

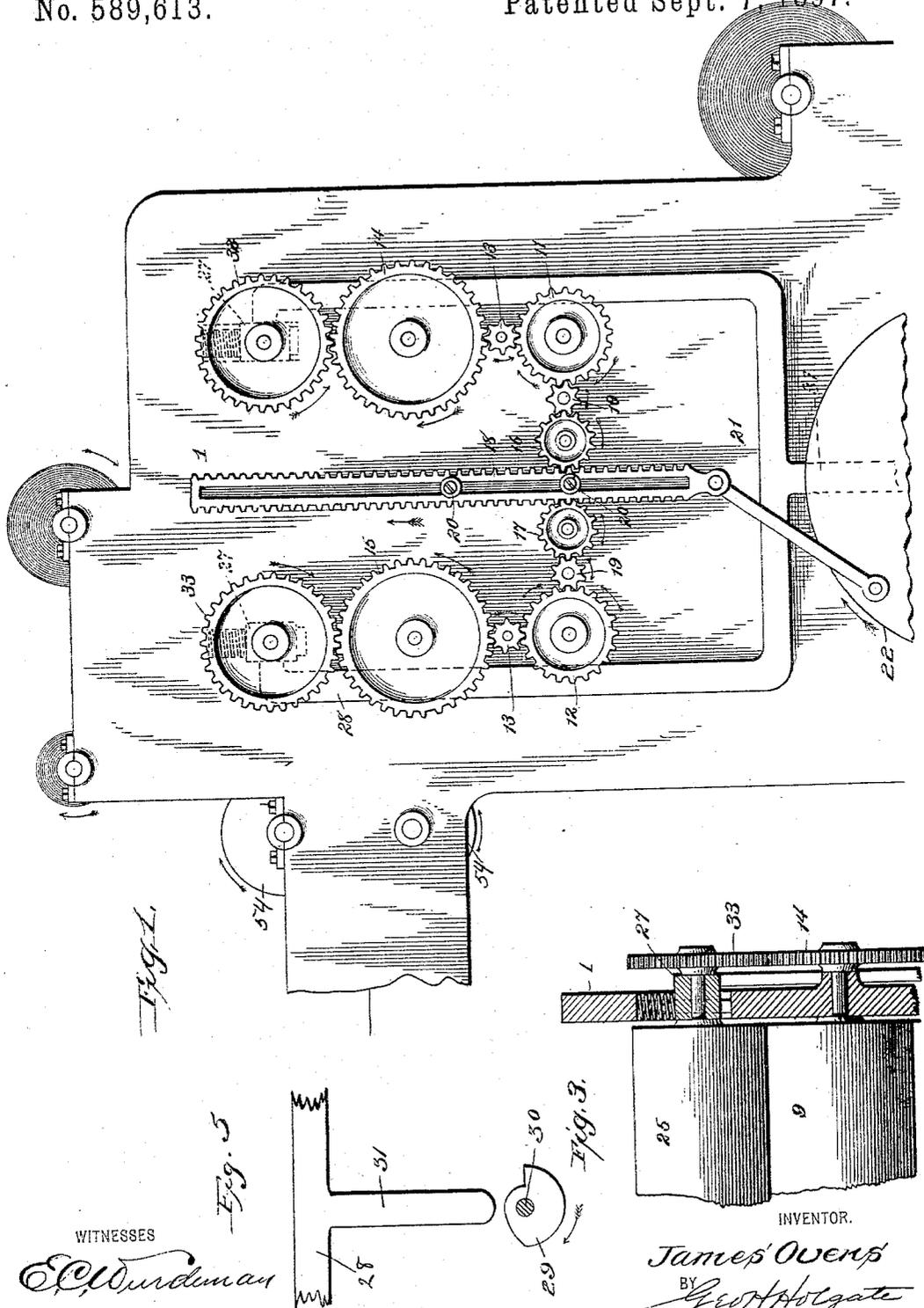
(No Model.)

2 Sheets—Sheet 1.

J. OVENS. PRINTING MACHINE.

No. 589,613.

Patented Sept. 7, 1897.



