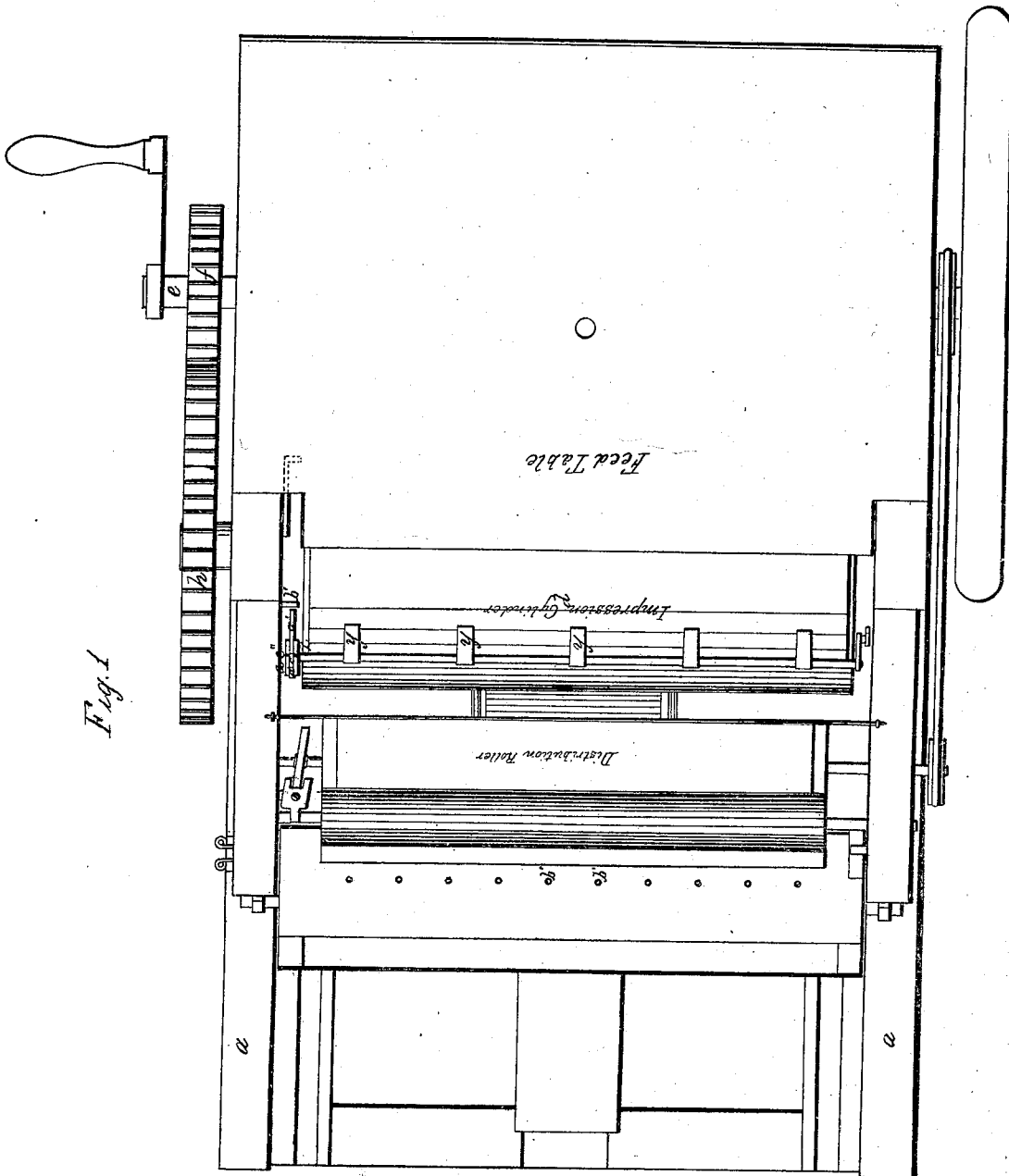


J. M. MARSH.  
PRINTING PRESS.

No. 5,819.

