

(No Model.)

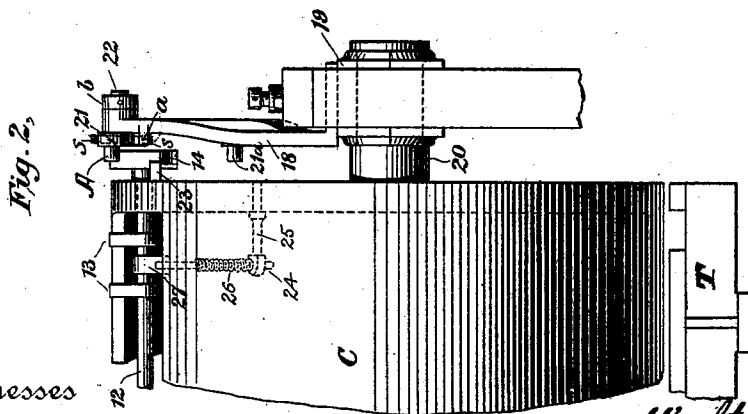
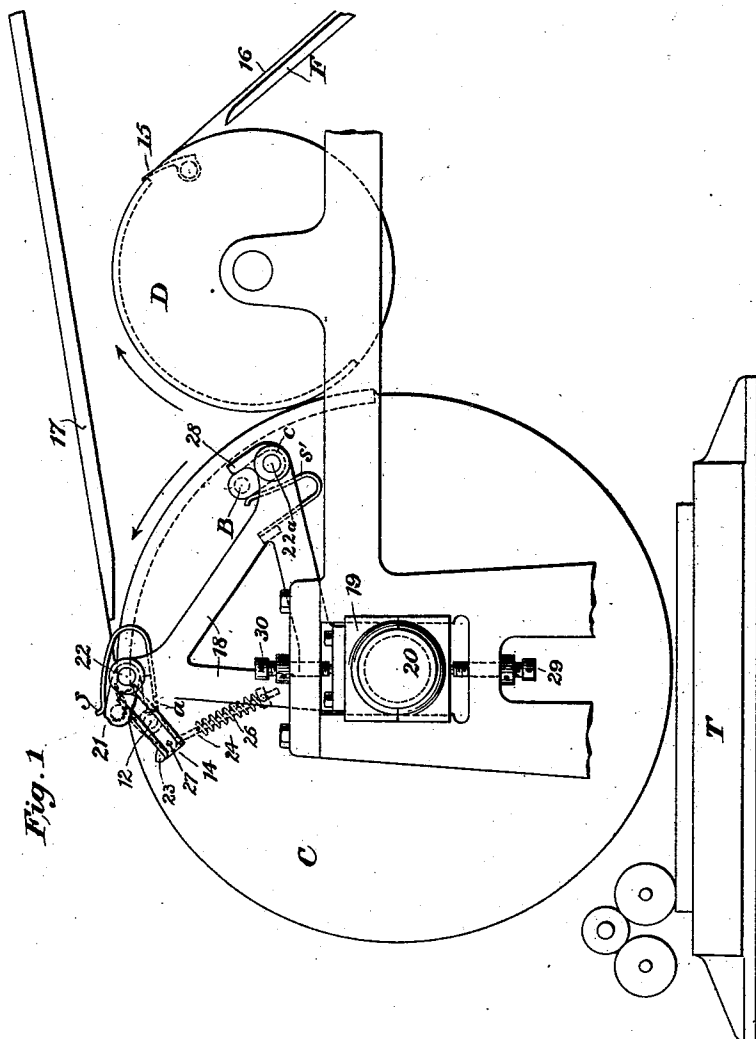
2 Sheets—Sheet 1.

W. SCOTT.

GRIPPER OPERATING MECHANISM FOR PRINTING MACHINES.

No. 508,053.

Patented Nov. 7, 1893.



Witnesses ¹²
Geo. W. Breech.
Henry W. Lloyd.

Inventor
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By his Attorneys
Wilcox & Barkley.

