

(No Model.)

2 Sheets—Sheet 1.

R. M. HUNTER.

PERFECTING PRINTING MACHINE.

No. 369,792.

Patented Sept. 13, 1887.

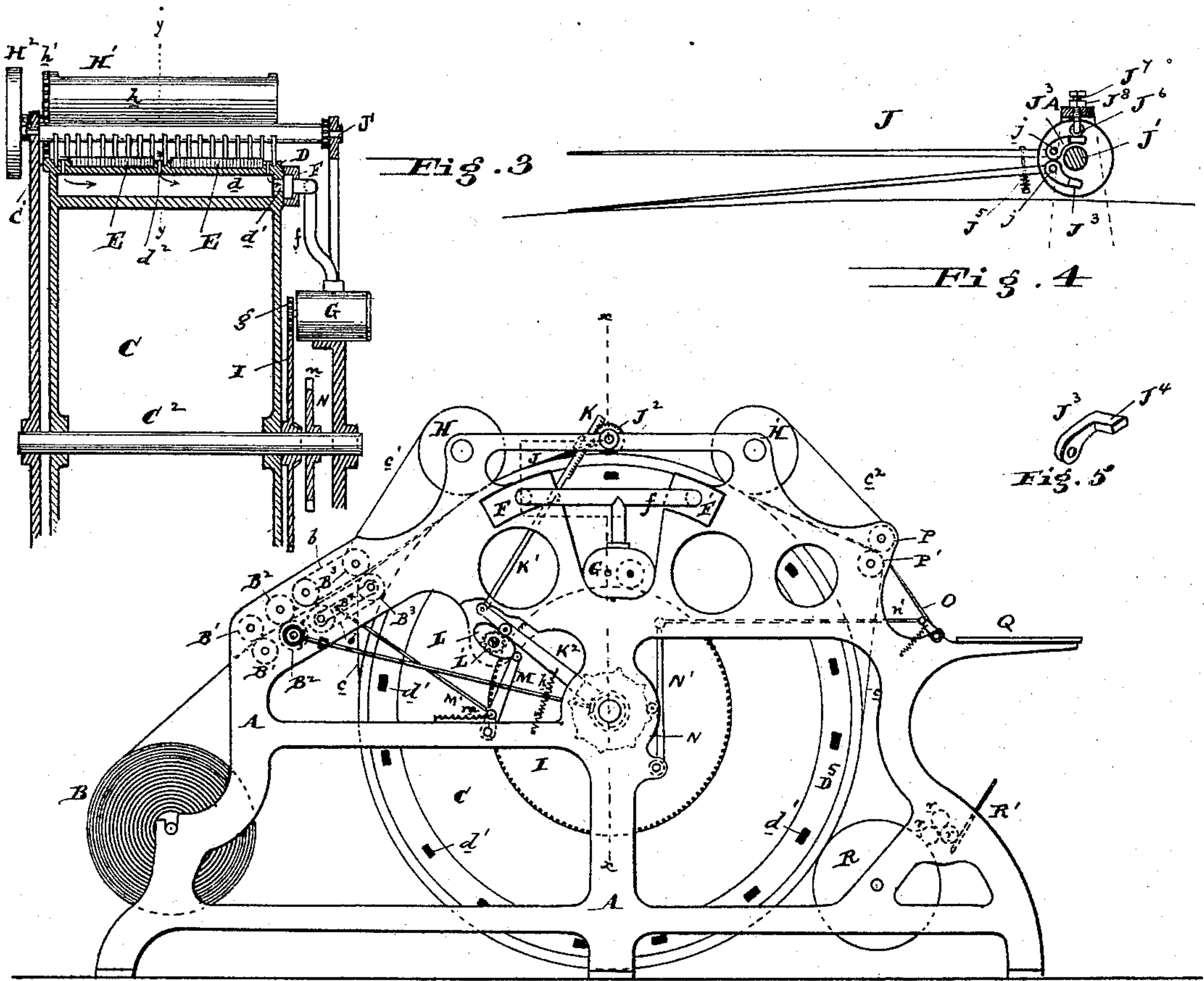


Fig. 3

Fig. 4

Fig. 5

