3 Sheets--Sheet 1.

W. VON DOEHN.

Paging and Numbering Machine.

No. 166,952. Patented Aug. 24, 1875

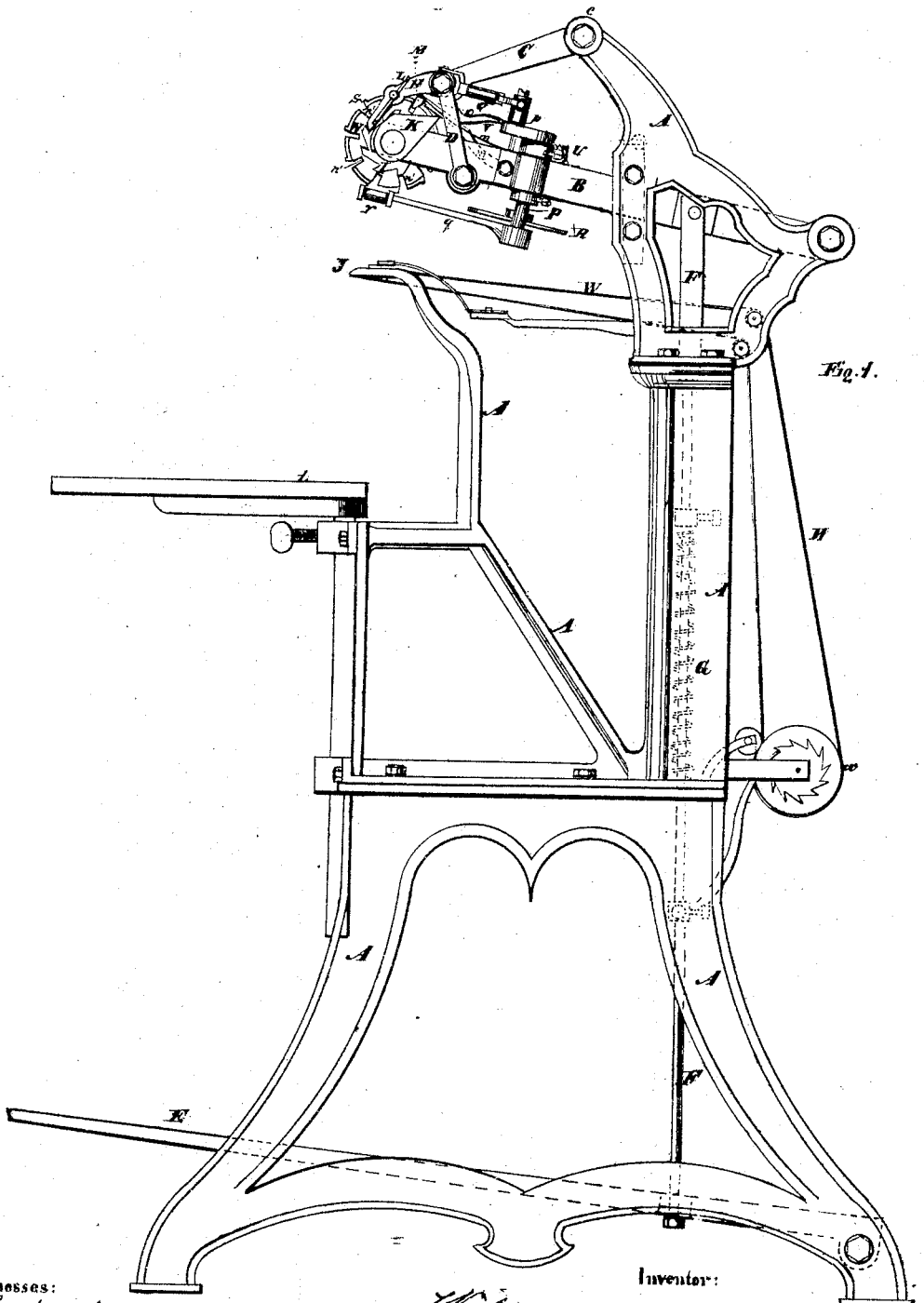

Fig. 1.