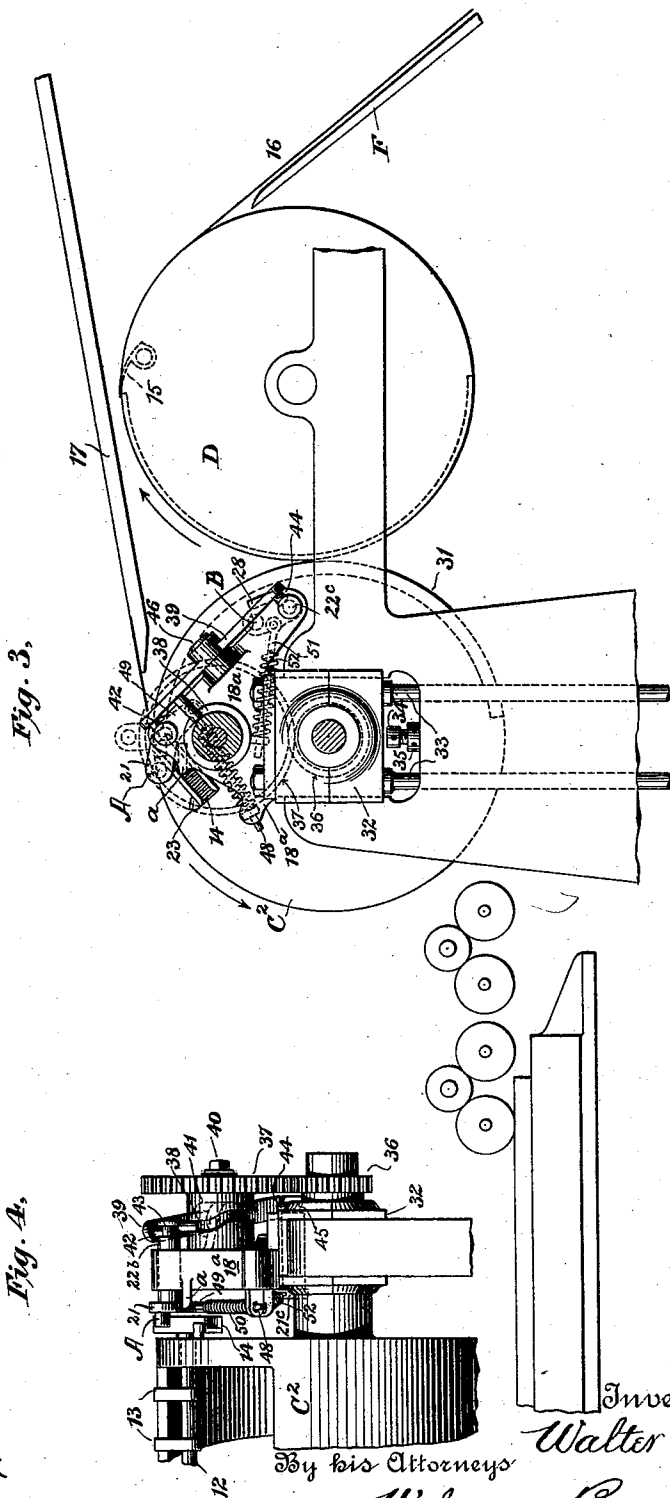
THE NATIONAL LITHOGRAPHING COMPANY.
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UNITED STATES PATENT OFFICE.

WALTER SCOTT, OF PLAINFIELD, NEW JERSEY.

GRIPPER-OPERATING MECHANISM FOR PRINTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 508,053, dated November 7, 1893.

Application filed April 28, 1891. Serial No. 390,797. (No model.)

To all whom it may concern:

Be it known that I, WALTER SCOTT, a citizen of the United States, and a resident of Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Gripper-Operating Mechanism for Printing-Machines, of which the following is a specification.

This invention relates to the mechanism operating the so-called tumbler grippers of printing machines. A common method of operating the rod or shaft carrying the grippers is to have a slotted T-head on the end thereof, and one or more pins, studs or lugs on the frame work to enter the slot and turn the rod. This construction is open to serious objections. It frequently happens that, in getting the press ready for running off an edition, the workmen place the gripper shaft in such position that the slot of the T-head does not register with the pin, stud or lug with which it next comes in contact, either in jacking the machine around or in starting up; that is, the pin strikes the outside of the T-head and not the slot. The usual result is a bending or breakage of some part, entailing annoyance, delay and expense.

The object of my invention is to avoid the possibility of damage, delay and expense caused by the non-registering of the parts spoken of above, whatever may be the cause of such non-registering, whether the carelessness of the workmen or other event. Other objects will appear hereinafter.

To these ends, my invention consists in the devices and combinations of devices hereinafter described, and more particularly pointed out in the appended claims.

