

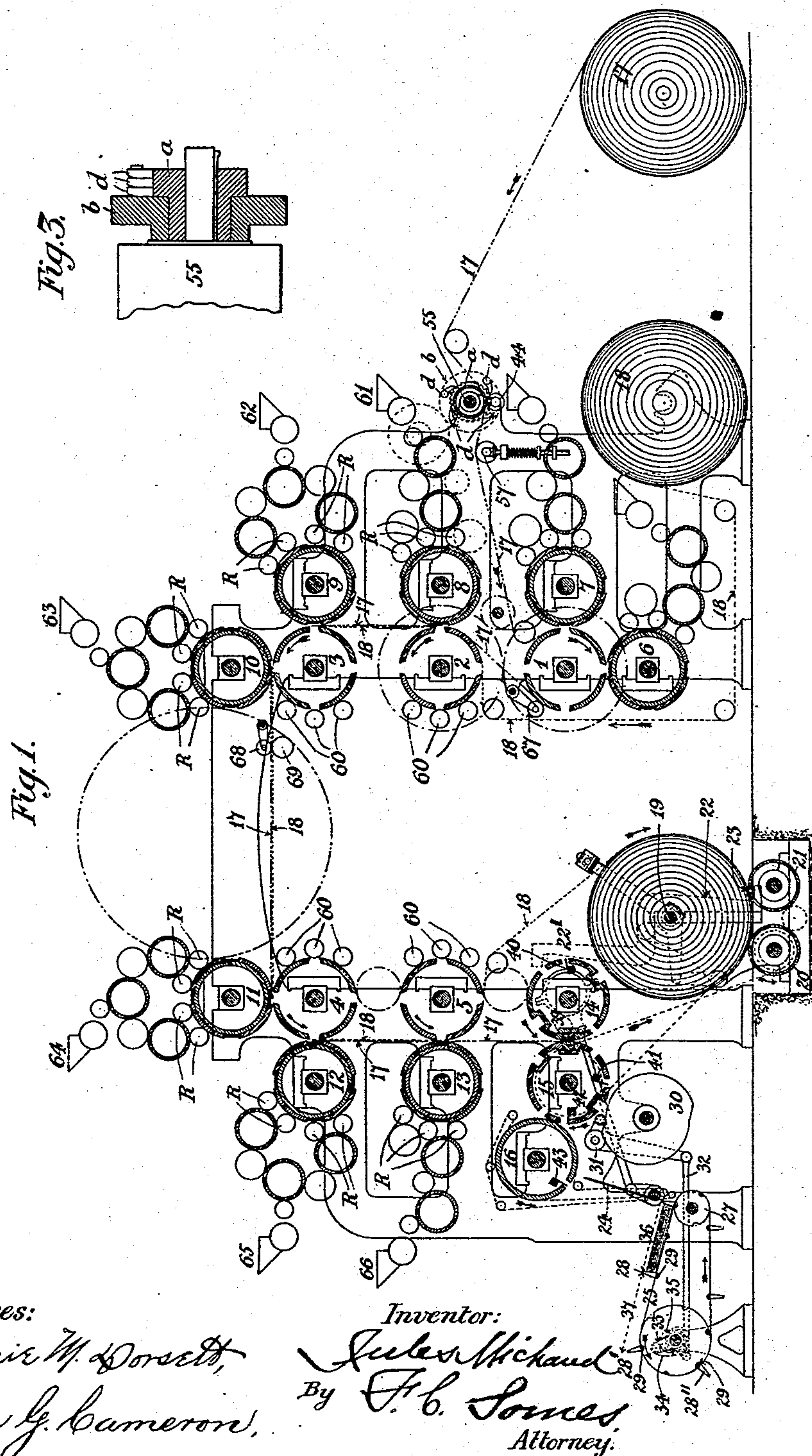
(No Model.)

2 Sheets—Sheet 1.

J. MICHAUD.
ROTARY PRINTING MACHINE.

No. 528,233.

Patented Oct. 30, 1894.



Witnesses:

Luzie M. Dorsett,
Jan G. Cameron.

Inventor:

Julius Michael
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Attorney.