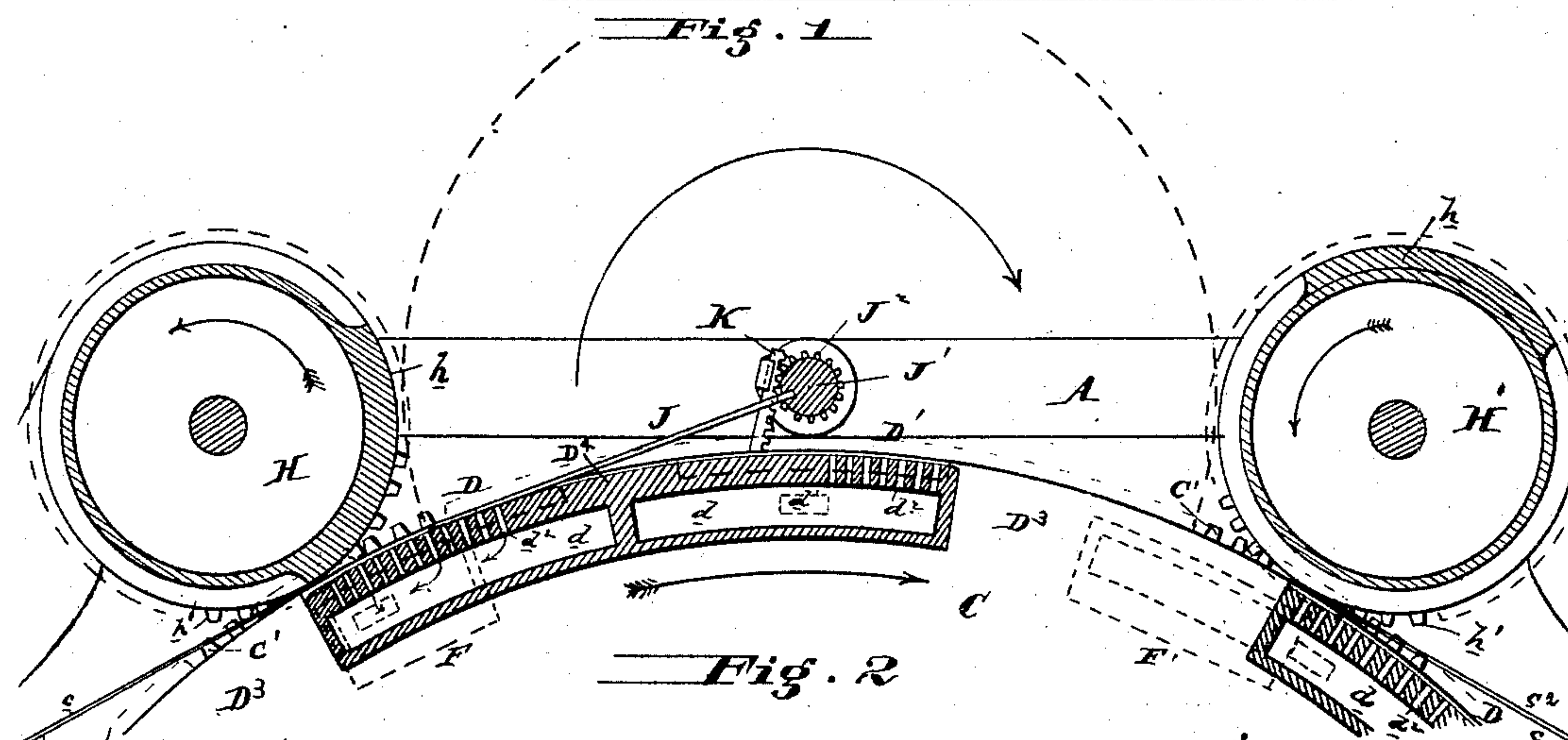


Fig. 2

Attest
William M. Wade
[Signature]

Inventor
[Signature]

(No Model.)

2 Sheets—Sheet 2.

R. M. HUNTER.

PERFECTING PRINTING MACHINE.