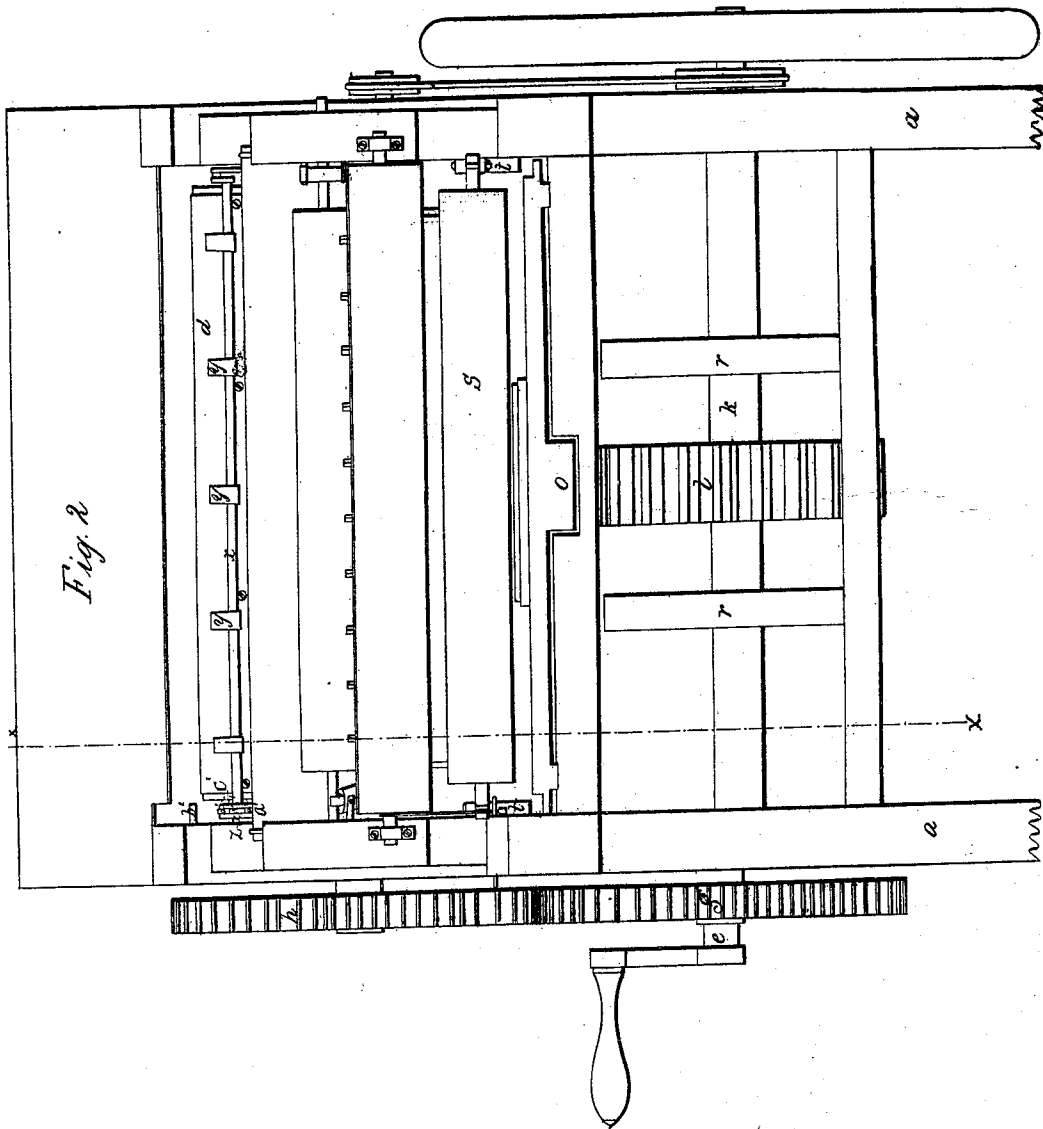
Patented Oct. 3, 1848.



