal g' g''. The ears of the frisket are to be made of suitable thickness to have grooves cut or formed in the ends of the same to rest and be sustained on the projections above mentioned. mentioned. In other respects the action and path described by the motions of the frisket are the same as those aforementioned, but there is a necessary specification of the parts or in other words placing the grooves in the ends of the frisket and the projections that move in the grooves on the inside of the frame of the press. This modification of the machinery I claim. Third the construction of the cam G with a roller in its end for the purpose of diminishing friction at the time of the impression and also of presenting at every revolution of the cam a new surface for the roller in the frisman to move over. Fourth the sustaining the frisman on a vibrator K. causing its back and forth movements and the application of a spring "k" (either with or without a roller in its end) to the vibrator to be acted on by a cam "A" on the main shaft for producing the back motions of the toggles. Fifth. The bar l' l'' for combining the central pressure of the lower toggle in the usual manner &c. Should the platten be stationary and the bar moved as towards by the toggles then bar may be applied in a simi-

the

ilar manner to the bed for the same purpose of preventing the lateral pressure of the upper toggle on the bed. Sixth the arrangement of a vibrator T. connected by a joint to one end of a bar S. which is supported at the other end on a pin in the top of a small vibrator U. the said pin having a roller on it travelling in the grooved cam R on the main shaft. for producing the motions of the picker carriage Seventh I claim the peculiar arrangement of the several parts for producing the impression as I have above described together with the disposition and adaptation of the the other parts of the machinery to my improvements so as to constitute what is usually denominated a "power press." In testimony that the above is a true specification of my said inventions and improvements I have hereunto set my hand this seventeenth day of August in the year of our Lord Eighteen hundred and thirty four.

Witness
Robt. H. Eddy
Calvin Brown

Oli Lufts

(Drawing)

Eyd.
M.F.C.

(516 words)