No. 369,792.

Patented Sept. 13, 1887.

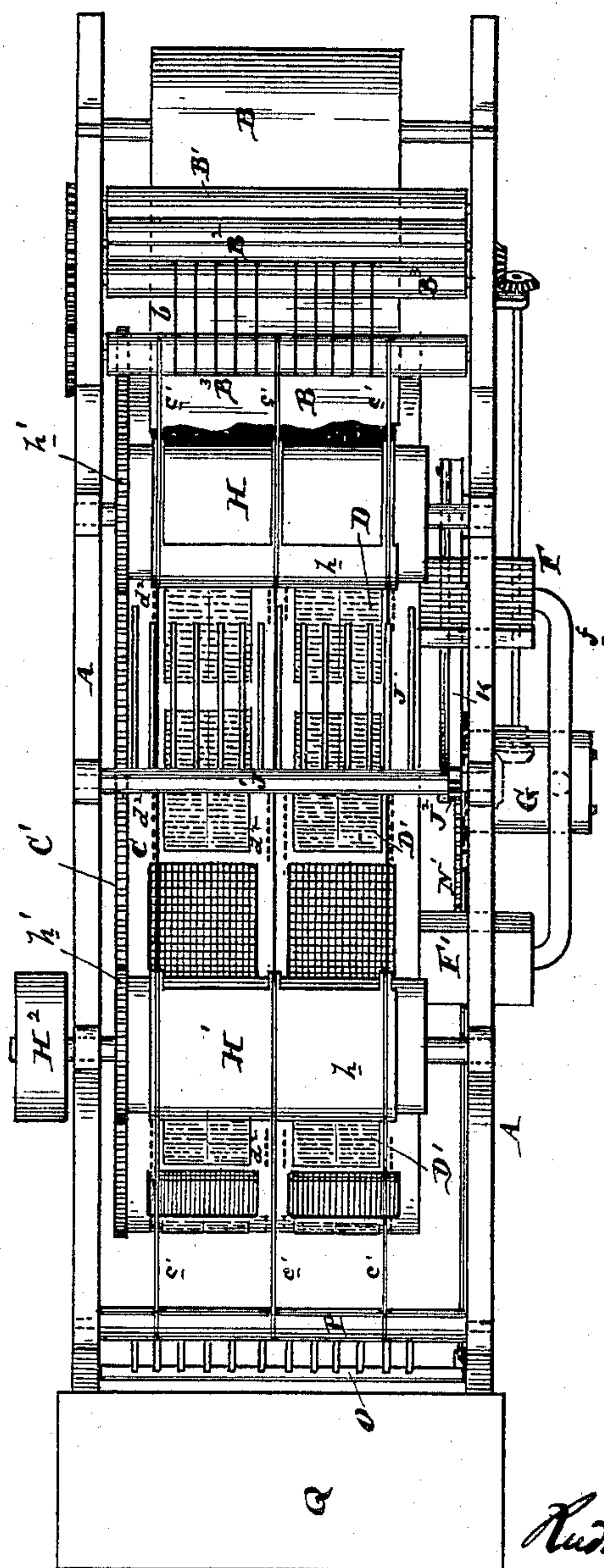


Fig. 6

Attest

George E. Hammel,
Notary A. Herr,

Inventor
Rudolph M. Hunter

UNITED STATES PATENT OFFICE.

RUDOLPH M. HUNTER, OF PHILADELPHIA, PENNSYLVANIA.

PERFECTING PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 369,792, dated September 13, 1887.

Application filed November 2, 1883. Serial No. 110,624. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH M. HUNTER, of the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Perfecting Printing-Machines, of which the following is a specification.

My invention has reference to printing-presses of the perfecting class; and it consists in certain improvements set forth and claimed hereinafter.