The preferred forms of my invention are shown in the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation showing my invention applied to the impression cylinder of a drum cylinder press. Fig. 2 is an end elevation of certain parts shown in Fig. 1. Fig. 3 is a side elevation showing my invention as applied to a two revolution cylinder press. Fig. 4 is an end elevation of certain parts shown in Fig. 3.

While I have shown the invention as applied to the impression cylinder, it is obvious that it is equally applicable to feed, delivery,

reversing, retaining or other cylinders. It is also applicable to oscillating cylinder presses, and other forms. Hence, I do not limit myself to the forms shown in the drawings and hereinafter described.

The devices shown in Figs. 1 and 2 will first be described. The reciprocating type bed T carries the form 10, which is inked by the rolls I. The drum cylinder C having the impression surface 11, carries the rod 12 which has the grippers 13 and the slotted tumbler-cam 14 thereon. There is a delivery cylinder D having grippers 15; also, the fliers, F, tapes 16, and feed board 17. All the parts thus far described are of usual construction and operation. It is not material so far as my invention is concerned, what form of type carrier, or feed, or delivery be used, whether those shown or others.

The gist of the invention consists of the combination with the slotted tumbler-cam of a gripper-shaft of a pin, to operate the same, mounted to swing about an external axis, which is or may be parallel to that of the pin, or to that of the gripper-shaft. Other combinations are also included in the invention. In the preferred form of the invention, the pin is carried by a rock-shaft or an arm thereof, and may be integral therewith. A suitable stop is used to prevent the pin from yielding in one direction, but allows of its motion in the other direction, so that when the cam is in its proper position, the pin will engage or articulate therewith to turn the grippers, but when the cam is in an improper position, the pin will yield and allow the cam to pass freely. Referring to Figs. 1 and 2, an A-shaped frame 18 is, by preference, bolted to box 19 which receives the journal 20 of the cylinder C. The tumbler-cam 14 is purposely shown in a wrong position in order that the action of the invention may be more clearly shown. The pin A is carried by the arm 21 of the shaft 22, and normally rests against the stop a in position to enter or articulate with the cam 14 when the latter is in its normal position. By preference, the axis of motion of pin A, as the shaft 22, is at a greater distance from the axis of cylinder C than is the gripper-shaft 12, as this gives greater ease of motion. When the cam 14 is in a wrong position, as in Figs. 1 and 2, the pin A is

pushed aside thereby. A spring *s* may be used to keep arm 21 normally against the stop *a*. The gripper shaft is preferably held in each of its two extremes of motion by a suitable spring-device. A stop 23, co-operating with the tumbler-cam 14, limits the movement of the gripper shaft in each direction. The spring device shown consists of a rod 24, pivoted at one end to an arm 27, on the opposite side of shaft 12 from the grippers and passes loosely through a suitable perforation in a lug 25 on the cylinder head; a spiral spring 26, surrounding the rod 24 and abutting against the lug 25 and a pin or collar on the rod 24, normally maintains contact between the cam 14 and stop 23. Whenever the gripper rod is moved from either of its positions to the other, the rod 24 slides through the hole in lug 25, and the spring 26 is compressed until the joint of rod 24 and arm 27 passes the imaginary line joining the center of shaft 12 and lug 25, when the spring, if unresisted, expands and throws the shaft 12 around until the cam 14 strikes the stop 23. In lieu of the above spring device, other suitable means may be used for the same purpose. For instance, the shaft 12 may have a sector of a circle on it with two V notches in it, and a flat spring having a V end to fit the V notches may engage the said notches whenever the shaft 12 has been turned far enough by the pin. The pin just described operates the grippers to close them in the process of feeding sheets.

I will now describe the arrangement of my invention when used to open the grippers to release a sheet. In the structure now just described the pin yields to a force applied at its inner side, and is unyielding to a force applied at its outer side. In the structure to be now described, the pin yields to a force applied at its outer side and is unyielding to a force applied at its inner side; outer and inner being used with reference to the axis of cylinder C as a center. The pin B is journaled in the same way as pin 21 in the frame 18, and by preference its axis of motion is closer to the axis of the cylinder C than is the shaft 12. The pin B is made unyielding in an outward direction, preferably by a stop, as 28, on the frame 18, and is held against the stop by any suitable means, as a counter weight or, preferably, by a spring, as *s'*. It may be noted here that when two pins are disposed as in Fig. 1, that is, one yielding outwardly and the other inwardly, each has a function in righting the gripper shaft and tumbler cam for the other. Whenever the tumbler cam is in a position, relative to either of the pins, where that pin cannot enter the slot, the said pin yields and the T-head passes by, and is turned or righted by the other or second pin so that the first pin can now operate it also. As shown in Fig. 1, the T-head is not in its right position to be operated by the pin A to grasp a sheet from the feed board 17, but it is in position for pin B to enter the slot