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T. H. Tyndale

Inventor:
William von Doehn

3 Sheets--Sheet 2.

W. VON DOEHN.

Paging and Numbering Machine.

No. 166,952. Patented Aug. 24, 1875.

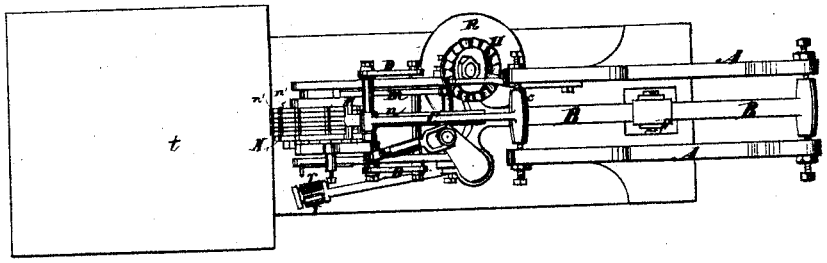


Fig. 2.

Fig. 3.

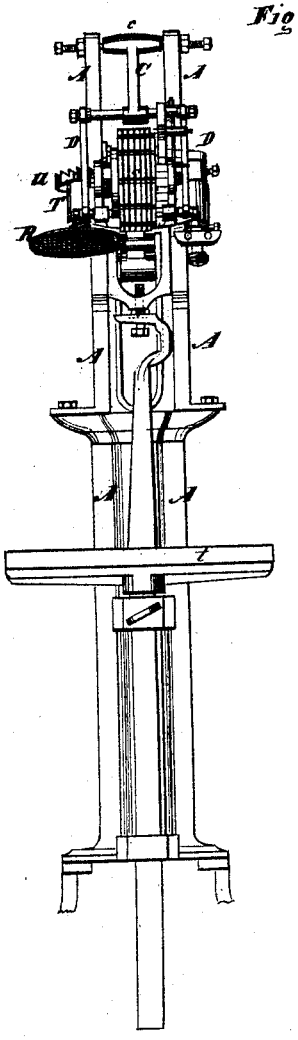


Fig. 11.

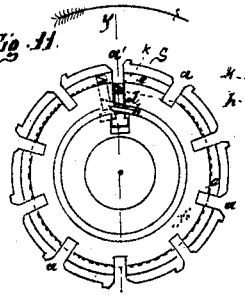
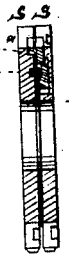


Fig. 12.



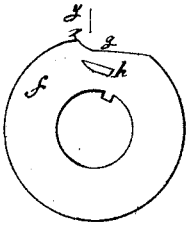


Fig. 13.

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3 Sheets--Sheet 3.

W. VON DOEHN.

Paging and Numbering Machine.

No. 166,952. Patented Aug. 24, 1875.

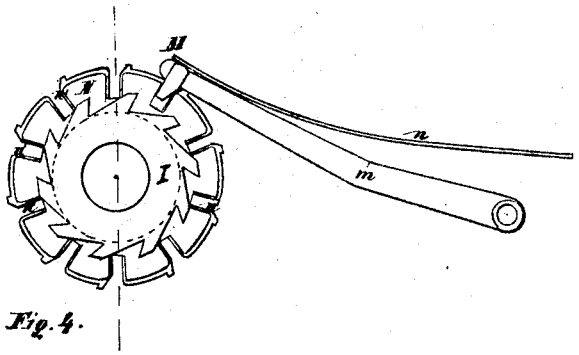


Fig. 4.

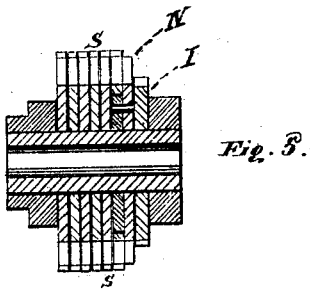


Fig. 5.