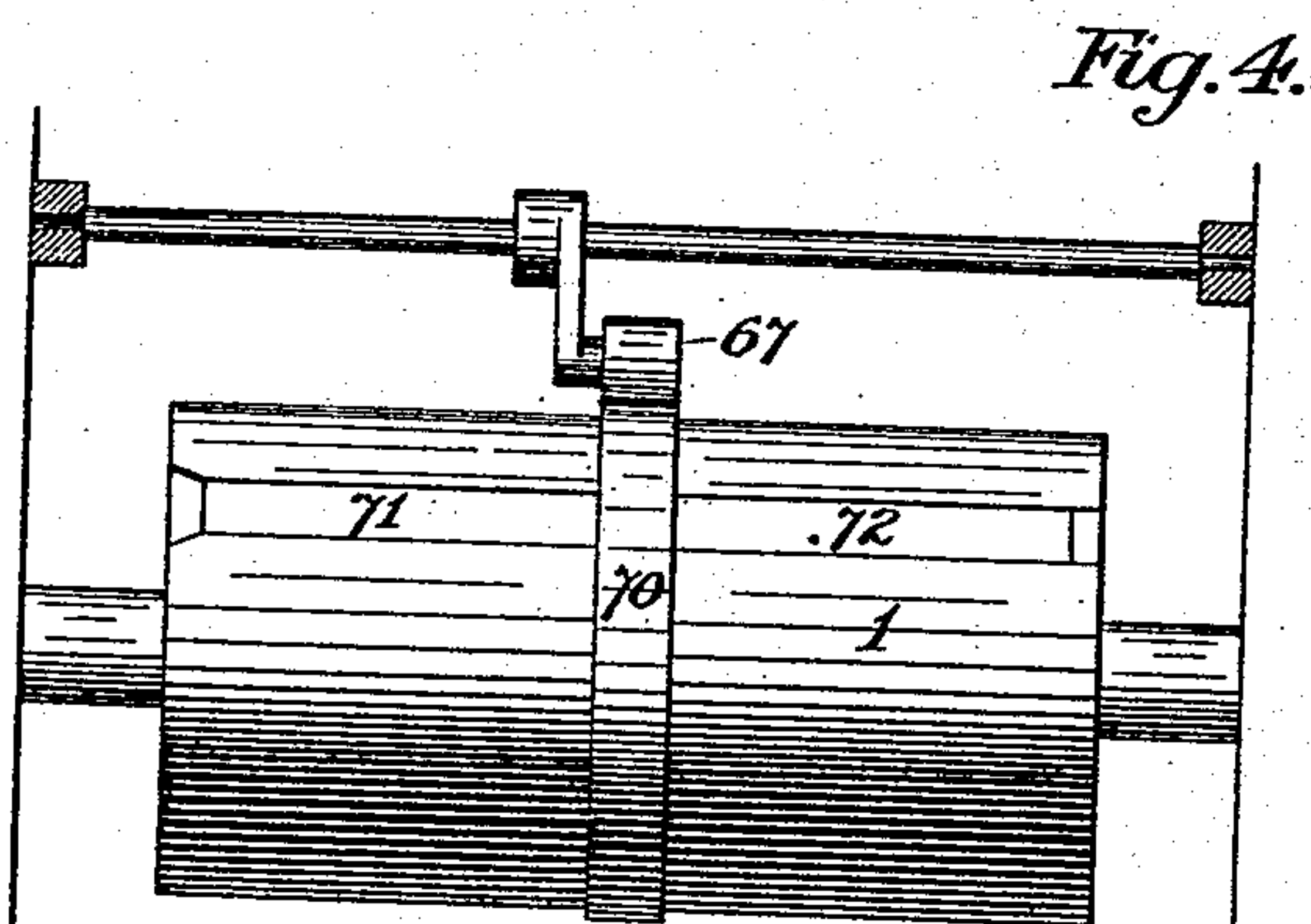
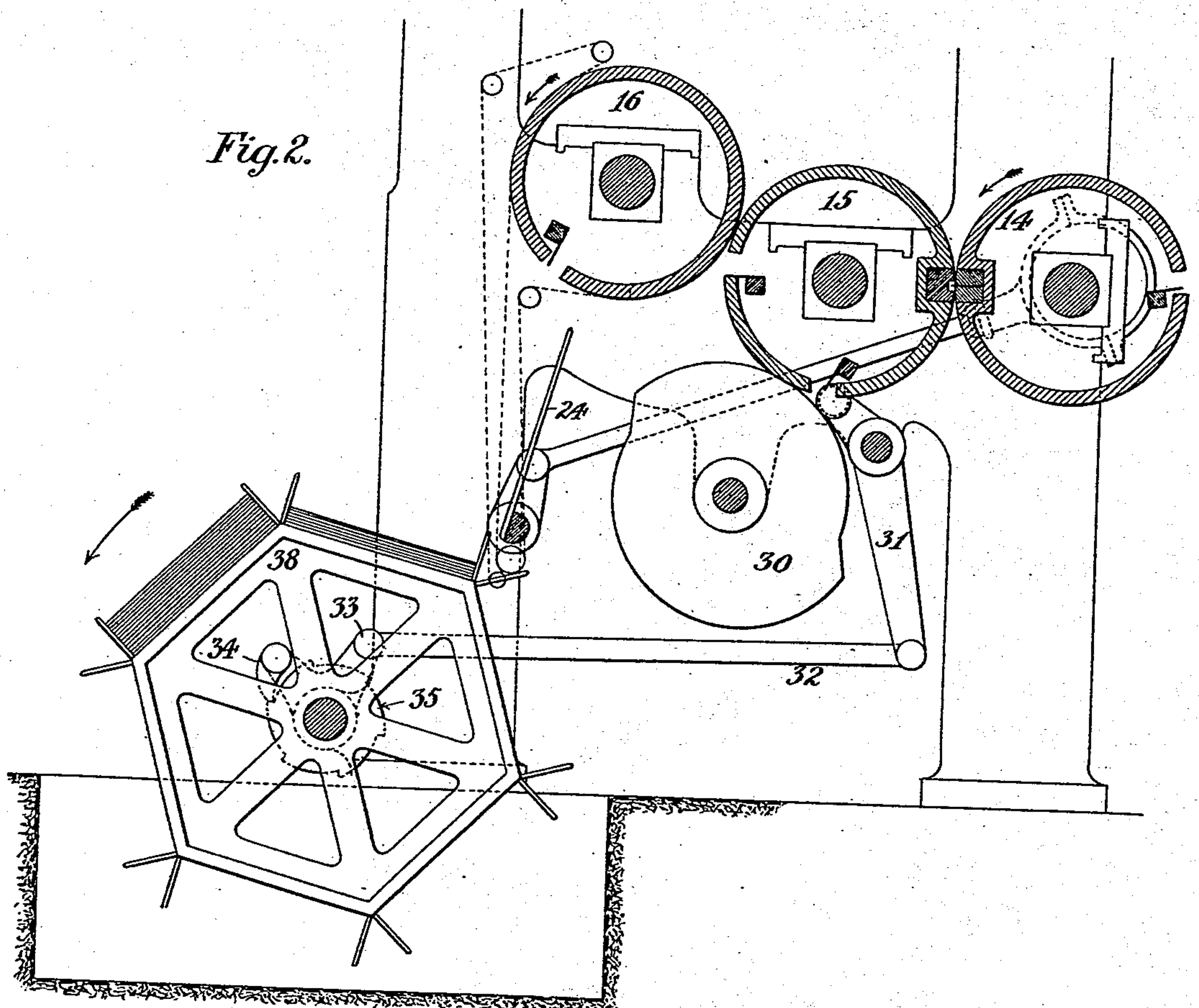
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J. MICHAUD.
ROTARY PRINTING MACHINE.