and open the grippers, after which pin A can enter the slot and close the grippers. The journal box 19 is shown in Fig. 1 as being adjustable by means of screws 29, 30, and the frame 18 is shown as being bolted to the journal box 19. This is not an essential but a preferred method of mounting the arms or frame 18 supporting the pins, as it avoids any adjustment of the said frame independently of that of the journal box, whenever, from any cause, the latter may require adjustment. It is understood, of course, that the working positions of the pins relative to the tumbler cam are and remain fixed in an operative construction. The pins A and B are held from endwise motion by collars *b* and *c* on their shafts 22 and 22^a respectively, which are secured to their outer ends as shown.

The structure shown in Figs. 3 and 4 will now be described. The type bed, form and ink rolls are as in Fig. 1. The two revolution impression cylinder C² has an impression surface 31, grippers 13 on shaft 12 having a tumbler cam 14, and stop 23, all as in Figs. 1 and 2. The journal boxes 32 (only one is shown) are movable in guides as in Fig. 1, and are borne by suitable rods as 33; these rods are or may be moved up and down at suitable times by any suitable mechanism, such, for instance, as that shown in my Patent No. 425,710, dated April 15, 1890. Screws, 34, regulate the descent of the boxes. 35 is a lock nut on the screw 34. The delivery cylinders D, and its grippers, the fliers, the tapes and the feed board are as in Fig. 1, and need no description. Since, in this case, the impression cylinder makes two revolutions, the "righting" action, spoken of above, of the pins during the first revolution must be avoided. In that form of my invention shown in Figs. 3 and 4, the pins have an endwise movement as well as the movement hereinbefore described, so that they have an "out" and an "in," an inoperative and an operative position. The gripper closing pin A is journaled and slides in a bearing in a frame 18^a bolted to the box 32 for the cylinder journal. The pin B for opening the grippers is mounted in the frame 18^a in a manner similar to that of pin A just described and rests against stop 28. To cause each pin to assume its "out" and its "in" position each once to two revolutions of the cylinder C², or one during one revolution and the other during the next revolution of the cylinder, I employ the gears 36, 37, cam 38, and lever 39. The gear 36 is placed on the extended end of the journal of the cylinder C² and meshes with the gear 37 which is mounted on a stud 40 on the frame 18^a. The gear 37 is twice the size or diameter of gear 36. The gear may have a sleeve 41 cast integrally therewith, or the sleeve may be separate from but bolted to gear 37. The cam 38 is on the sleeve 41. The shaft of each pin has a circumferential groove in its outer end. A pin 42 on the lever 39 engages groove 43 in the shaft 22^b of pin A, and pin 44 on the said lever en-

gages groove 45 in the shaft 22° of pin B. Lever 39 is pivoted at or near its center on a stud 49 on frame 18°, and has a pin 47 that engages with cam 38 whereby it is operated. The pin A is held against the stop *a* by any suitable spring device or by its own weight or both. I show a rod 48 pivoted loosely (so as not to interfere with the endwise movement of the pin) to an arm 49 of pin A and passes loosely through a perforated lug or frame 18°. A spiral spring 50 surrounds rod 48 and abuts against the lug for said rod and against a pin or collar on the rod. The pin B is held against the stop 28, but is not prevented from sliding, by a similar rod 51, pivoted to an arm on the pin, passing through a lug or frame 18°, and surrounded by a spiral spring 52, which abuts against the lug and a pin or collar on the rod. It will be noted that the tumbler-cam is shown in Fig. 3 as being in a similar position to that shown in Fig. 1, and for a similar reason.