Fig. 6.

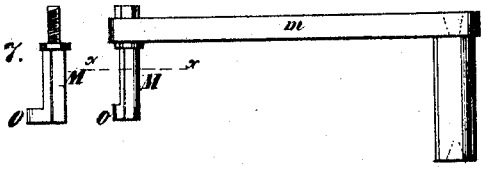


Fig. 7.

Fig. 8.

Fig. 10.

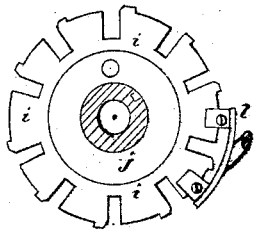
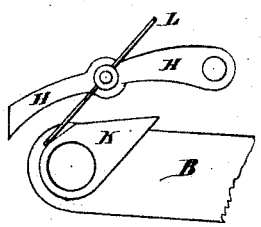


Fig. 9.



Witnesses:
Stephen Clay
T. H. Tyndale

Inventor
William von Doehn

UNITED STATES PATENT OFFICE.

WILLIAM VON DOEHN, OF CHICAGO, ILLINOIS, ASSIGNOR TO CULVER, PAGE, & HOYNE, OF SAME PLACE.

IMPROVEMENT IN PAGING AND NUMBERING MACHINES.

Specification forming part of Letters Patent No. **166,952**, dated August 24, 1875; application filed December 11, 1871.

To all whom it may concern:

Be it known that I, WILLIAM VON DOEHN, of Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Paging and Numbering Machines, of which the following is a specification:

The first part of my invention relates to a metal disk interposed between the actuating-ratchet of the type-wheel and the unit-dial, to both of which it is rigidly connected, revolving in unison with them. This disk is cut with ten peripheral notches, which engage a cam upon the aligning-bar, and operate to lift the said bar and disengage the same from the type of the dials during the change from one number to another.

The second part of my invention relates to the aligning-bar constructed with a cam-shaped leg, to engage the notches in the disk above referred to, and to ride upon the periphery of said disk during change of number, so that the aligning-bar proper is lifted clear of the face of the type.

The third part of my invention relates to the combination of a guide-plate or form rigidly attached to the bearing of the type-wheel and the pawl of the actuating-ratchet of the type-wheel, said pawl being furnished with a rider, to rest upon said form, so that the pawl is lifted and kept from engaging the ratchet more than one tooth at a time, said ratchet and pawl being so arranged that when this form is removed or lowered out of the way the pawl will each time skip a tooth, engaging every alternate one. By means of this adjustable form the machine may be caused to print consecutive numbers or alternate numbers only, adapting it to both paging and numbering work.

The fourth part of my invention relates to the construction and arrangement of the mechanism for actuating the inking-rollers, consisting of a shaft carried upon one side of the lever which carries the type-wheel, upon the opposite side of which lever is the shaft which carries the inking-disk. The first-mentioned shaft is furnished with a short crank-arm at its upper extremity, to the wrist-pin of which is attached a universally-jointed connecting-rod, communicating with the jointed connection between the lever carrying the type-wheel and the stationary frame of the machine being connected to the pivot of said jointed connection, so that when the machine is operated, and the type-wheel brought down, the said short crank-arm is caused to partially revolve its shaft. To the lower extremity of this partially-revolved shaft is attached a long crank-arm, upon the outer extremity of which are carried the inking-rollers, which sweep around across the face of the type and to the under surface of the inking-disk when said shaft is partially revolved, and return when the revolution is reversed in the upward motion of the type-wheel to its first position, the whole mechanism being carried up and down with the motion of the main lever, to which it is attached.

The fifth part of my invention relates to the combination and arrangement of the main lever, which carries the type-wheel, and the jointed connection between it and the stationary frame above the said lever, to obtain motion for the pawl of the actuating-ratchet of the type-wheel and the actuating mechanism of the inking-rollers.