WITNESSES
E. C. Wurdman
A. Williamson

INVENTOR.
James Ovens
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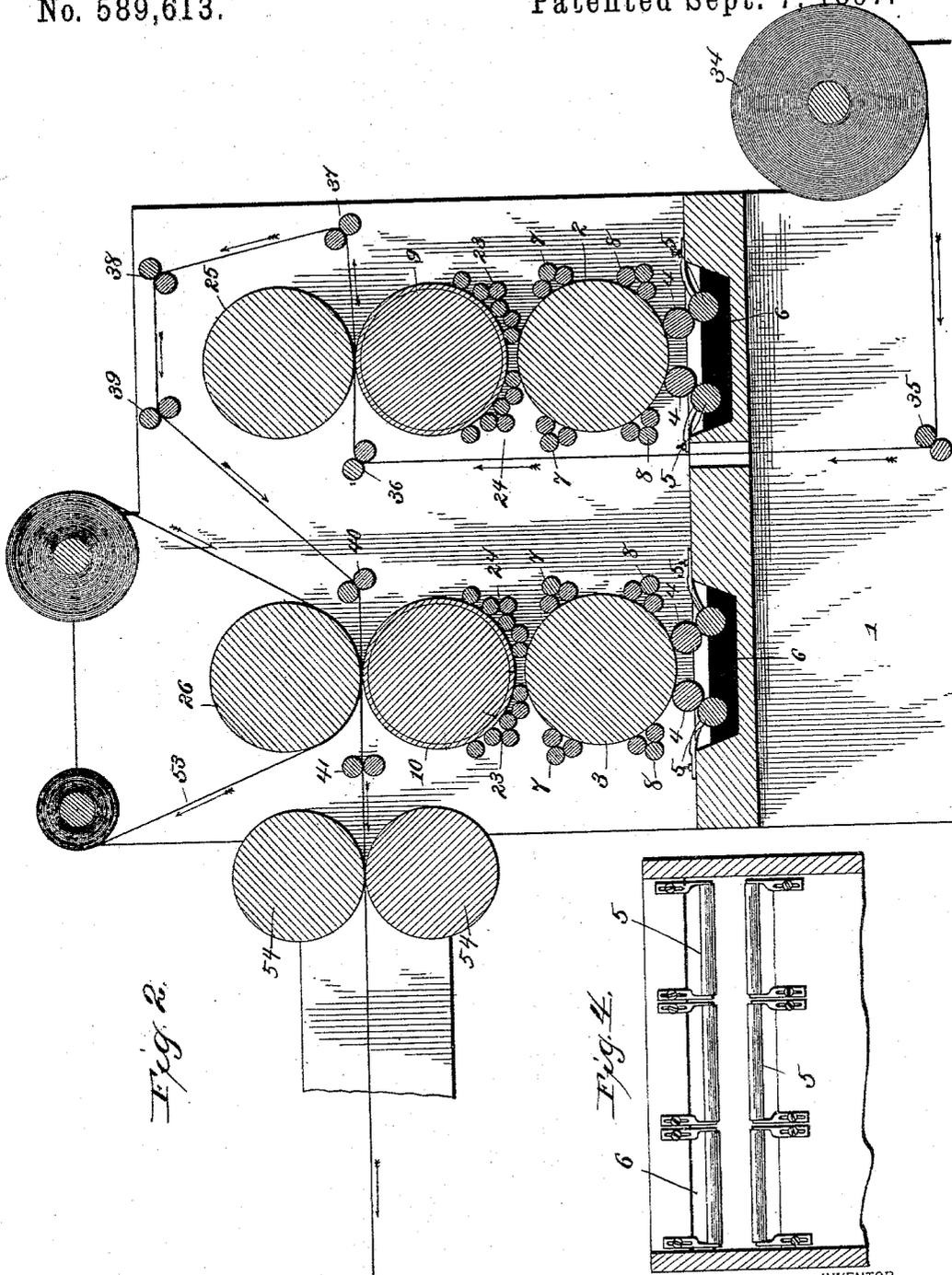


Fig. 2.

Fig. 1.

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UNITED STATES PATENT OFFICE.