2 Sheets—Sheet 2.

No. 528,233.

Patented Oct. 30, 1894.



Witnesses:
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San G. Cameron,

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UNITED STATES PATENT OFFICE.

JULES MICHAUD, OF PARIS, FRANCE.

ROTARY PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 528,233, dated October 30, 1894.

Application filed October 22, 1892. Serial No. 449,647. (No model.) Patented in France August 6, 1890, No. 207,459, and in England July 20, 1891, No. 12,290.

To all whom it may concern:

Be it known that I, JULES MICHAUD, a citizen of the Republic of France, residing at 96 Rue d'Assas, Paris, France, have invented certain new and useful Improvements in Rotary Printing-Machines, (for which I have obtained certificates of addition, dated March 7, 1891, April 25, 1891, June 4, 1891, July 1, 1891, and August 1, 1891, to French Patent No. 207,459, dated August 6, 1890, and a patent in Great Britain, No. 12,290, dated July 20, 1891,) of which the following is a specification.

The present invention relates to various improvements applicable to rotary printing machines generally.

I shall proceed to describe such improvements as are applied to a machine for color printing. They may be applied irrespective of the number of printing cylinders employed.

Figure 1, is a vertical section of the machine. Fig. 2, is a vertical section of a modification of the means employed for delivering a packet or pile of sheets. Fig. 3 is a longitudinal section of the means for driving the feed roller. Fig. 4, is an end view of a blanket cylinder showing the arrangement of a continuous circle for the balls which govern the feed of the paper to bear upon.