The sixth part of my invention relates to the mechanism for operating the inking plate or disk to cause it to revolve; and consists of the arrangement of the inking-disk upon a shaft carried by the lever carrying the type-wheel, the said disk being carried at the lower extremity of the shaft, while at the upper extremity thereof is carried a crown ratchet-wheel. A pawl is connected to one of the levers D, and as said ratchet and its attached shaft and inking-disk are carried down with the downward motion of the lever, the pawl revolves the ratchet and ink-disk in a partial revolution.

The seventh part of my invention relates to the arrangement of the connecting-rod, which communicates between the pedal or foot-lever and the main lever of the machine, so that the strain upon said rod is always a pull instead of a push at the downward motion of the pedal, saving all springing tendency in said rod.

The eighth part of my invention relates to the construction of the above-mentioned connecting-rod.

The ninth part of my invention relates to a

mechanism for operating the radial catches or dogs lying between the dials of the type-wheel, to cause said dials to rotate in a proportionate numerical succession. In this, as in other machines for this purpose, the dials of the type-wheel rotate as follows: The unit-dial revolves in unison with the actuating ratchet; the next or tens-dial revolves one-tenth of its circuit for each complete revolution of the units-dial; and so on in like proportion the revolution proceeds from dial to dial until the limit of the machine has been reached; and the revolution from one to another is imparted by means of a dog lying within, say, the unit-dial, and having at its outer extremity a projection or tooth, extending into and traveling round a facial circular groove in the contiguous—say, the tens—dial. Interposed between the dials are stationary thin circular steel plates, having cam-shaped depressions at one portion of the periphery, which allow the tooth or projection of the dog to be drawn down into one of the notches, ten in number, of the dial to be moved, and, after the dial has been moved one-tenth of a revolution, to lift said dog back into the circular groove. This downward motion of the dog has hitherto been accomplished either by the weight of the dog or by a retractile spring. The former method is extremely unreliable at all times, and the latter likely to become disarranged; and this part of my invention consists in constructing the thin steel plates above mentioned with short projecting cams, conforming in contour to a portion of the cam-shaped depression, and situated immediately below said depression, which projecting cam lies in a groove in the dial and engages a slot in the dog as it passes in revolution acting to draw the said dog down, and releasing it as soon as down.

In the accompanying drawing, Figure 1 is a side elevation of the entire machine. Fig. 2 is a top or plan view thereof, and Fig. 3 is a front elevation of the same. Fig. 4 is a side view of the type-wheel and aligning-bar detached. Fig. 5 is a transverse vertical central section of the type-wheel, &c., showing the alphabetical dial applied. Fig. 6 is a top view of the aligning-bar and its carrying-arm. Fig. 7 is a front view of the bar detached from its arm. Fig. 8 is a section on *x x* of Fig. 6. Fig. 9 is a view of the pawl and guide-washer, or form detached, showing the operation of the rider. Fig. 10 is a side view of the alphabetical dial and its concentric supporting-washer. Fig. 11 is a side view of two of the numerical dials detached, showing the operation of the dog. Fig. 12 is a section on *y y* of Fig. 11. Fig. 13 is a side view of one of the thin circular steel plates.