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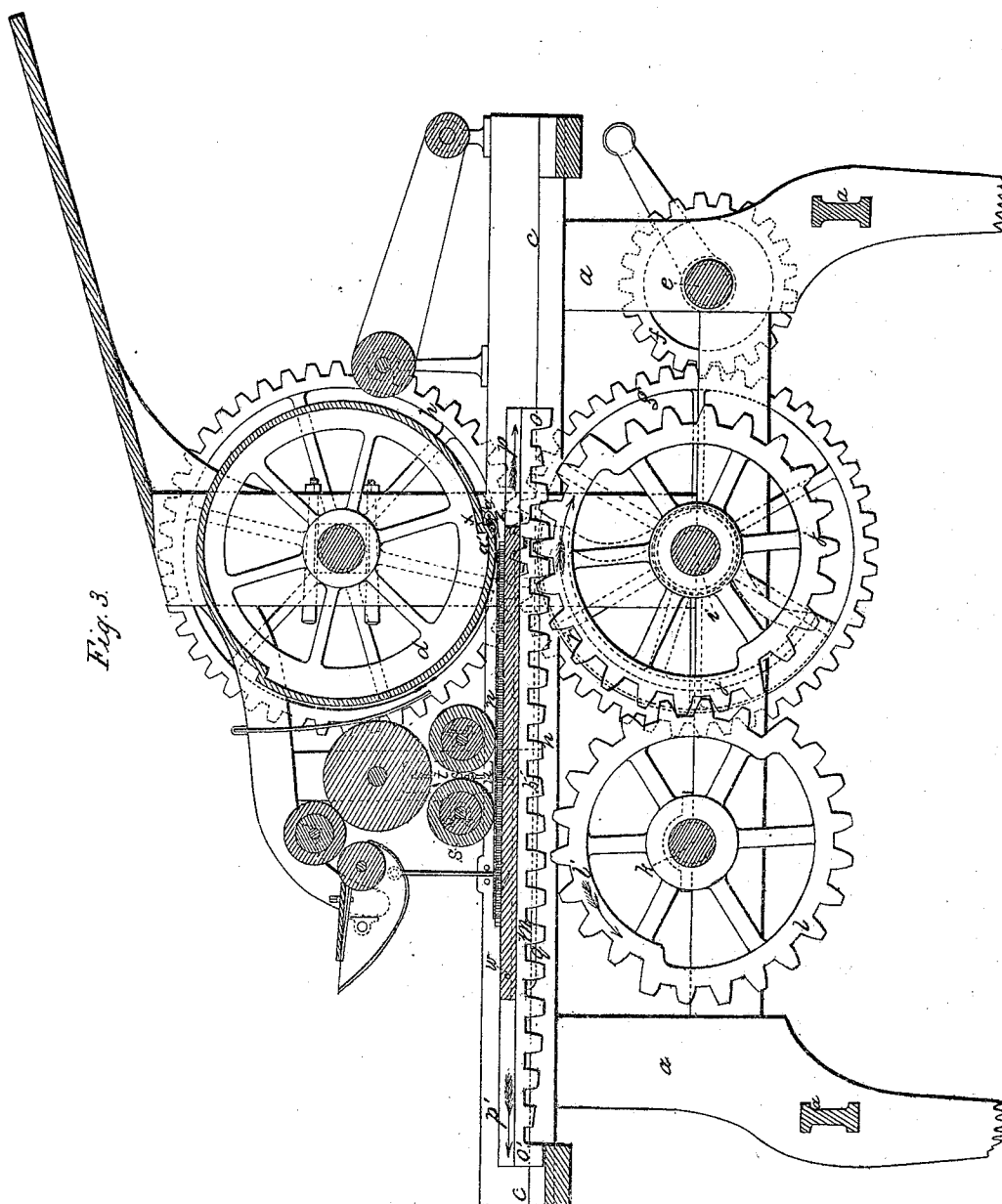
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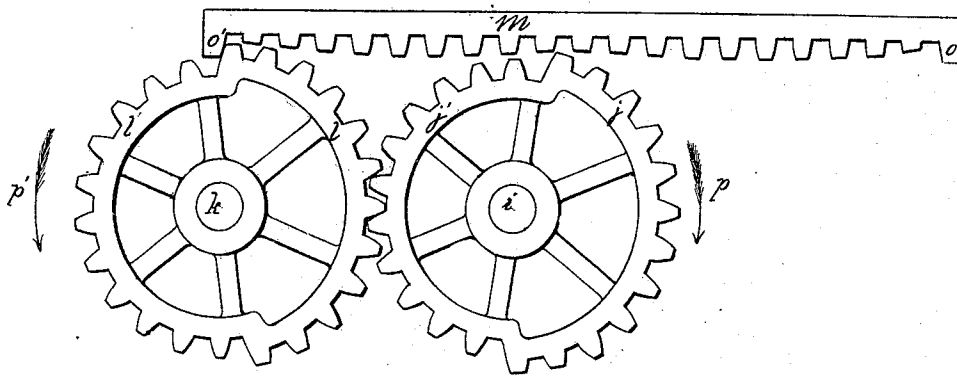


