2 Sheets—Sheet 1.

G. T. FRAZEE.

Printing Press.

No. 201,770. Patented March 26, 1878.

Fig. 2.

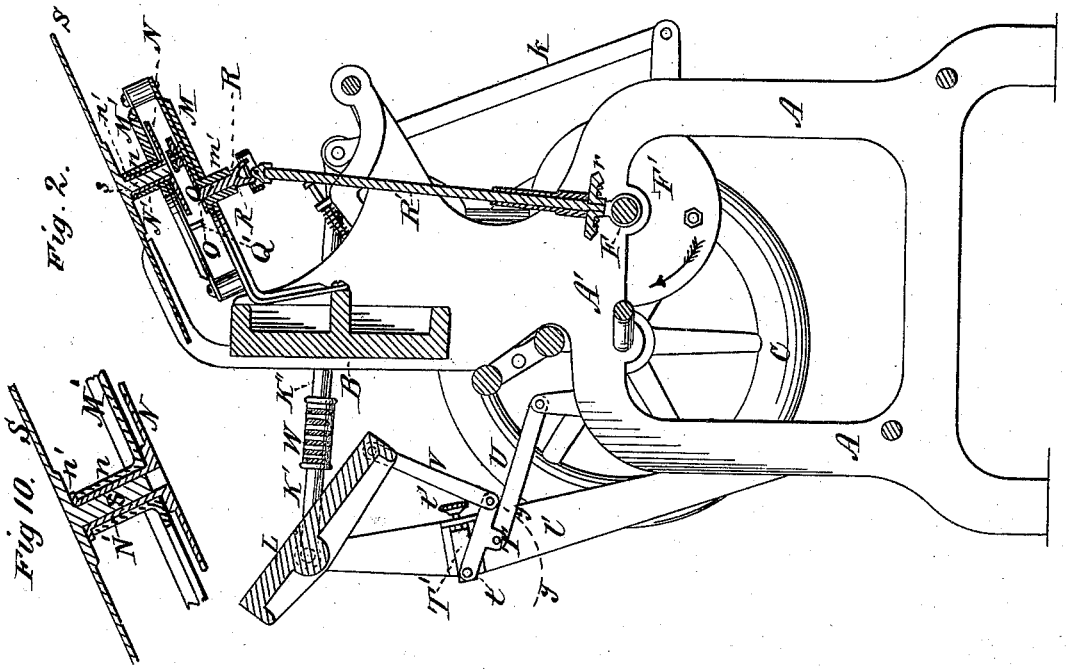
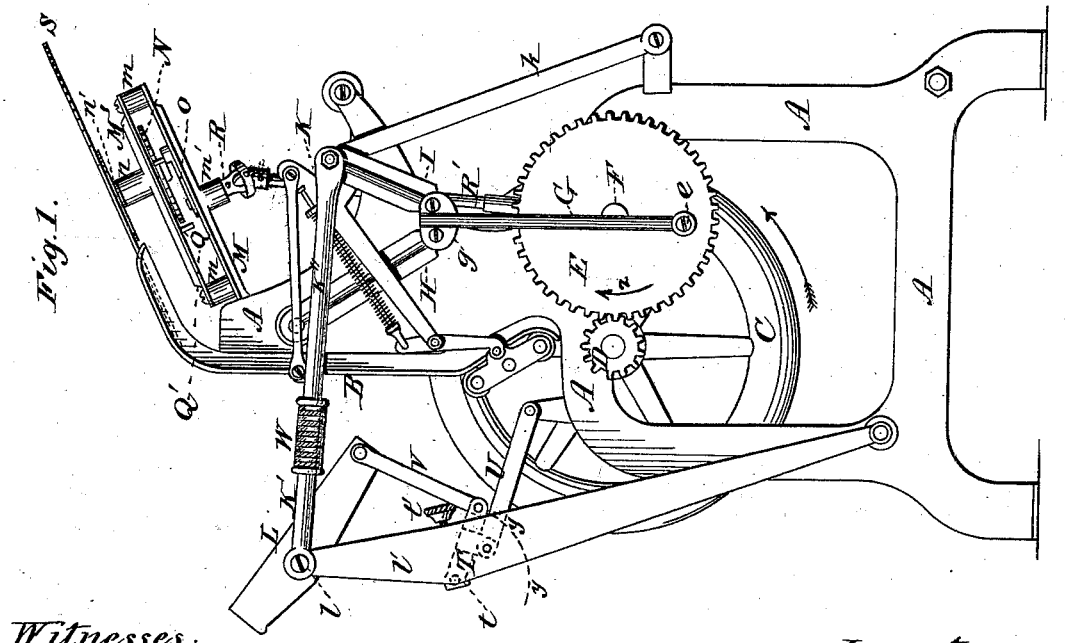


Fig 10.