A is the frame-work of the machine, constructed to elevate the mechanism to a convenient height for the operator. B is a lever, with its fulcrum or pivot at the rear upper extremity of the frame-work. This lever is forked at its front end, and between the tines of the ork, at the extremity thereof, is carried the type-wheel, consisting of a series of dials with numerals engraved upon their peripheries, being the nine digital numbers and the cipher, making ten numerals in all. The construction and operation of these dials will be hereinafter more fully described, their method of rotation, &c. C is an arm pivoted to the highest portion of the frame A at the point *c*, and pivoted at the other end to the double arms D D, one of which is pivoted to each fork of the lever, thus forming a knee-lever, or jointed connection, between the frame A at the point *c* and the moving end of the lever B. When the said lever B is elevated this knee-lever is bent, as shown at Figs. 1, 2, 3. E is a pedal, conveniently placed to be operated by the foot, and connected by a rod, F, to the lever B, so as to bring said lever down when pressure is applied, while a spring, G, acting to resist downward pressure of the pedal, when such pressure ceases returns the pedal and lever to their normal position. To the joint of the knee-lever C D D is pivoted a pawl, H, which falls upon a ratchet-wheel, I, having ten teeth, and connected with the unit-dial of the type-wheel. Now, when the lever B is brought down so that the type are pressed upon the printing-rest J, the knee-lever C D D is straightened and the pawl drawn back, falling upon the ratchet at a new position, and when the lever B is returned to its upper position, removing the type from the paper, the bending of the knee-lever throws forward the pawl and causes the ratchet to revolve, thus actuating the unit-dial and, through it, the whole series. The sweep or play of the pawl is so measured that two teeth are taken at once upon the ratchet, and thus alternate numbers printed instead of consecutive, which is convenient in paging. When it is desired to print consecutive numbers, a form-plate, K, is attached to the lever B at the bearing of the type-wheel shaft, and a rider, L, upon the pawl H strikes this plate, lifting the pawl away from ratchet in backward motion, and allowing it to engage but one tooth at each time.

M is the aligning-bar, carried by the arm *m*, which is pivoted to the forked lever B. A spring, *n*, presses this arm down to its work firmly, said spring being also attached to the lever B. The object of this aligning-bar is to keep the type always aligned in one plane while operating. This it accomplishes by dropping into coincident notches in the periphery of the dials, there being a notch for each numeral and one extra notch upon each dial to set the dial at zero. N is a steel disk, having ten peripheral notches, n^1, the sides of which are parallel to a radius passing through the center of the notch. This disk is concentric with the ratchet and dials, and is rigidly connected with the ratchet and unit-dial, being interposed between them. Upon the end of the aligning-bar farthest from the arm *m* is a depending cam or wedge-shaped projection, *o*, which enters the notches *n'* when the bar descends.

When the type-wheel or a portion of it is revolved the upper edge of the notch—which, be it noticed, is slightly rounded away—engages this cam and lifts the aligning-bar out of the notches in the dials, the wedge-shaped projection riding upon the unnotched portion of the periphery of the disk N, which lifts the aligning portion of the bar so far above the face of the type that the dials may make the change in number without coming in contact with the bar, thus avoiding all danger of injury to the face of the type. When the change has occurred and the disk is revolved as far as the ratchet will carry it the bar drops again into the notches.

The inking of the type at each descent of the type-wheel is accomplished as follows: A shaft, P, is carried upon one of the forks of the lever B, having a crank-arm, *p*, at its upper extremity, to the wrist-pin of which is attached a universally-jointed connecting-rod, Q, attached at its other end to the joint-pivot of the knee-lever C D D, so that when the said knee-lever is straightened in the operation the shaft P is partially revolved. To the lower extremity of this shaft is a second crank-arm, *q*, long enough to reach the type-wheel and carrying a pair of inking-rollers, *r*. Upon the opposite side of the lever-fork B is carried the inking plate or disk R lying in a horizontal position and being inked upon its under surface. The crank-arm *q* is so arranged and its motion so timed that it passes the face of the type and sweeps across the face of the inking-disk in the down-motion of the type-wheel, and returns laden with fresh ink again across the face of the type in the upward motion of said figure-head. The inking-plate or disk R is carried upon a shaft, T, borne upon the lever B, said shaft having at its upper extremity a crown ratchet-wheel, U, which is engaged by a pawl, V, attached to one of the arms D of the machine. It will thus be readily seen that the inking-disk is made to revolve at the same time that the rollers cross a portion of its face, and this revolution is opposed in direction to the sweep of the inking-rollers. By this means a more equal distribution of the ink is obtained than is possible, perhaps, in any other way. W is the smut-belt commonly employed, operated by the ratchet and drum *w*, to continually change the surface immediately below the stroke of the type-wheel, which would otherwise soon become soiled and would smut the under side of the sheet being numbered. *t* is an adjustable table or rest to support the work.

