

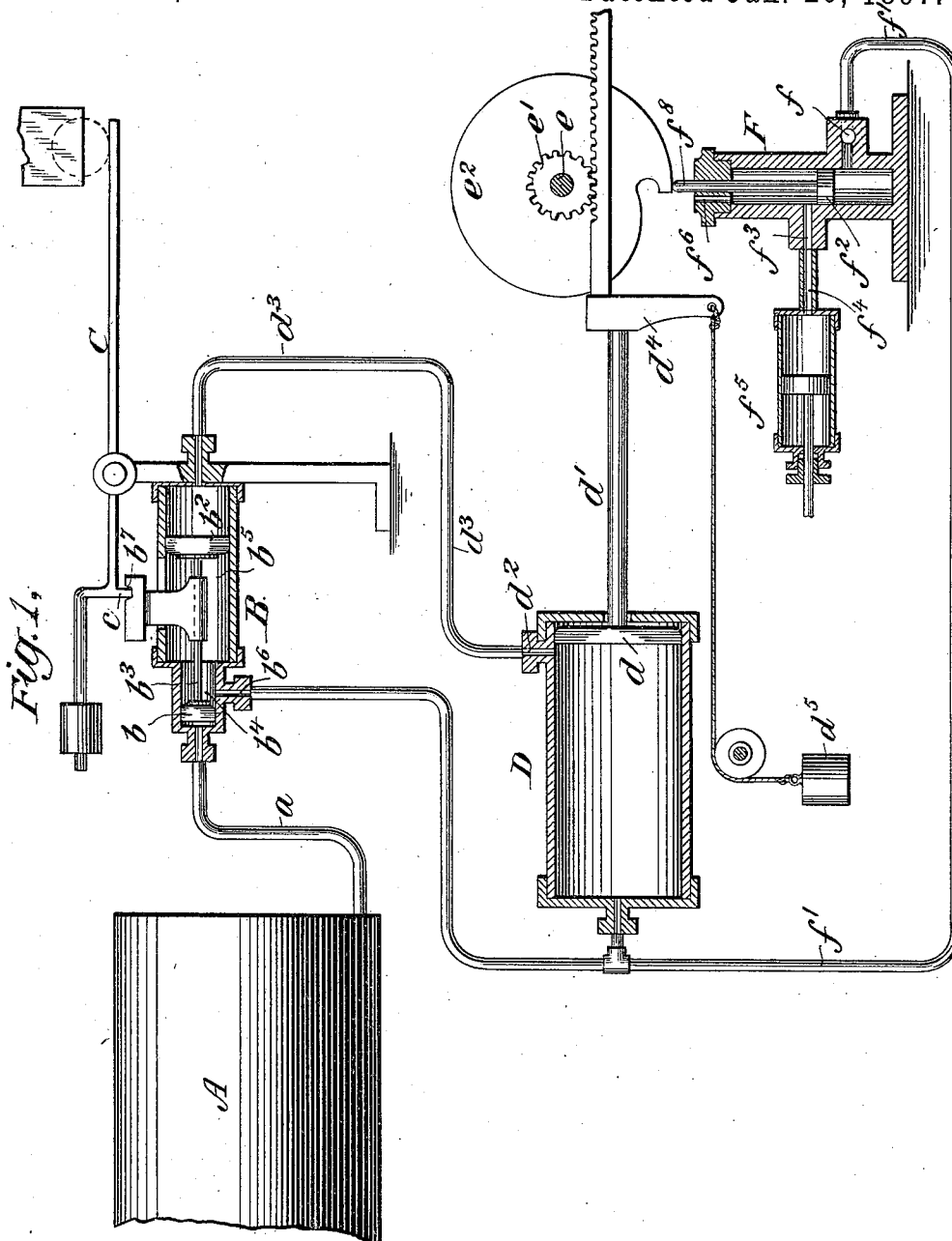
(No Model.)

2 Sheets—Sheet 1.

A. W. COLE.
AUTOMATIC FLUID PRESSURE MACHINE.

No. 575,702.

Patented Jan. 26, 1897.