Fig. 1.



Witnesses:
Floyd Norris.
Jno. T. Keay

Inventor:
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by Johnson & Johnson
Att'ys

2 Sheets—Sheet 2.

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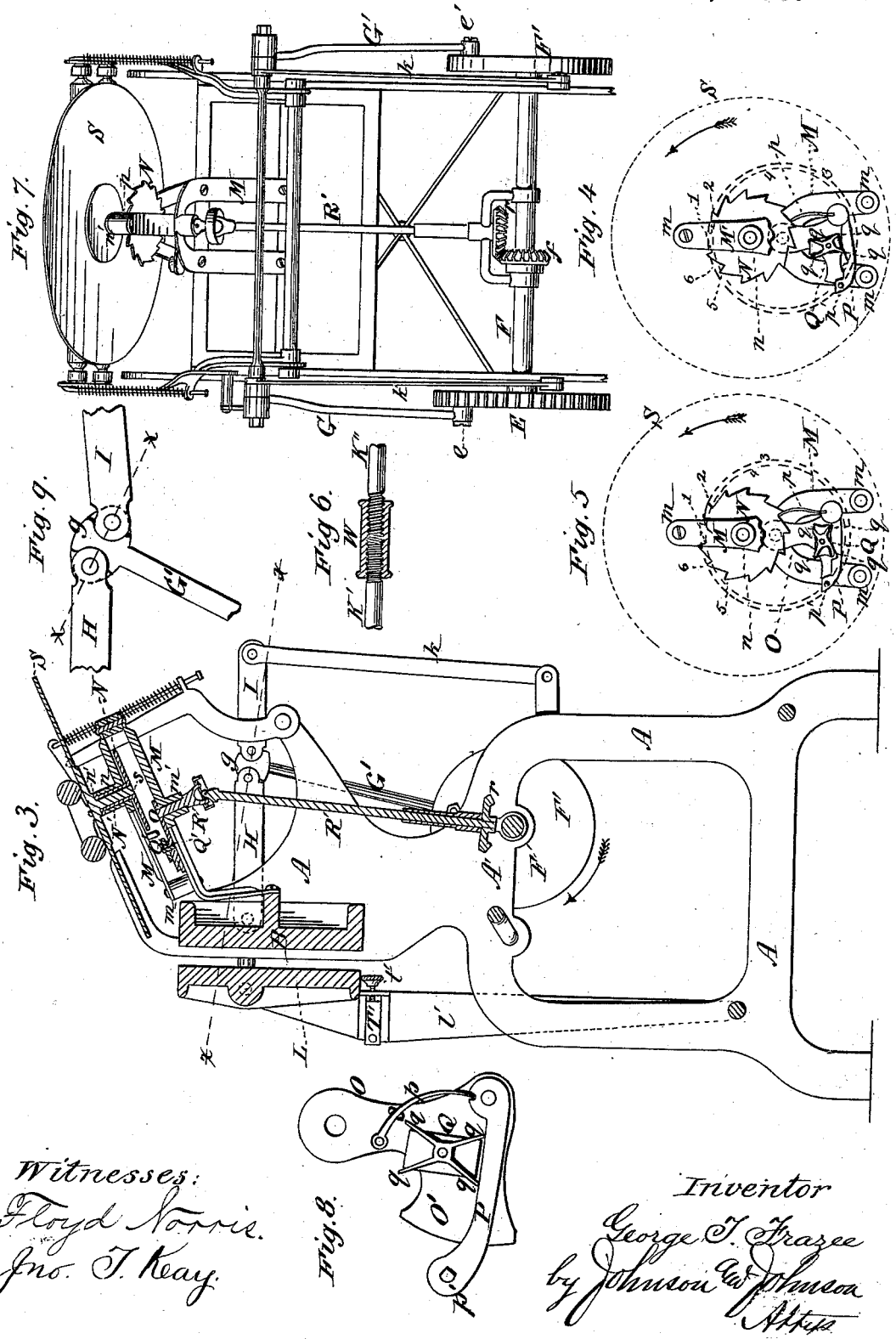

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UNITED STATES PATENT OFFICE.

GEORGE T. FRAZEE, OF WEST MITCHELL, IOWA, ASSIGNOR OF ONE-HALF HIS RIGHT TO HENRY F. MILLER, OF SAME PLACE.