The object of my invention is to provide a perfecting-press adapted to print circulars, newspapers, and book-sheets upon both sides before leaving the same, whereby less handling is required and more accurate printing is the result. As the paper is fed from a roll and automatically cut off into sheets and delivered printed upon both sides, the operation is of necessity rapid and inexpensive. In the case of book-sheets, each type-form may contain different matter, corresponding to the different pages of the book or pamphlet, and as the said printed sheets are received and laid in their proper consecutive order the pamphlet can be at once bound. In case of printing circulars, they may be all of one kind or two or more kinds, and these can be regularly interposed between each other when delivered by the mechanism shown, or by simple devices they may be kept entirely separate.

In the drawings, Figure 1 is a side elevation of my improved perfecting-press. Fig. 2 is a section on line *y y* of Fig. 3 and shows the transfer device. Fig. 3 is a cross-section on line *xx* of Fig. 1. Fig. 4 is a side elevation of a modified form of transfer-nippers. Fig. 5 shows a perspective view of one of the nipper-cranks, and Fig. 6 is a plan view of my improved perfecting-press; but in this view the mechanism for operating the fly, suction apparatus, &c., are shown as arranged on the opposite side to that shown in Fig. 1.

A is the frame of the machine.

B is the roll of paper, which is fed between the tension and feed rollers B', and from them it passes between the cutting-cylinders B², and after being severed into sheets they are intermittently fed by tapes *b* on rollers B³ to the tapes *c c'*, passing, respectively, around the printing-cylinder C and the impression-cylinder H. The sheets, after being cut by cutting-

cylinders B², are not fed forward to the printing mechanism until the tapes *b*, which are continually moving, are pressed together, and this action is intermittent, being produced by the cam L and connecting mechanism, subsequently referred to.

The cylinder C is supported upon a shaft, C², carried in suitable bearings in frame A, and is provided upon its circumference with pairs of type-form supports D D', in which each pair of forms E E is separated by a large space, D³, and the forms of each pair by a small space, D⁴, the object of which will be hereinafter set forth. The supports D D' are made hollow, as at *d*, and these spaces communicate with the periphery of the cylinder C between the type E by small apertures *d*², and with the atmosphere on the side of the cylinder C by apertures *d'*, which latter open through a smooth surface, D⁵. The apertures *d*² in the type-supports D communicate with one end and those in support D' with the other end. (See Fig. 2.) Working against the surface D⁵ and close to the impression-cylinders H H' are the suction-boxes F F', which communicate with an exhaust blower or fan, G, by pipes *f*, and operate to exhaust the air out of said spaces *d* through apertures *d'* as they pass before boxes F F', and this in turn creates a suction on the surface of the cylinder C and carries the sheet along for a given distance for the purpose of insuring its delivery to or from the transfer-frame J, pivoted to the frame A between said cylinders H H'. The blower or exhaust-fan G may be run by a spur-wheel, I, on shaft C², meshing with the pinion *g* on the fan-shaft.

The impression-cylinders H have impression-surfaces *h*, separated by spaces and adapted to print from every alternate type-form, and are rotated by gearing *h'*, which meshes with gearing C' on the printing-cylinder C.

The transfer-frame J is secured to an axle, J', having a pinion, J², and journaled in the frame A, equidistant between the cylinders H H', as shown in Fig. 2. The transfer-frame may be made of simply three fingers or three sets of fingers, according as to whether it is single or double, and these fingers may have their ends arranged to run in grooves or in spaces between the type-forms arranged upon the type-cylinder, and thus receive and de-

liver the sheet without injury to the type-forms. If desired, the spaces between these fingers may be filled in with shorter fingers, which, when the frame is down, do not quite touch the type-forms which pass beneath them. The frame is rotated so as to lift the sheet as it passes from under cylinder H over to cylinder H', and during such manipulation reversing it, and then returns quickly to its original position. It is rotated by a rack, K, reciprocated by a bar or rod, K', pivoted to a lever, K², which is actuated by a cam, L, which is rotated by a pinion, L', which meshes with spur-wheel I. A spring, k, keeps the lever K² in contact with the cam. This cam L also rocks a lever, M, held against it by a spring, m, and this in turn, by a bar, M', actuates the lower feed-rollers, B³, by vibrating their frame B⁴.