JAMES OVENS, OF BROOKLYN, NEW YORK.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 589,613, dated September 7, 1897.

Application filed November 4, 1896. Serial No. 611,058. (No model.)

To all whom it may concern:

Be it known that I, JAMES OVENS, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Printing-Presses, of which the following is a specification.

My invention relates to a new and useful improvement in perfecting printing-presses, and has for its object to so construct a press of this description as to provide for the placing of the form upon a cylinder and arranging a pressure-cylinder in such manner that it will bring the paper to be printed upon in contact with the form through certain portions of its rotation, while relieving the pressure therefrom through certain other portions of its rotation, whereby the cylinders may be revolved in both directions for the purpose of facilitating the inking of the form in order that better work may be produced than is now possible upon rotary presses, while at the same time increasing the product of the press over that produced by a reciprocating bed press; and another object of my invention is to provide means whereby various-size forms may be utilized for printing.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth, and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, its construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of a press having my improvements embodied therein; Fig. 2, a section thereof. Fig. 3 is an enlarged sectioned view of the cylinder-gearing. Fig. 4 is a detail view of the ink-rollers, and Fig. 5 is a detail view of the cam mechanism.

Referring to the drawings in detail, 1 represents the frame of the machine, which may be of any design adapted to support the operating parts thereof, and within this frame are journaled the inking-cylinders 2 and 3, against which bear the feed-rollers 4, which latter in turn bear against the ink-rollers 5,

arranged to revolve within the inking-fountains 6, and, as will be noted, the feed-rollers 4 are arranged in pairs, one pair for each inking-cylinder, so as to come in contact therewith at two points for the purpose hereinafter set forth. A series of distributing-rollers 7 and 8 are arranged to bear against the inking-cylinder and against each other, in order that when these cylinders are revolved the ink transmitted thereto by the feed-rollers will be thoroughly spread, kneaded, and distributed to all parts of the cylinder equally to prevent the passing of clogs or surplus quantities of ink to any portion of the forms.

Journaled above the inking-cylinders are the form-cylinders 9 and 10, and for the purpose of causing these last-named cylinders to revolve in unison with the first-named cylinders gear-wheels 11 and 12 are secured upon the spindles carrying the inking-cylinders and mesh with idle-pinions 13, which in turn mesh with the gear-wheels 14 and 15, secured upon the spindles of the form-cylinders, and motion is imparted to these cylinders by the gears 16 and 17, meshing with the opposite sides of the rack-bar 18, and the pinions 19, meshing with the gears 16 and 17 and the gears 11 and 12, by which arrangement, when the rack-bar is moved up and down, the gears 16 and 17 will transmit motion to the cylinders first in one direction and then in the other. The rack-bar is guided upon the frame of the machine by the bolts 20 and is connected by the pitman 21 to the crank-wheel 22, the latter being located upon the power-shaft, so that when said shaft is revolved the crank-wheel will reciprocate the rack-bar vertically through this pitman.

After the ink has been properly distributed, as before described, upon the cylinders 2 and 3, it will be transmitted to the forms by the rollers 23 and 24, which consist of any desired number so arranged as to bear against the forms and each other, two of their number bearing against each of the inking-cylinders.

Pressure-cylinders 25 and 26 are journaled within the boxes 27, which latter are guided within suitable slots in the frame of the machine, while being supported by the upper ends of the yoke 28, as clearly shown in Fig. 1, and

the object of these cylinders is to bring sufficient pressure upon the paper to be printed upon to cause it to be properly acted on by the forms, and it is therefore essential that
 5 the pressure-cylinders be at one time brought to bear upon the paper and then removed therefrom when the form-cylinders are being revolved in a reverse direction, and this is accomplished by the elevation and depression
 10 of the yoke 28 in proper time with the rotations of the form-cylinders, which is accomplished by a cam 29, located upon the power-shaft 30 and adapted to act upon the projection 31 carried by said yoke. While this arrangement accomplishes the result, it is obvious
 15 that any suitable mechanism might be used for this purpose.