Assuming that the tumbler cam were in proper position to be closed by the pin A and that it is to the right of the pin in Fig. 3, the operation of the parts is as follows:—The cylinder turning in the direction indicated by the arrow, brings the upper wall of the slot of the tumbler cam into contact with the pin A and the tumbler-cam and gripper shaft are turned to close the grippers to take a sheet from the feed board. The pin A being in its "in" or operative position, the pin B is in its "out" or inoperative position, and remains "out" until the tumbler cam has passed it when cam 38 (making a half turn to one turn of the cylinder) moves lever 39 from the position shown. This moves both pins; pin A is moved to its "out" position, and pin B to its "in" position. The tumbler-cam therefore passes clear of pin A just as it passed clear of pin B and the grippers remain closed. As the tumbler-cam again passes pin B, the latter enters the slot and opens the grippers. The cam 38 again moves the lever 39, this time into the position shown, moving pins A and B into the positions shown. Pin A again operates the tumbler-cam and the above described cycle of movements begin over. If from any cause the tumbler-cam, as it approaches pin A in its "in" position, happens to be in the position shown in Figs. 3 and 4, it lifts that pin and is itself unmoved from the position shown until it is operated by the pin B when the latter is in its "in" position. When the tumbler-cam is in its other position (not shown) as it approaches the pin B, it pushes that aside and is not moved itself, until the pin is in its "in" position, when it is operated. That is to say, the pair of pins each have the "righting" function relatively to the other, just as in first case described.

Many changes may be made in the mechanism for sliding the pins without departing from my invention. They may be so operated from other parts of the machine than the journal of the impression cylinder. Each

pin may have its own operating mechanism, independent of that of the other. The essential feature in the case shown in Figs. 3 and 4 is the pin having a turning and a sliding movement, whatever may be the nature of the means used to give it the latter movement. As above stated, it is preferred to have the axis of motion of the pin parallel to that of the cylinder whose grippers the pin is to operate.

While the invention is shown in all cases as being on an impression cylinder, its use is not limited to such a cylinder.

My invention may operate in another manner in a two revolution cylinder press. Instead of sliding in and out for the purposes described, the pin or pins may be turned by suitable means until the pin is out of the path of the tumbler cam in every possible position of the latter. This is shown by the dotted positions of the pin A and the tumbler-cam. The positions of the spring devices for holding the pins against their respective stops would be different from those shown, so as to return the pins to position. I have not shown any mechanism for operating my invention in this last form, as I intend to make that the subject-matter of another application.

It is not necessary that the slot in the tumbler cam shall extend all the way across, since there may be a partition or wall in the middle, thus cutting it into two slots.

When my invention is used in connection with an oscillating cylinder, the pins exchange functions during the reverse or non-printing movement of the impression cylinder; that is, the pin A opens the grippers if closed (otherwise, it merely lifts over the tumbler cam) and pin B closes them if open (or is moved inwardly by the tumbler cam if they are closed).

By the term parallel in the claims I do not limit myself to absolute parallelism, but simply use it as a convenient term to mean parallelism more or less approximate.

While a two revolution cylinder is shown in Figs. 3 and 4 and is described above, it is obvious that it might make more than two revolutions and the pins be operated accordingly without departing from my invention, and I regard such arrangements as coming within the scope of my claims.

While I have shown a lever in Figs. 3 and 4 to move the pin both in and out, it is obvious that the pin could be moved in by the lever and out by a spring, or vice versa, without departing from my invention, being a construction equivalent to that shown. Further, the cam 38 may control the lever 39 in any way other than that shown. The cam 38 may be an "open" one and the lever held against it by a spring, a construction equivalent to that shown. The lever 39 could operate the pins when their axes of motion are at right angles to the axis of the cylinder since its pivot would only need to be at right an-

gles to the pivot shown, and a slight change only in the cam, making it a face cam, would be required.

What I claim is—

5 1. In a printing machine, the combination of the tumbler-cam of the gripper-shaft, a pin to operate the same, an arm carrying the pin and having its axis of motion parallel to that of the gripper-shaft, and a stop limiting the
10 motion of the pin in one direction, whereby the cam is operated or the pin moved aside, substantially as described.

2. In a printing machine, the combination of the tumbler-cam of the gripper-shaft, a pin to operate the same, an arm carrying the pin
15 and having its axis of motion parallel to that of the gripper-shaft, a stop limiting the motion of the pin in one direction, and a spring pressing the pin toward the stop, substantially
20 as and for the purposes described.

3. The combination of a cylinder moving about its axis, its grippers and their shaft having a slotted cam, the pin to operate the cam,
25 an arm supporting the pin and having its axis of motion parallel to that of the cylinder, a stop limiting the motion of the pin, and a spring pressing the pin toward the stop, substantially as and for the purposes described.

4. The combination of a cylinder having
30 motion about its axis, its grippers and their shaft having a slotted cam, two pins, one to open and the other to close the grippers, pivoted arms carrying said pins, and stops limiting the motion of the pins, the one inwardly
35 and the other outwardly, substantially as and for the purposes described.