*Fig. 5*

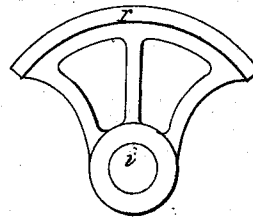


*Fig. 6*

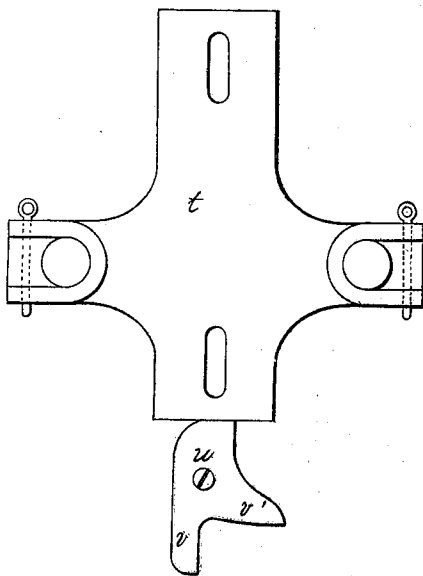
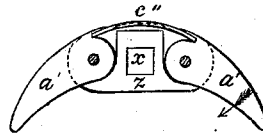


*Fig. 7*



# UNITED STATES PATENT OFFICE.

JOS. M. MARSH, OF NEW YORK, N. Y.

## PRINTING-PRESS.

Specification of Letters Patent No. 5,819, dated October 3, 1848.

*To all whom it may concern:*

Be it known that I, JOSEPH M. MARSH, of the city, county, and State of New York, have invented new and useful Improvements in Cylinder Printing-Presses, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of my improved printing press; Fig. 2, a rear elevation; Fig. 3, a longitudinal vertical section taken at the line (*x x*) of Fig. 2; Fig. 4, a separate view of the rack and cog wheels for operating the bed of the press; Fig. 5, a separate view of one of the segmental supporters; Fig. 6, an elevation on an enlarged scale of the trip lever and one of the sliding boxes in which the journals of the inking rollers run; and Fig. 7 an enlarged view of the spring arms for operating the grippers.

The same letters indicate like parts in all the figures.

The first part of my invention relates to the method of giving the required reciprocating motion to the carriage or bed of the press, and consists in effecting this end by means of two cogged wheels and a cogged rack, each wheel being composed of two segments of different diameters and so placed relatively to each other and the rack that the small segment of one engages the large segment of the other and vice versa, and so that when the cogs of the large segment of the first wheel is carrying the rack in one direction the cogs of the small segment engage the cogs of the large segment of the second, and just as the end of the cogs of the large segment of the first wheel are leaving the rack the cogs of the large segment of the second wheel are just beginning to engage the cogs of the rack to carry it back in the opposite direction; in this way the use of additional cog wheels on the shafts of the segment wheels to present the segments alternately to the rack is entirely avoided.

The second part of my invention, when used in combination with the first part, consists in making the tips of the cogs of the rack along a curved line so that the cogs along the portions operated upon by each segment shall be in full gear at the middle

and gradually less toward each end that the cogs of one segment may disengage at each end as the cogs of the other segment are beginning to engage, and vice versa—the rack being provided with a long cog at each end to insure the motion of the rack when started at each end.

The third part of my invention consists in using one, two, or more circular segmental bearers on a shaft below the carriage and in combination therewith to sustain the bed of the press while passing under the pressure of the cylinder.