IMPROVEMENT IN PRINTING-PRESSES.

Specification forming part of Letters Patent No. **201,770**, dated March 26, 1878; application filed October 12, 1877.

To all whom it may concern:

Be it known that I, GEORGE T. FRAZEE, of West Mitchell, in the county of Mitchell and State of Iowa, have invented certain new and useful Improvements in Printing-Presses; and I do hereby declare that the following is a full, clear, and exact description of my invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of power printing-presses having a vertical bed, in front of which the platen oscillates, and in which an intermittingly-rotating disk is employed to distribute the ink upon the rollers.

Its objects are, first, to provide means for giving a powerful impression and allowing a suitable "dwell" thereof; second, to effect a more perfect distribution of the ink upon the rollers than has been heretofore accomplished; third, to bring the platen, when away from the bed, into a position convenient for "making ready" and feeding; and, fourth, to furnish an effective means for regulating the impression.

The devices and combinations thereof which I employ in accomplishing these objects will be hereinafter fully described, and their operation explained with reference to the drawing, in the several figures of which identical parts are indicated by the same letters, and in which—

Figure 1 is a side elevation of a printing-press constructed according to my invention. Fig. 2 is a vertical section, showing the parts in the same positions. Fig. 3 is a vertical section, showing the positions of the parts at the commencement of the dwell of the impression. Fig. 4 is a plan view of the devices for causing the intermittent rotation of the ink-disk in alternate greater and less steps in the same continuous direction. Fig. 5 is a similar view, showing the parts in different positions from Fig. 4. Fig. 6 is a detail view, partly in section, of the device for regulating the impression. Fig. 7 is a rear view of the press; Fig. 8, an enlarged detail of the automatic trip and the automatic dog operated thereby, to operate the ink-disk; Fig. 9, the toggle cross-head connection; and Fig. 10, a detail of the ink-disk sleeve-connection.

Referring to Fig. 1 of the drawings, the frame A supports the bed B in a permanent vertical position, and in the horizontal bars A′ of said frame are arranged the bearings of the driving-shaft, upon one projecting end of which is the fly-wheel C, and upon the other end a pinion or small gear-wheel, D. This pinion D meshes with a gear-wheel, E, mounted upon the end of a shaft, F, (shown in Fig. 7,) which is journaled in the rear of the driving-shaft. Upon the other end of shaft F is a blank wheel or disk, F′. To a crank-pin, *e*, projecting from gear-wheel E, is connected a pitman, G, extending upward, and provided with a cross-head, *g*. To the inward side of this cross-head *g* are pivoted the inner ends of toggle-arms H and I, as shown in Figs. 1 and 3. The outer or front end of the long toggle-arm H is pivoted to the permanent frame A, just in the rear of the bed B of the press, and the outer or rear end of the short toggle-arm I is jointed to the rear end of the platen-rod K, the front end of which is connected to the stud-pin *l* of the platen L, which is supported on vibrating arms *l′ l′*. Upon the opposite side of the press is an arrangement of parts similar to that just described, the pitman G′ being connected to a crank-pin, *e′*, on the blank wheel or disk F′. The rear ends of the toggle-arms I and platen-rods K are supported by vibrating rods *k*.

When the fly-wheel and driving-shaft are revolved toward the front of the press, the pinion D rotates the gear-wheel E in the direction of the arrow *z*, and, supposing the movement to commence when the parts are in the positions shown in Fig. 1, the pitman G will be moved upward, raising the toggle-arms H and I toward a horizontal line, and, as the arms H are pivoted to the stationary frame, the arms I will, of course, be driven rearward, pulling with them the platen-rods K, and drawing the platen L toward the bed B. As the toggle-arms H and I are raised the arms H first reach a horizontal plane, owing to the oblique position of the cross-heads *g*, as shown in Fig. 3, and said bars H reach this position

just as the pitmen come on the center or radial lines with reference to wheels E and F′, and, as the toggle-joints are then to the rear of the centers of the said wheels, the heads of the pitmen are inclined rearward, and the front ends of the cross-heads *g*, to which the arms H are pivoted, are slightly more elevated than their rear ends, so that the cross-head pivots of arms H and I are on a line oblique to the horizontal, as shown by broken line *x x*, Fig. 3.