In place of using a single fly or transfer frame, J, as shown in Fig. 2, a double clamping-frame may be used, as shown in Fig. 4, in which the two frames J are drawn together by a spring, J⁵, and cranks J³ are secured to the respective shafts j of the frames, and are provided with lugs J⁴, which alternately come in contact with the roller J⁶, held by the adjusting-screw J⁷, which may be adjusted in the frame A and locked by nut J⁸.

The two frames J, shaft j, and cranks J³ all rotate simultaneously with the main axle or shaft J'. By this construction the two frames are separated until the sheet is received, and upon rising they close upon it, but open as they rest upon the cylinder C, next to the impression-cylinder H'. Any other form of transfer device may be used, if desired.

The suction by box F' and form-support D' carries the sheet from the frame J and feeds it to the impression-cylinder H', which only prints from the forms on supports D', while the cylinder H only prints from the forms on supports D.

The printed sheet after passing between cylinders C and H' is carried off by tapes c c², which pass around rollers P P', and is received upon the fly-frame O, which deposits it upon the table Q. This fly-frame may be actuated by a rod, n', lever N', and cam-wheel N, having projections n.

The type E may be inked by cylinder R, having distributing-rollers r, for transferring the ink from plate R' to said cylinder R.

The machine may be driven by a belt over the wheel H² on the shaft of one of the impression-cylinders.

It is evident that two or more sets of impression-cylinders may be used and sheets simultaneously printed from two or more rolls of paper.

The operation is as follows: The sheet being cut off the roll of paper B by cutting-cylinders B², and then fed at the proper interval between the cylinders C and H by the rollers B³ and tapes b c', which cause it to be fed between them with a surface speed substantially equal to that of the type and impression cylinders,

(and considerably faster than the surface speed of the rollers B' B²), it is printed upon one side by type in support D. As it emerges from between the said cylinders, it is received upon the frame J, and to insure its being brought up sufficiently high thereon the air-currents from box F' create a suction and cause the paper to cling to the cylinder C, which automatically shoves it up on frame J. When sufficiently high, the air is cut off by aperture d', passing from under the box F', and the frame J is simultaneously rocked, carrying the sheet over, turning and placing it upon the cylinder C just as the type in support D' reach the end of frame J, and the aperture d' of this support is then in juxtaposition with the suction-box F', and the suction created causes the forward end of the paper to cling to the cylinder C, which in its movement drags the paper sheet from the frame J and feeds it between the said cylinder and impression-cylinder H', where it is printed upon its other side. The sheet printed on both sides is then delivered by bands c c² to the fly-frame O and is deposited upon the table Q.

I do not limit myself to the exact construction shown, as it may be modified in various ways without departing from my invention.

I do not claim, broadly, a large cylinder provided with two or more sets of type-forms, one or more pairs of impression-cylinders adapted to print, respectively, from different type-forms of each set or pair, and mechanism located between said impression-cylinders to receive the sheet after being printed on one side, reverse it, and feed it to the second impression-cylinder to be printed upon the other side.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a cylinder having two or more sets of type-forms upon its circumference with two impression-cylinders arranged to respectively make contact with and avoid alternate forms, a vibrating transfer or fly frame, substantially as described, for receiving a printed sheet, head first, after leaving the first impression-cylinder and delivering it, tail first, before it passes to the second impression-cylinder, and a suction device to cause the said sheets to be properly delivered to or from said conveyer or transfer device, all substantially as and for the purpose specified.

2. The combination of a cylinder having two or more sets of type-forms upon its circumference, each pair of type-forms being arranged close to each other and separated from the next pair by a wide space, with two impression-cylinders arranged to respectively make contact with and avoid alternate forms, a vibrating transfer or fly frame, substantially as described, for receiving a printed sheet, head first, after leaving the first impression-cylinder and delivering it, tail first, before it passes to the second impression-cylinder, and a suction device to cause the said sheets to be properly delivered to or from said conveyer or

transfer device, all substantially as and for the purpose specified.