5. The combination of a cylinder moving about its axis, the tumbler-cam of its gripper-shaft, two pins, one to open and the other to
40 close the grippers, pivoted arms carrying said pins, a stop outwardly of one and inwardly of the other of said arms, and springs pressing the pins toward said stops, substantially as and for the purpose described.

45 6. The combination of a tumbler-cam of the gripper-shaft, two pins, one to open and the other to close said grippers, arms carrying said pins, and having their axes of motion parallel to that of the gripper-shaft, and means
50 holding one pin against outward and the other against inward motion and allowing each to move the other way, substantially as described.

7. The combination of a cylinder moving
55 about its axis, the tumbler-cam of its gripper-shaft, two pins, one to open and the other to close the grippers, arms carrying said pins and having axes of motion parallel to that of the grippers, a stop inward of one and a stop
60 outward of the other of said arms, and means holding the arms against the stops yieldingly, substantially as described.

8. The combination of a cylinder moving about its axis, the tumbler-cam of its gripper-shaft, two pins, one to open and the other to
65 close said grippers, arms bearing said pins, a stop inward of one and outward of the other

of said arms, and springs pressing the arms against said stops, substantially as and for the purposes described.

9. The combination of a two revolution cylinder, the tumbler-cam of its gripper-shaft, an
70 arm carrying the pin, a stop therefor, and mechanism moving the pin and arm into operative position during one revolution of the cylinder and out of said position during the
75 next operation thereof, substantially as described.

10. The combination of a two revolution cylinder, the tumbler-cam of its gripper-shaft, a
80 pin to operate the cam, an arm carrying the pin, a stop therefor, and spring devices pressing the arm against the pin, with mechanism moving said arm and pin into operative position during one revolution of the cylinder
85 and out of said position during the next revolution thereof, substantially as described.

11. The combination of a two revolution cylinder, the tumbler-cam of its gripper shaft, an arm carrying the pin, a shaft parallel to
90 the axis of the cylinder and carrying said arm, a stop for said arm, means holding said arm against said stop in a yielding manner, and mechanism moving said shaft and pin into operative position during one revolution
95 of the cylinder and out of said position during the next revolution thereof, substantially as described.

12. The combination of a two revolution cylinder, the tumbler-cam of its gripper-shaft, a
100 pin to operate the same, an arm carrying the pin, a shaft carrying the arm, a stop for the arm, spring devices holding the arm against the stop, and mechanism for moving the shaft and pin into operative position during one
105 revolution of the cylinder and out of said position during the next revolution thereof, substantially as described.

13. The combination of a two revolution cylinder, the tumbler-cam of its gripper-shaft, two
110 pins, arms carrying the pins, a stop outward of one and inward of the other of said arms, means holding said arms against said stops in a yielding manner, and mechanism moving said arms and pins, one into and the
115 other out of its operative position during each revolution of the cylinder, substantially as described.

14. The combination of a two revolution cylinder, the tumbler-cam of its gripper-shaft, two
120 pins to operate the same, arms carrying the pins, shafts parallel to the cylinder and carrying the arms, means holding one pin against outward and the other against inward motion, and mechanism moving the
125 shafts to move one pin into and the other out of operative position during each revolution of the cylinder, substantially as described.

15. The combination of a two revolution cylinder, the tumbler-cam of its gripper-shaft, two
130 pins to operate the same, shafts parallel to the cylinder and having arms carrying said pins, a stop inward of one and outward of the other of said arms, spring devices press-

ing said arms against said stops, and mechanism sliding said shafts to move one pin into and the other out of operative position during each revolution of the cylinder, substantially as described.

16. The combination of cam 14, gripper-shaft 12, pin A, arm 21, a spring, and stop *a*, substantially as described.

17. The combination of cam 14, gripper-shaft 12, pin A, arm 21, shaft 22^b, a spring, stop *a*, lever 39 engaging shaft 22^b, and means for moving lever 39, substantially as described.

18. The combination of cam 14, gripper-

shaft 12, pins A and B, the arms carrying them, the shafts 22^b and 22^c, stops *a* and 28, 15 springs, centrally pivoted lever 39 engaging shafts 22^b and 22^c, and means for rocking said lever, substantially as described.

Signed at New York, in the county of New York and State of New York, this 27th day 20 of April, A. D. 1891.

WALTER SCOTT.

Witnesses:

F. GOODWIN,

R. W. BARKLEY.