WITNESSES:

B. H. Hayward
D. Davies

INVENTOR

Arthur W. Cole
BY
E. W. Dickerson
HIS ATTORNEY

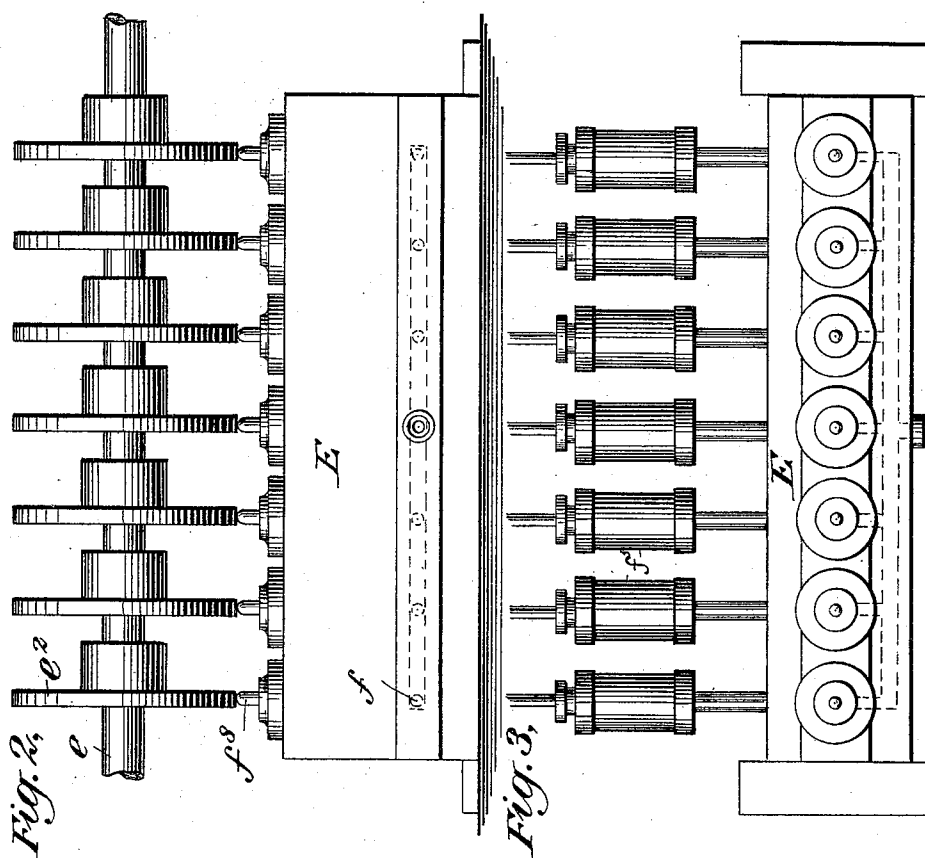
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UNITED STATES PATENT OFFICE.

ARTHUR W. COLE, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AUTOMATIC PHOTOGRAPH MACHINE COMPANY, OF WEST VIRGINIA.

AUTOMATIC FLUID-PRESSURE MACHINE.

SPECIFICATION forming part of Letters Patent No. 575,702, dated January 26, 1897.

Application filed December 17, 1895. Serial No. 572,410. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. COLE, a subject of the Queen of Great Britain, residing in Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Automatic Fluid-Pressure Machines, of which the following is a full, clear, and exact description.

This invention relates to that class of machines commonly known as "slot-machines," which are set in motion by the weight of a coin deposited on one end of a lever; and it consists in improvements in the motor for such apparatus and in the valve mechanism admitting fluid-pressure to and exhausting it from the motor, the distributing-valves and the various cylinders transmitting motion to the other parts of the machine. Heretofore the power generally used in actuating both the machine, its motor, and the governing and distributing valves has been a weight or spring with a train of wheels.

The object of this invention is to lighten, cheapen, and simplify the motor for machines of the class referred to and to furnish simple and effective forms of control and distributing valves adapted to manipulate fluid-pressure with minimum leakage and to be automatically actuated by such pressure derived from a common source.

Referring to the accompanying drawings, Figure 1 represents a sectional elevation of a portion of a coin-controlled machine, showing the reservoir or source of fluid-pressure, the coin-lever, the primary motor, the controlling-valve for the motor, and one of the distributing-valves with its actuating-cam. Fig. 2 shows a series of such distributing-valves, and Fig. 3 a series of supplementary motors for operating the various parts of the apparatus.