Referring to Fig. 1, 1, 2, 3, 4 and 5, are the blanket or impression cylinders. 6, 7, 8, 9, 10, 11, 12 and 13 are the printing cylinders. Each of the latter is provided with an inking apparatus. 14, 15 and 16 are cutting and folding cylinders.

The blanket cylinder 1 prints one side of the sheet in two colors by contact with the printing cylinders 6 and 7. The other cylinders serve for printing the other side of the sheet.

I have shown four blanket cylinders 2, 3, 4 and 5 for the second side of the sheet, but there may be more, and with each I may employ one or more printing cylinders, but no matter what the number of these cylinders, I arrange them so that by means of the space left in the middle of them each cylinder may be reached and the blanket readily removed, and the make-ready effected with ease. The printing cylinders being outside the line formed by the paper passing round the blan-

ket cylinders, these operations will in no way be interfered with. The result of this arrangement of cylinders and the manner in which the paper passes, is that the removal of the blankets and the make-ready may be effected on the cylinders for printing the second side of the sheet and for color printing, without having to cut the paper.

The reel of paper to be printed is shown at 17.

18 is a reel of paper for the off-set, the object of which is, by its interposition between the blankets of cylinders 2, 3, 4, 5 and the printed sheet, to prevent the soiling of the blankets on such cylinders. The web of off-set paper, after having passed through the machine is rewound on spindle 19 which first rests on the two rollers 20, 21, and which rises between two guides as the diameter of the reel 19 increases. The rollers 20, 21, revolve and effect the winding of the paper. Roller 20 carries a pulley driven by a belt from a pulley mounted on the end of cylinder 15. The rollers 20 and 21 are connected by toothed wheels. One of the guides between which spindle 19 rises is movable. This is marked 22, and when the reel has attained its full size and it is necessary to remove same, such part is raised to the position 22', for which purpose it is only necessary to remove the bolt 23.

It will be clearly seen in Fig. 1, that the off-set paper and also the web to be printed may remain engaged in the machine and do not require to be severed in order to enable the make-ready to be effected on the cylinders 2, 3, 4, 5.

In the case where the employment of an off-set web is not indispensable, I may apply cleaning rollers 60 to each of the blanket cylinders, such rollers, either coated with paraffine or not, serving to clean the blankets.

The printed sheets are cut by the saw or knife 39 and folded by the blades 40, 41, 42, 43, of the cylinders 14, 15 and 16, and are then received by the fliers 24. 25 is an endless web of linen, leather belt, or metallic sheet passing over two rollers 26 and 27. Pins or stops 28, 28', 28'', &c., are fixed to this strap or web, and are the same distance apart as the size of the folded sheet. The parts 29

which correspond with recesses made in the rollers 26, 27, insure the strap being carried forward, but this may be effected by any other suitable means. By means of the mechanism consisting of the cam 30, lever 31, connecting rod 32, the pawl lever 33, pawl 34 and the ratchet 35, for a given number of revolutions of the printing cylinders I obtain a forward travel of the web equal to the length of the sheet, such travel occurring between two movements of the fliers, whereby the packet or pile of sheets previously received advances from 36 to 37, where it may be readily removed, and which pile consists of a given number of sheets.

Fig. 2, shows another arrangement for obtaining the same result. 38 is a prism each side of which is equal to the size of the sheet. On one of its faces it receives a given number of sheets, and when such number is attained it is turned by means of the same mechanism as in the preceding case, to the position to present a new face to the fliers.

In all rotary machines in general, and particularly in that class to which the present invention is specially applicable, it is of very great importance to insure a regular travel of the paper no matter what resistance is offered by the brakes to the unwinding of the reels. In machines as at present constructed it may happen that at a given moment the blanket cylinders all cease to bear on the printing cylinders, and that then a slipping of the paper may occur which may produce a failure in either the register of the impressions on the opposite sides of the sheet, or in the register of the different colors. In this case the balls such as 67, 68, Fig. 1, bearing on cylinder 1 or on the roller 69 in the blank or white parts may not prove sufficient to prevent this slipping.