When the parts have reached this position the impression is complete—*i. e.*, the platen is brought as close to the bed as it will be. Movement of the wheel E continuing in the same direction, the passing of the center by the pitman causes the front ends of the cross-heads *g* to be lowered (owing to the lower ends of said pitmen moving downward and rearward) and the rear ends raised, and thus, as the arms H are descending from the arms I are approaching a horizontal line, the result being that said arms I, the platen-rods, and platen are, for a moment, not moved either forward or rearward—not rearward, because the dynamic effect of a toggle-lever is produced only when its members are approaching a straight line together, and not forward, because the movements of the arms, as just described, compensate each other in passing the dwell point. This non-motion of the platen is what is called the "dwell," when, although there is no cessation of motion in the driving-shaft, the sheet upon the platen is allowed to remain for a brief time in contact with the form upon the bed.

In Fig. 4, M represents a bracket or arm projecting from the rear of bed B, near its top, and inclined upward, and upon studs *m* projecting upward from this bracket is arranged a bar, M′. From about the middle of the bracket M a sleeve-bearing, *m′*, Fig. 2, projects downward, and in this sleeve-bearing fits a short shaft, R, to the upper end of which is rigidly connected an arm, O, arranged between the bracket M and bar M′, and having an elbow extension, O′, Fig. 8.

Upon the arm O is pivoted a dog, P, which extends along the upper side of extension O′, and carries at its free end a pin, *p′*, rising therefrom. A spring, *p*, attached to arm O and dog P presses said dog inward against an oblong trip, Q, which is pivoted to the arm O, and provided on its upper surface with four teeth or ridges, *q*, extending from the center to the corners of said trip. From the under side of bar M′ a short stud, Q′, projects downward in the path of the teeth or ridges on trip Q. The lower end of the short shaft R is connected by a universal joint with a vertical shaft, R′, the foot of which is provided with a bevel-gear wheel, *r*, meshing with another bevel-gear wheel, *f*, upon shaft F. From the bar M′ a sleeve, *n*, projects upward, and in this sleeve fits a short tubular shaft, N′, to which is attached a ratchet-wheel, N, arranged immediately under the bar M′. The said tubular shaft is provided with a rim, *n′*, which projects over the top of sleeve *n*, in order to hold the shaft in place. The center of the ratchet-wheel N does not coincide with the center of rotation of shaft R of arm O, but is located eccentrically thereto, and some distance farther from the bed B. The ink-disk S has a pin, *s*, projecting from its center, and this pin *s* fits in the tubular shaft N′ of the ratchet-wheel N, and should fit so closely that friction will cause it to rotate with the ratchet-wheel when the rollers do not rest upon the said ink-disk; or the socket of the shaft N′ and the pin *s* may both be angular.

The object of the arrangement of the devices just described is to cause the ink-disk to intermittingly perform alternately greater and less partial rotation, so that the spaces moved under the rollers will lap, and thereby cause a perfect distribution of the ink. Their operation is as follows: When the press is in operation, the bevel-gear wheel on shaft F communicates rotary motion to shaft R′, through which this motion is transmitted to short shaft R, causing arm O and the devices arranged upon it to rotate.

Referring to Fig. 4, it will be seen that the oblong trip Q is in such position that the dog P rests against one of its ends; and, if the arm O should make its revolution with the dog in this position, the pin *p′*, projecting upward from said dog, would travel in the path indicated by dotted circle 3, and in its progress strike tooth 1 of ratchet-wheel N; but the dog will not continue in this position, for the reason that, as the arm O progresses in its revolution, one of the teeth or ridges on trip Q will strike the stud Q′, and the trip will be turned with its side toward the dog, allowing said dog to be swung inward by the spring *p* to the position shown in Fig. 5, and the pin *p′* will then travel in the dotted circle 4 and strike tooth 2 of the ratchet-wheel N. On the following revolution of the arm O the stud will cause the trip to turn its end toward the dog, swinging said dog outward, so that pin *p′* will travel in circle 3 and strike tooth 1 of the ratchet-wheel. When the pin *p′* strikes a tooth of the ratchet-wheel N it continues to revolve, and carries the ratchet-wheel around with it until, in following its prescribed path, it is compelled to relinquish its engagement with the said wheel. Thus when the pin, in its path, strikes tooth 1, it carries it to the position shown by the numeral 6, moving the ratchet-wheel five teeth, and when said pin strikes tooth 2 it carries it to 5, moving the wheel seven teeth.

The number of teeth of the ratchet-wheel may be varied, of course, and the relative proportions of the trip may, as will be readily seen, be such that a difference of any desired number of teeth may exist between the movements of the wheel. I prefer, however, to give the ratchet eleven teeth, and have the pin *p′* skip one tooth between its inner and outer paths, moving the wheel five and seven

teeth alternately. These movements are communicated to the ink-disk through its connection with the ratchet-wheel.