The pressure-cylinders 25 and 26 are caused to revolve in unison with the form-cylinders
 20 by the gears 32 and 33, meshing, respectively, with the gears 14 and 15, and in practice it is necessary to have the teeth of these gears of sufficient length to prevent them from passing out of mesh when the pressure-cylinders
 25 are elevated, but as this elevation is only slight no difficulty is experienced in thus providing for the continued meshing of the gears, although, if desired, idle-gears may be intervened between the gears of the form-cylinders
 30 and the gears of the pressure-cylinders and arranged to follow the movements of said gears, as is well understood in certain classes of machines.

The paper to be printed upon is led from
 35 the roll 34 between the guide-rolls 35, and then upward between the guide-rolls 36, after which it passes between the form-cylinder 9 and pressure-cylinder 25, and again between the guide-rolls 37, 38, 39, and 40, after which
 40 it passes between the form-cylinder 10 and pressure-cylinder 26, and finally between the guide-rolls 41 and feed-rolls 54 to the cutter. (Here not shown.) The rolls 54 are caused to revolve intermittently by being thrown in
 45 and out of gear with the roll 26 by means not shown.

From the foregoing description the operation of the press will be obviously as follows: The inking-fountains being provided with ink
 50 and the paper properly led through the machine, as just described, and motion imparted to the operating parts of the press, the ink will be fed from the inking-fountains and evenly distributed and transmitted to the
 55 forms on account of the back-and-forth movement of both the inking-cylinders and the form-cylinders, and when the pressure-cylinders are brought to bear upon the paper it will be forced against the forms and fed in
 60 the direction of the arrows until the pressure-cylinders are elevated, thus permitting the paper to move upward from the surface of the forms, when said forms will commence upon their reverse movement and receive
 65 fresh ink from the rollers 23 and 24 and have this ink again spread by the next forward re-

volving thereof, so that when the type come in contact with the under side of the paper they will be in a condition to impart a perfect
 70 imprint to said paper.

It is well recognized in the art of printing that the most perfect work is produced by a reciprocating-bed press and the reason for
 75 which is that the form moves to and fro as well as the inking and distributing rollers, thereby more evenly and perfectly distributing the ink than is possible when such parts
 80 revolve in one direction only, as with the ordinary rotary press, and these advantages I gain by my improvement, since all of the parts revolve first in one direction and then in
 85 the other, thereby producing the exact effect as that produced by the reciprocating-bed press, and in practice it will be found that my improvement, while producing this same
 90 result, will produce it in a higher degree. The principal disadvantage of most of the reciprocating-bed presses is the fact that the paper must be fed in sheets, requiring both
 95 complicated mechanism for such feeding as well as the constant attendance of a person for the delivery of the sheets to the feed mechanism, and incidentally a considerable
 100 number of sheets are lost in the feeding, as is well known, so that while a press built in accordance with my improvement has all the advantages of perfection of imprint of the reciprocating-bed press it also has all of the
 105 advantages of the continuously revolving press in that the paper is fed from a roll and requires no attendant for its delivery to the feed mechanism, but when delivering remains in position between the pressure-cylinders and form-cylinders without being acted upon, so that
 110 when the next forward operation of the press takes place the paper is fed by this operation, as before described.

The advantage of arranging the feed-rollers
 115 4 in pairs is that no portion of the inking-cylinders is left unacted upon by said rollers, even though said cylinders do not make a complete revolution in either direction, and this is of importance, since it is not preferable to have the cylinders make a complete revolution, but rather to have them oscillate through
 120 something like two hundred and seventy degrees; but of course the amount of oscillation may be varied to suit the requirements of the work.

It is to be noted that a press built in accordance with my improvement is capable of producing various lengths of printed matter by
 125 changing the size of the form and length of the stroke of the rack-bar, which will correspondingly change the degrees of rotation of the form-cylinders, and thereby regulate the amount of paper printed on during each impression. It is obvious that when work is
 130 thus varied there must be a corresponding variance in the cutting mechanism, in order that the work may be cut to correspond to the lengths in which it is printed; but as this

forms no part of my present invention I will not enter into a detail description thereof.

The ordinary set-off web 53 is utilized in the usual manner for preventing the blurring and set-off of the surface of the first print.