It will be noticed that the rod F is attached to the pedal and lever B in such a manner that the said lever is brought down by means of a pull instead of a push, as in ordinary paging-machines, in which the fulcrum of the pedal and lever is usually placed between the power or resistance and the connecting-rod.

The advantage of my arrangement consists, chiefly, in the fact of a more direct application of the power, and also that the strain upon the connecting-rod is a pulling strain instead of a pushing strain, thus avoiding tendency to spring.

Fig. 10 of the drawings, as above stated, represents an alphabetical dial to be used, if desired, in connection with the numerical dials. This dial consists of the annular disk *i*, of shape similar to the numerical dials, so far as peripheral notches, &c., are concerned, but having letters instead of figures. When employed, this dial is interposed between the disk N and the unit-dial, and revolves upon a washer, *j*, placed upon the shaft of the type-wheel, which washer is rigidly attached, by means of a pin, to the ratchet, disk N, and unit-dial. This alphabet-dial is set in proper position by hand, and secured from turning by a proper clamp, *l*, connected to the lever B, so that it may be changed from time to time as occasion occurs, a change only being necessary at long intervals.

It will be observed that the upper extremity of the connecting-rod F is forked. This is done to allow of a direct central passage of the smut-belt from the guide-pulleys at the rear of the machine to the printing-rest J and back again.

By this simple contrivance a great deal of cumbersome mechanism usually employed is entirely dispensed with.

S designates the numerical dials of the type-wheel, made with the radial peripheral notches *a*, ten in number, of which one, *a'*, is made of greater depth and of an inverted T shape, to contain the dog *d*, made of like inverted T shape, so that the arms of the T will engage the metal, and be prevented from too great a vertical motion. This dog has its upper end cut away to an incline, and is furnished with a laterally-projecting-tooth, *k*, extending into the annular groove *e* of the contiguous dial. One of the steel washers *f* is interposed between each contiguous pair of dials, and is fastened by a key to the shaft, upon which all the dials revolve loosely. These washers are cut at the periphery, so as to form a cam-shaped depression, *g*, and are provided with the short cam-arm *h*.

Now, when the dial carrying the dog has revolved far enough to bring the tooth *k* over the point *z*, the cam-arm *h* enters a transverse slot in the body of the dog, and forces the same to ride down the declivity of the cam-depression *g*, thus causing the tooth *k* to descend from the groove in the contiguous dial into the first notch it passes. The two dials are now locked together, and move in unison for one-tenth of a revolution. By this time the cam-arm has become disengaged, and the ascent of the cam depression rides the tooth again to its groove, whereupon the second dial ceases to revolve.

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

1. The peripherally-notched disk N, where-

by the operative pawl rotates the type-wheel, in combination with the type-wheel and its aligning-bar, substantially as specified.

2. The aligning-bar M, provided with a dependent cam or wedge shaped projection, *o*, in combination with the disk N, whereby said bar is raised out of engagement with the type-wheel, substantially as specified.

3. The combination of the guide-plate or form K, pawl H, rider L, and ratchet I, substantially as specified.

4. The combination of the knee-lever C D D, the lever B, pawl H, and ratchet I, all constructed and operating substantially as specified.

5. The cam *h*, combined with cam *g*, upon the interposed steel cam-washer *f* of the type-wheel, for the purpose of drawing the dog *d* into a locked position, substantially in the manner specified and shown, whereby the ordinary spring is dispensed with.

WILLIAM VON DOEHN.

Witnesses:
S. CLAUS,
T. H. TYNDALE.