It is of course apparent that the particular functions of the machine herein described are unnecessary to a full and clear understanding of the improvements sought to be covered and hereinafter set forth.

A represents a reservoir or source of fluid-supply, in or into which the actuating-fluid is compressed by any suitable means. Pipe

a leads therefrom to valve B. This valve contains two pistons, of different areas, b and b^2 , secured to the same stem b^3 and working in their respective cylinders b^4 and b^5 . The smaller piston b is constantly open to reservoir-pressure through pipe A. Port b^6 leads to the inner or left end of the motor-cylinder D, and b^7 is a notch in the lug carried on piston-stem b^3 and moving in a slot in cylinder b^5 .

C is the coin-lever, provided with a coin-receptacle at one end and a hook c on the other, said hook meshing with notch b^7 when the valve is in its normal position.

Motor-cylinder D contains piston d on its rod d' . Piston d is returned to its inner position by means of finger d^4 , rigidly secured to its piston-rod d' . Port d^2 is located near the outer end of cylinder D at a point where piston d will pass it in making its full stroke. Pipe d^3 connects port d^2 to the inner or closed end of the larger valve-cylinder b^5 . Piston-rod d fits loosely in its guide in the cylinder-head through which it passes, so that no resistance may be encountered through compression of air between the piston d and the cylinder-head. Piston-rod d' is provided with a rack on its upper face, at its outer end.

E represents the several distributing-valves with their actuating-cams. The cam-shaft e carries gear-wheel e' , into which the rack on piston-rod d' meshes. One revolution of said cam-shaft is accomplished by the full outward stroke of piston d and completes a single entire operation of the machine.

Valve F is a detail of each of the distributing-valves operated by cam-shaft e . From the connecting-pipe between port b^6 and cylinder D pipe f' is run to port f , furnishing fluid-pressure to the distributing-valves.

f^2 is the piston of one of the distributing-valves shown. Port f^3 and pipe f^4 connect valve F with the supplementary-motor cylinder f^5 , the piston of which it governs. The upper end of valve-case F is provided with exhaust-port f^6 .

The various supplementary - motor cylinders are represented by $f^5 f^5 f^5$, and any number of such supplementary motors, with their respective governing-valves, may of course be

utilized, according to the varied requirements of the many forms of coin-actuated machines in common use.

The operation is as follows: When a coin is deposited on the end of lever C, its weight tilts said lever, raising hook c out of notch b^7 , whereupon fluid-pressure from reservoir A, passing through pipe a and constantly against piston b , forces the latter, with its rod b^3 and piston b^2 , rigidly secured to the same rod, to the opposite extremity of stroke, thus uncovering port b^6 and allowing pressure to pass to motor-cylinder D and to force piston d to its outward limit, thus completing a single full operation of the machine, after which motor-piston d is automatically disengaged from cam-shaft e by means of a clutch on the cam-shaft (not herein shown) and is free to be returned to its inner position, ready for the next operation. This return movement is accomplished as follows: When piston d has completed its outward movement, it uncovers port d^2 , allowing pressure in cylinder D to reach the inner side of piston b^2 by pipe d^3 . The area of piston b^2 being greater than that of b , it is evident that a pressure virtually equal to that constantly against piston b will return both pistons to their first position. Piston d , as shown in the drawings, has completed its outward stroke, and the pressure from its cylinder has passed by port d^2 and pipe d^3 to cylinder b^5 and has forced piston b^2 to its outer position. Port b^6 is thus open to the atmosphere, and pressure remaining in cylinder D escapes through said port past the piston-stem and the lug carried thereon and through the slot in which said lug moves. The exhaust of pressure from the inner side of piston d permits the same to be returned to its inner position by weight d^5 and finger d^4 . When piston-stem b^3 reaches its normal or left-hand position, as per drawings, hook c drops into notch b^7 , thus locking valve B in its normal position until a second coin is deposited on the opposite end of lever C.