The fourth part of my invention consists in combining with sliding boxes in which the journals of the inking rollers run, what I denominate trip levers, that is, levers which lie below the sliding boxes, that part of the said levers which is below the sliding boxes being cam formed to lift and permit their descent when turned either to one side or the other by pins on the carriage, so that when the carriage is run out with the form of types the levers shall be tripped to permit the inking rollers to fall onto and ink the types and when run in, the levers shall be turned to lift up the rollers so soon as the form of types has passed from under them. And the last part of my invention consists in combining with the gripping fingers spring arms by which the gripping fingers are closed and opened by pins against which they strike as the cylinder rotates, the spring arms being introduced that they may yield whenever it may be desired to turn back the cylinder, and thus avoid breakage.

In the accompanying drawings (*a*) represents a frame adapted to the purpose but which may be varied at pleasure, and (*b*) the bed or carriage which receives the form of types and which runs on ways (*c, c*) in manner similar to the well known cylinder press.

The cylinder (*d*) which gives the impression is constructed and arranged in the usual manner, and receives a continuous rotary movement from a main shaft (*e*) by a train of cog wheels (*f, g, h*).

On the shaft (*i*) of the wheel (*g*) and about the middle of its length, there is a cog wheel (*j, j'*) made of two segments, the diameter of one segment being greater than the other by about the depths of the cogs.

The cogs of each segment occupy nearly one half of the entire circumference, there

being a space on each side at the junction of the two segments equal each to a cog, and the length of these segments, the difference in their diameter, and the size of the cogs should be such that the large segment shall have one more than the small one.

Immediately in front of the cog wheel just described and on a parallel shaft ( $k$ ) there is another cog wheel composed of two segments ( $l, l'$ ) similar in every particular to the one described, and so located with reference to the proportions indicated that the cogs of the large segment of the one shall engage the cogs of the small segment of the other, and vice versa, so that the one shall rotate the other in the opposite direction, as in the case of ordinary cog wheels. To the under face of the bed or carriage there is properly secured an inverted cogged rack ( $m$ ) that is alternately engaged by the cogs of the large segments ( $j$ ) and ( $l$ ) for the purpose of giving the required reciprocating motion to the carriage, the segment ( $j$ ) being employed to run it in, and the one ( $l$ ) to run it out; but as the rack is much longer than the periphery of either one of the segments, to prevent their cogs from catching, or rather hanging, in the cogs of the rack, these are so formed as to have the general line of their tips curved in the following manner: supposing the length of the rack to be divided in two parts by the red line ( $n, n$ ) the cogs in the middle of each of these divisions are made of full depth, and from these points toward each end the cogs are made of gradually less depth so that the cogs of the segments shall become gradually disengaged and engaged.

At each end of the rack there is a cog ( $o, o'$ ) of full depth for the purpose of starting the rack. As the segment ( $j$ ) rotates in the direction of its arrow it carries the rack and carriage in the direction of the arrow ( $p$ ), and during this motion the segment ( $l$ ) is moving in the reverse direction, as indicated by its arrow, and as it passes the rack it will be obvious that if the cogs thereof were of full length (on a plane parallel with the line of motion) that they would catch and that some part of the machinery would of necessity break, but as the cogs are of less length at the part then being passed the cogs of the segment and rack do not come in conflict, and the segment ( $l$ ) passes around freely until the first cog thereof strikes against the long cog ( $o'$ ) and by that time the cogs of the segment ( $j$ ) have become disengaged from the rack, partly by the distance to which they have been rotated and partly by the reduced depth of the cogs of the rack along the middle of its length, and therefore the segment ( $l$ ) starts the rack in the direction of the arrow ( $p'$ ); and by reason of the long cog ( $o'$ ) the segment ( $l$ ) carries the rack sufficiently far to enable

the cogs of the segment and rack to become gradually engaged with one another. On the reversed motion it will be obvious that the same thing will take place at the other end. In this way the required reciprocating motions are given to the rack from the continuous motions of the segment wheels without shock or jar and without breaking the cogs.