I insure the regular feed of the paper from the reel not only by rollers and balls, and by the pressure of the printing cylinders on the blanket cylinders, which pressure is necessarily intermittent on account of the spaces between the printing plates, but by the pressure before any impression of a roller 44 clothed with india-rubber or other suitable material, against a cylinder 55 traveling at exactly the same speed as the circumference of the blanket cylinders. (See Fig. 1.) The cylinder 55 is driven so as to always maintain the paper at the proper tension even if there is a slight difference between its speed and that of the printing cylinders. In the first place the surface speed of the roller 55 is calculated so as to be exactly the same as that of the printing cylinders when carrying the normal clothing or covering, that is to say the blankets and a make-ready or backing of a predetermined thickness. If then the circumferential speed of roller 55 is greater than that of the blanket cylinders, it is because the latter are not sufficiently clothed, and it is only necessary to apply to such cylinders, beneath the blanket, a sheet of paper, so as to increase

their size and consequently the surface speed, and thus to attain approximately (preferably exceeding same than otherwise) the circumferential speed of the feed roller 55. The paper will then always remain stretched between rollers 55 and the printing cylinders, and it is then only necessary to guard against the breaking of the paper which might occur from excess of tension if the speed of the roller 55 is less than that of the printing cylinders. For this purpose I actuate roller 55 so that it insures the feed of the paper at the speed it is calculated it should have, but further if the speed of the printing cylinders is higher than that calculated (which might occur at the beginning of an impression when the blankets are not then compressed) it will be the printing cylinders which draw the roller 55 around at their own speed by means of the sheet of paper itself.

The method of driving roller 55 is shown in Fig. 1, and also in section in Fig. 3.

b is the driving wheel actuated by the machine and turning freely on the axle of the roller. *a* is a ratchet wheel keyed to the axle of such roller.

d, d, are pawls fixed to the wheel *b*, which wheel in revolving actuates the roller by the intermediary of the pawls *d*.

On the speed of the paper exceeding that imparted to the roller by the wheel *b*, the roller turns under the action of the paper. There are several pawls *d*, and they are of different lengths so that when one of them leaves one tooth of the ratchet wheel, another one is in contact with another tooth. A roller 57 supported by a spring also serves to prevent the rupture of the paper, by rising or falling according to the increase or decrease of the tension of the paper.

With regard to the carrying forward of the paper by balls 67 of metal, india-rubber or other material, which bear on the blanket cylinder, in order to maintain the tension of the paper between two succeeding blanket cylinders, I employ the arrangement shown in Fig. 4, to overcome the difficulties resulting from the passage of the gaps or openings of the cylinder beneath such balls.

In the case where there is a blank or white corresponding to the middle of the printed sheet, I may, as shown in Fig. 4, place in the middle of the cylinder a circle 70 of which the diameter is equal to that of the cylinder when clothed. This circle divides the gap, in which the ends of the blanket are secured, into two parts 71, 72, and it is upon such circle, which is continuous, that the balls 67 serving to carry the paper forward bear. Separate rods for stretching and securing the blanket will then be provided for the right hand and the left hand of the machine. This arrangement will have the further advantage of facilitating the "make-ready" on the cylinder, as the blankets will be in two parts in the direction of the length of the cylinder. If there were three or more printing plates in the width of

the machine, I should employ as many gaps in the blanket cylinders as there are printing plates and separate same by circles.

The machine above described and shown in Fig. 1, is constructed so as to print one side of all the pages in six colors.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a rotary printing mechanism, a feed roller for feeding the web of paper to said mechanism, and provided with an axle, a ratchet wheel keyed to said axle, a driving wheel for said feed roller actuated by the machine and turning on the axle of the roller, and a pawl on said driving wheel adapted to engage said ratchet wheel, substantially as described.

2. The combination of a rotary printing mechanism, a feed roller for feeding the web of paper to said mechanism, a friction roller forming contact with said feed roller, and means for rotating said feed roll at a given speed and permitting it to rotate at a higher speed under the draft of the paper, substantially as described.

3. The combination of a rotary printing

mechanism, of a polyangular drum, the periphery of which has a series of flat peripheral receiving faces for the sheets delivered, triangular partitions extending outwardly from the angles of the drum, and means for intermittently rotating said drum, substantially as described.

4. The combination of a rotary printing mechanism, a feed roller for feeding the web of paper to said mechanism, means for rotating said feed roll at a given speed and permitting it to rotate at a higher speed under the draft of the paper, and a spring roller for preventing the breaking of the paper, substantially as described.

5. The combination of a rotary printing cylinder, and a rotary blanket cylinder provided with one or more gaps in its periphery, a continuous rib surrounding said cylinder at a given point, and blankets on opposite sides of said rib, and paper holders bearing on said rib, substantially as described.

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