Mechanism not herein shown automatically removes a deposited coin from lever C as soon as the latter is tilted by the weight of such coin, and, further, prevents a second coin being deposited thereon during the operation of the machine. Fluid-pressure in cylinder b^5 is free to escape to atmosphere through pipe d^3 , port d^2 , and around the loosely-fitting piston-rod d' whenever piston d is at or near its inner position. The outward movement of piston-rod d rotates cam-shaft e , the cams on which are thereby moved and successively operate their respective valves. The initial movement of cam e^2 releases piston-stem f^8 . The pressure which has passed by pipe f' to the lower side of piston f forces the latter up, uncovering port f^3 and passing by port f^3 and pipe f^4 to its supplementary motor f^5 and actuating the piston of such supplementary motor. The complete revolution of cam e^2 forces down stem f^8 and valve f , thus allowing fluid-pressure to escape from motor f^5 by pipe f^4

and ports f^3 and f^6 to the atmosphere. Each of the cams on shaft e , with their respective valves and supplementary motors, is operated in this manner, and thus the several movements necessary to a single complete operation of the machine are effected, and the entire apparatus is returned to its normal condition, ready for another operation.

Any suitable form of reservoir for fluid-pressure, or method of obtaining such pressure, or mode of locking the governing-valve, or of returning motor-piston d to its inner position, or of performing the various functions of the machine by the mechanism actuated by the several supplementary motors, may of course be utilized without departing from the spirit of my invention, and I limit myself to no particular form of apparatus in either of these details.

Heretofore in all automatically-operated coin-controlled machines with which I have become familiar the motive power employed to actuate both the motor, its controlling-valve, and the distributing-valves has been a weight and train of wheels, and in most cases this source of power has been employed to move the entire machine.

By utilizing a fluid under pressure for the source of power, actuating both the motor, its controlling-valve, the distributing-valves, and the supplementary motors, I claim to have materially reduced the total weight of a machine of the class referred to to such a point as will enable it to be easily handled in transportation, thus obviating a serious objection heretofore prevailing when its value from a commercial standpoint is considered.

My invention further decreases the cost of maintenance of such machines and increases their capacity as to the number of consecutive operations possible without manual attention. The distributing-valves heretofore employed have been of the "plug" type. This form of valve has been found highly objectionable in practice because of the opportunities it presents for leakage of fluid-pressure. The present form of piston-valve, with its operating mechanism, greatly enhances the simplicity and automatism of this part of the apparatus and almost entirely prevents leakage. These advantages are also evident in the construction of the governing-valve.

Having thus described my invention, I claim—

1. The combination of a reservoir, a motor, a valve controlling communication between same and comprising two pistons of different areas on a common stem, an independent supplemental motor, and a valve governed by the main motor and controlling said supplemental motor, substantially as described.

2. The combination of a reservoir for fluid-pressure, a main motor, a valve controlling communication between the same and comprising two pistons of different areas on a common stem, an independent supplemental motor, a shaft rotated by the main motor,

and a valve operated by said shaft and governing said supplemental motor, substantially as described.

3. The combination of a reservoir for fluid-
5 pressure, a main motor, a valve comprising
two pistons of different areas, a passage connecting said reservoir and main motor and
controlled by one piston of said valve, an escape-port for said main motor leading to the
10 other piston of said valve, a supplemental
motor, and a valve operated by the main motor and controlling the supplemental motor,
substantially as described.

4. The combination of a reservoir, a motor
15 operated by fluid-pressure, a valve for controlling communication between the said reservoir and motor, and which consists of two
pistons having different areas, a detent for locking the valve which when released will
20 permit the valve automatically to open communication between the reservoir and the
motor, and a passage-way opened by the move-

ment of the motor, to the fluid-pressure, thereby effecting a return of the valve to the position in which it is locked by the detent, substantially as specified. 25

5. The combination of a reservoir for fluid-pressure, a main motor, a valve governing communication between them and containing
two pistons of different areas on a single stem, 30
a coin-actuated detent for said valve, an exhaust-port for said main motor controlled by
its piston and leading to said valve, a series of supplemental motors, and a series of distributing-valves governing said supplemental
35 motors and operated by the main motor, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR W. COLE.

Witnesses:

ANTHONY GREF,
WM. A. POLLOCK.