I will now describe the devices which I employ for bringing the platen into a convenient position for making ready and feeding, and which forms another part of my invention.

When the platen is at its farthest distance from the bed, it is desirable, for the purposes before mentioned, to have it more nearly horizontal than would be the case if it simply moved back from the bed in the arc of a circle.

The studs *l l*, by means of which the platen is hung upon the arms *l' l'*, are arranged a little above the center of said platen, in order that a partial upward rotation of its lower edge may not cause a corresponding depression of the top. As the platen recedes from the bed the arms *l' l'* carry outward the ends *t t* of arms T T, which are pivoted thereto, and, as said arms are connected to the stationary frame by rods U U, they are compelled to perform a semi-revolution toward the press in the dotted lines *y y*, thus forcing upward the links V V, which are jointed to the said arms, and also to the lower corners of the platen, the lower edge of which thus commences to swing upward the moment it leaves the bed B, and continues to rise toward the horizontal until it has reached the position shown in Fig. 1, when it is easily accessible for the purpose heretofore stated.

The arms T T are not pivoted directly to the arms *l' l'*, but to adjustable slides T' T', operated by adjustable screws *t' t'*, the movement of which throws the lower edge of the platen outward from or draws it toward the bed. By this means the position of the platen with relation to the bed may be regulated.

In my arrangement of devices for regulating the force of the impression, each of the platen-rods K is composed of two parts, the short part, K', being connected with the stud-pin *l* of the platen, and the longer part, K'', being jointed to the rear end of toggle-arm I. These two parts in each rod are connected together by milled sleeve-nuts W, into which project the screw-threaded ends of the parts K' and K'', the threads of which are of different pitch, that of the short part K' being, say, sixteen to the inch, and that of the long part K'' being, say, ten to the inch, and both should be right-hand threads, which arrangement will produce a differential screw action, which, as is well known, is a powerful and very perfect means of adjusting mechanical devices.

Turning the milled sleeve-nuts to the right shortens the whole length of rods K, and, of course, increases the impression, while turning them to the left produces an opposite effect.

The device for operating the platen renders it noiseless in its movements, and holds it while the impression is being taken, so that a form can be printed on one corner and give an even impression.

I claim—

1. In a power printing-press, an inking-disk, in combination with mechanisms, substantially as described, whereby alternately greater and less partial rotations of said disk are made continuously in the same direction, and by which the space moved under the rolls shall lap to more perfectly distribute the ink, as set forth.

2. The combination, with the inking-disk, of the revolving arm O, pivoted spring-dog P, having pin *p'*, pivoted oblong trip Q, stud Q', and ratchet-wheel N, substantially as set forth.

3. The combination, with the inking-disk, of the ratchet-wheel N with the revolving pivoted dog P, and mechanism, substantially as described, by which said dog is adapted to move eccentrically thereto and vibrate alternately toward and from its center of motion, substantially as set forth.

4. The combination, with the inking-disk, of the shaft R' and bevel-gear wheels *r* and *f*, shaft R, revolving arm O, carrying-dog P, and ratchet-wheel N, substantially as set forth.

5. The combination of swinging journaled platen L, links V V, arms T T, platen-supporting arms *l' l'*, and rods U U, pivoted to frame A, as described.

6. The combination of adjustable slides T' T' on arms *l' l'*, pivoted arms T T, links V V, and platen L with the rods U U, connecting the main frame, as set forth.

7. The long and short platen-arms H I, connected to the pitman cross-head *g* at a point to bring said pivoted connection in rear of a vertical line through the crank-pins *e e'*, when the toggles are horizontal and the crank-pins are on the dead-centers, in combination with the pitman-rods G G' and the oscillating platen, whereby to give the maximum power to the platen when said cross-head is on an oblique line with said toggle-arms, and to give the "dwell" of the platen during the movement of said cross-head to a horizontal position, as set forth.

8. The combination, with an oscillating power printing-press and an ink-disk making alternately greater and less partial rotations, of an automatic trip and a dog which automatically engages with and leaves the disk-operating device.

9. The platen L, arranged upon its journals *l l*, above its center or middle, and connected at its lowest and longest part to the arms V V, in combination with the pivoted arms T T and the frame-connecting arms U U, whereby the upward movement of the lower and longest part of the platen will not produce a corresponding depression of its top or shortest part, as herein set forth.

In testimony that I claim the foregoing I have affixed my signature in presence of two witnesses.

GEORGE T. FRAZEE.

Witnesses:
J. M. SCHUYLER,
C. L. CHENEY.