3. The combination of a cylinder having two or more sets of type-forms upon its circumference with two impression-cylinders arranged to respectively make contact with and avoid alternate forms, a vibrating transfer or fly frame, substantially as described, for taking a printed sheet, head first, after leaving the first impression-cylinder and delivering it, tail first, before it passes to the second impression-cylinder, a suction device to cause the said sheets to be properly delivered to or from said conveyer or transfer device, and mechanism for feeding the paper from a roll, cutting it into sheets, and feeding said sheets to said type-form cylinder, all substantially as and for the purpose specified.

4. The combination of a cylinder having two or more sets of type-forms upon its circumference with two impression-cylinders arranged to respectively make contact with and avoid alternate forms, a suitable conveyer or transfer device for receiving a printed sheet, head first, after leaving the first impression-cylinder and delivering it, tail first, before it passes to the second impression-cylinder, consisting of a vibrating frame pivoted close to the type-form cylinder and adapted to rest upon it and receive the sheets therefrom, and a suction device to cause the said sheets to be properly delivered to or from said conveyer or transfer device, substantially as and for the purpose specified.

5. The combination of a cylinder having two or more sets of type-forms upon its circumference with two impression-cylinders arranged to respectively make contact with and avoid alternate forms, a vibrating transfer or fly frame, substantially as described, which receives the sheet after it passes from between the impression and type-form cylinders, reverses it, and redelivers it to said type-form cylinder during its passage between said impression-cylinders, whereby the sheet is printed upon both sides, all substantially as and for the purpose specified.

6. The combination of a cylinder having two or more sets of type-forms upon its circumference with two impression-cylinders arranged to respectively make contact with and avoid alternate forms, a vibrating transfer or fly frame mounted in stationary bearings, which receives the sheet after it has passed from between the first impression-cylinder and type-form cylinder, reverses it, and delivers it to the type-form cylinder and upon the type-form immediately in front of that from which it was printed in passing under the first impression-cylinder, all substantially as and for the purpose specified.

7. The combination of a cylinder having two or more sets of type-forms upon its circumference with two impression-cylinders arranged to respectively make contact with and avoid alternate forms, a vibrating transfer or fly frame, substantially as described, mounted

in stationary bearings, which receives the sheet after it has passed from the first impression-cylinder, reverses it, and delivers it to the type-form cylinder and upon the type-form immediately in front of that from which it was printed in passing under the first impression-cylinder, and a suction device to insure the sheet being delivered to and from said transfer device, all substantially as and for the purpose specified.

8. The combination of a cylinder having two or more sets of type-forms upon its circumference with two impression-cylinders arranged to respectively make contact with and avoid alternate forms, a suitable stationary sheet-transfer device consisting of a frame pivoted close to the type-form cylinder and equidistant between the impression-cylinders, which receives the sheet after it has passed from the first impression-cylinder, reverses it, and delivers it to the type-form cylinder and upon the type-form immediately in front of that from which it was printed in passing through the first impression-cylinder, all substantially as and for the purpose specified.

9. The combination of cylinder C, having type-form supports D D', impression-cylinders H H', and pivoted transfer-frame J, arranged between said cylinders H H' and adapted to swing to and from cylinder C during its vibration, substantially as and for the purpose specified.

10. The combination of cylinder C, having type-form supports D D', having suction devices, substantially as described, impression-cylinders H H', pivoted transfer-frame J, arranged between said cylinders H H' and adapted to swing to and from cylinder C during its vibration, and suction-creating devices, substantially as described, substantially as and for the purpose specified.

11. The combination of cylinder C, having type-form supports D D', having suction devices, substantially as described, impression-cylinders H H', pivoted transfer-frame J, arranged between said cylinders H H' and adapted to swing to and from cylinder C during its vibration, suction-creating devices, substantially as described, and cut-off devices, substantially as described, to control the said suction, substantially as and for the purpose specified.

12. The combination of cylinder C, having type-form supports D D', impression-cylinders H H', pivoted transfer-frame having two frames or jaws, J J, shafts J' j j, cranks J³ J³, and spring J⁵, arranged between said cylinders H H' and adapted to swing to and from cylinder C during its vibration, and stationary cam-pin J', substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

RUDOLPH M. HUNTER.

Witnesses:

WILLIAM MCWADE,
J. ALFRED SMITH.