There are two ways ( $q, q$ ) attached to, or formed on the under face of the bed or carriage, the under faces of which correspond with the pitch line of the rack ( $m$ ), and on the shaft ( $i$ ), which lies vertically below the cylinder ( $d$ ) of the press, there are two cylindrical segmental bearers ( $r, r$ ), (represented by red lines in Fig. 3), the peripheries of which correspond with the pitch line of the large segment ( $j$ ), so that as the shaft ( $i$ ) with the cylindrical segmental bearers rotates the ways ( $q, q$ ) will run on the periphery of the bearers to sustain the bed or carriage and resist the pressure made on the form of types by the cylinder in giving the impression, and thus not only avoid the yielding of the bed, but at the same time save much of the friction which would be produced did the carriage, as in the usual manner, run on flat rails or ways.

The inking rollers ( $s, s$ ) that spread the ink on the form of types have their bearings in sliding boxes ( $t, t$ ) on each side, that slide vertically on stud pins projecting from the inner face of the frame, and these rest each on a cam formed trip lever ( $u$ ), which when in the position represented in Fig. 6 holds the sliding boxes up so high that the periphery of the rollers will receive ink from the inking cylinder, and when turned in the position represented by dotted lines in Fig. 3 permits the boxes to slide down so low that the rollers run on and ink the form of types.

For the purpose of tripping the cam formed levers they are each made with two arms ( $v, v'$ ) and the carriage is provided with a pin ( $w$ ) on each side, which, as the carriage runs out strikes the arms ( $v$ ) to trip the lever ( $u$ ) and permit the rollers to descend and run on the form of types, and as it runs in strikes the arms ( $v'$ ) to elevate the rollers.

On one end of the arbor ( $x$ ) that carries the gripping fingers ( $y$ ) there is a nut ( $z$ ) to which is jointed two spring arms ( $a', a'$ ), which as the cylinder rotates strike alternately against pins ( $b', b'$ ) projecting from the inside of the frame, first to open and then to close the fingers to liberate a printed and grip an unprinted sheet. These jointed arms cannot turn on the nut of the arbor in the direction indicated by the arrow, and therefore when they strike the pins ( $b', b'$ ) the arbor is turned by them, but when it becomes necessary for any purpose to re-

verse the motion of the cylinder the opposite side of the arms strike against the pins, and as the arbor cannot turn in the reverse direction the arms contract the spring (*c''*) and turn on the joint which connects them with the nut on the end of the arbor and thus permits the cylinder to turn without breaking or injuring the fingers in any particular.

10 It will be obvious from the foregoing that some parts of my invention can be employed without others, and that my improved method of giving the reciprocating motion to the carriage can be advantageously applied to other purposes. It will be obvious also that instead of reducing the depth of the cogs on the rack alone for the purpose of clearing, that this may be divided by partly reducing the depth of some of the cogs of the large segments. If it be desired to locate the rack and segment wheels in other parts, the cylindrical segmental bearers can be put on a separate shaft to effect the same purpose.

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

1. The method, substantially as herein described, of obtaining a reciprocating motion from a continuous rotary motion, by combining with a cogged rack two cogged wheels composed each of segments of different diameters, the small segment of one wheel engaging the cogs of the large seg-

ment of the other, and vice versa, as herein described.

2. I claim in combination with the combined segmental cog wheels made and running together substantially as herein described, making the cogs of the rack of gradually less depth toward the ends and toward the middle of its length, and with a long cog at each end, substantially in the manner and for the purpose specified.

3. I also claim the method of sustaining the bed of the press as it reciprocates against the pressure of the cylinder by combining with the bed one or more ways and rolling segmental bearers, substantially as described.

4. I also claim the method, substantially as herein described, of elevating and depressing the inking rollers as the bed of the press runs in and out, by combining with the rollers the sliding boxes and the trip levers, operated by the reciprocating carriage, as described.

5. And finally I claim operating the finger bar by means of spring jointed arms at the end thereof, substantially as described, to admit of turning back the cylinder without injury to the arms, finger bar or fingers, as described.

J. M. MARSH.

Witnesses:

ALEXR. PORTER BOURNE,  
E. PETERS.