In practice suitable doctors are placed within the inking-fountains in such manner as to either bear against or project into close proximity with the ink-rollers, and in order that the ink may be distributed in varying quantities to the inking-cylinders the ink-rollers may be made in sections and so journaled in suitable frames that the sections may be adjusted independent of each other, thereby increasing or decreasing the amount of ink transferred from the inking-fountains to the inking-cylinders, and the splitting of these rollers into sections will permit printing in colors, since the inking-fountains may be divided into like sections and each of the sections of the ink-rollers thus permitted to transfer a different color of ink to the inking-cylinders.

I am aware that various modifications might be made in the construction of my invention as here shown without departing from the spirit thereof, and I therefore do not wish to be limited to this particular construction.

Having thus fully described my invention, what I claim as new and useful is—

1. A printing-press, consisting of a suitable frame, form-cylinders journaled therein and adapted to revolve in two directions, means for revolving said cylinders, pressure-cylinders so journaled as to bear against the form-cylinders when the latter are revolving in one direction but be elevated from said cylinders when revolving in the other direction, means for bringing about these movements of the pressure-cylinders, inking-cylinders arranged beneath the form-cylinders, distributing-rollers bearing upon the inking-cylinders, feed-rollers for transmitting the ink from the inking-fountains to the inking-cylinders, and series of rollers for spreading the ink upon the forms, substantially as and for the purpose set forth.

2. In a printing-press, two form-cylinders journaled within the frame of the machine and adapted to revolve in two directions, gears for revolving said cylinders, a rack-bar for imparting motion to said gears, means for operating the rack-bar, pressure-cylinders also adapted to revolve in two directions, means for raising and lowering the last-named cylinders into and out of contact with the first-named cylinders, inking-cylinders journaled beneath the form-cylinders and adapted to revolve in unison with said form-cylinders ink-rollers extending within the inking-fountains, feed-rollers 4 arranged to bear against

the inking-cylinders and also against the ink-rollers so as to draw ink from the inking-fountains and transmit it to the inking-cylinders, rollers 7 and 8 for distributing the ink upon the inking-cylinders when the latter move back and forth, and two series of rollers 23 and 24 arranged to transmit the ink from the inking-cylinders to the forms and evenly spread the same, substantially as and for the purpose set forth.

3. The herein-described combination of a frame, form-cylinders journaled therein, gears carried by said form-cylinders, a train of gears meshing with the first-named gears, a rack-bar adapted to operate the train of gears first in one direction and then in the other, a crank-disk 22 connected by pitman to the rack-bar for reciprocating the same, pressure-cylinders geared to the first-named cylinders so as to revolve in unison therewith, a yoke in which the pressure-cylinders are journaled, a cam carried by the main shaft and adapted to elevate the yoke so as to remove the pressure-cylinders from the form-cylinders at predetermined times, inking-cylinders journaled beneath the form-cylinders, feed-rollers 4, two of which are adapted to bear against each of the inking-cylinders, ink-rollers against which the rollers 4 bear and from which the latter take the ink, distributing-rollers 7 and 8 for spreading the ink uniformly upon the inking-cylinders, rollers 23 and 24 for spreading the ink upon the forms, and means for guiding paper to be printed from a roll over the form-cylinders, all arranged substantially as and for the purpose set forth.

4. In a device of the character described, a frame, form-cylinders journaled therein, gears carried by said form-cylinders, a train of gears meshing with the first-named gears, a rack-bar adapted to operate the train of gears first in one direction and then in the other a crank-disk on the main shaft connected by a pitman to the rack-bar for reciprocating the same, pressure-cylinders geared to the first-named cylinders so as to revolve in unison therewith, a yoke in which the pressure-cylinders are journaled and a cam carried by the main shaft adapted to elevate the yoke so as to remove the pressure-cylinders from the form-cylinders at predetermined times, as and for the purpose described.

In testimony whereof I have hereunto affixed my signature in the presence of subscribing witnesses.

JAMES OVENS.

Witnesses:

S. S. WILLIAMSON,
LINCOLN H. HOUGH,
ALEXANDER FERRIS.