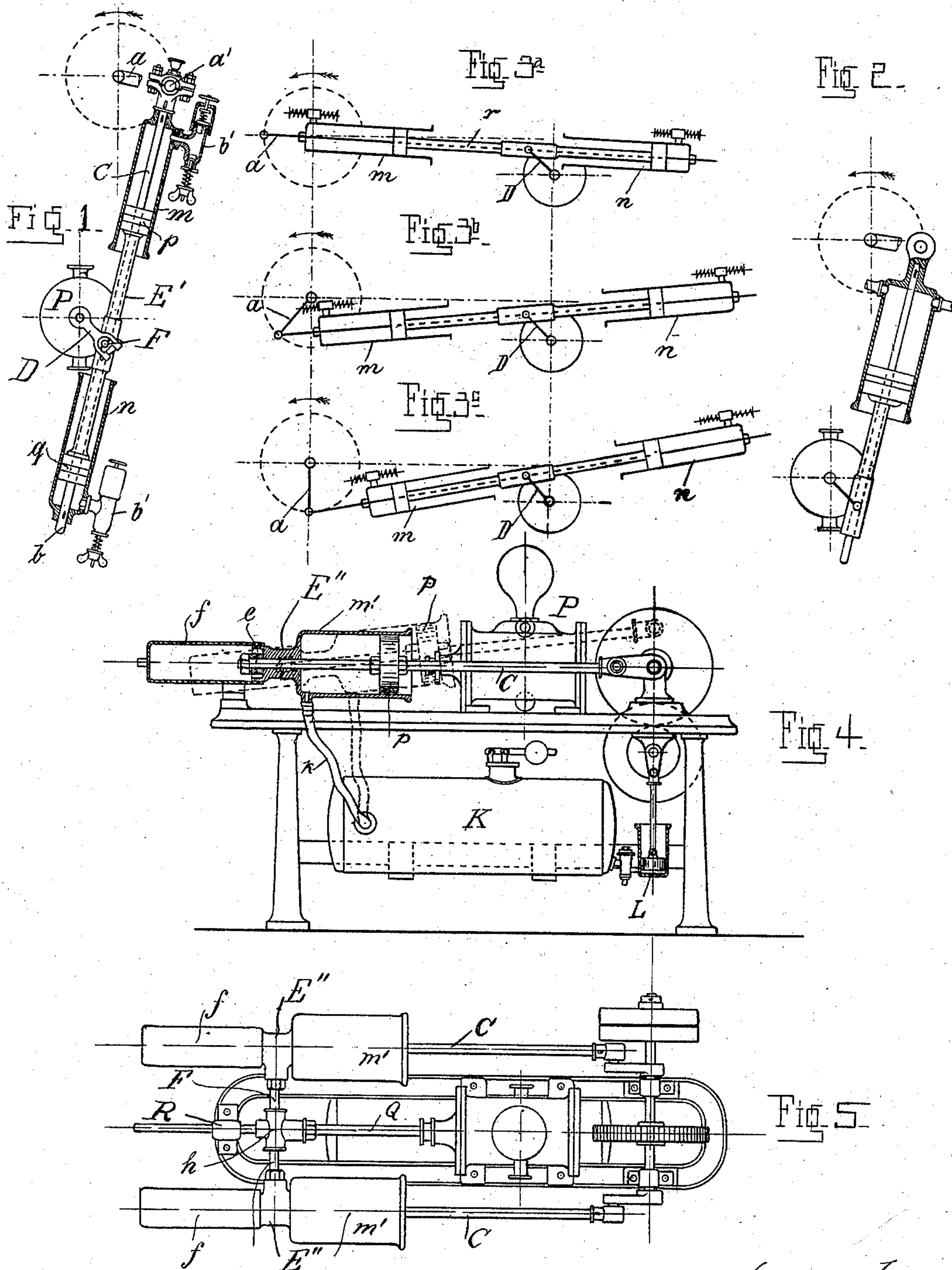


(No Model.)

M. HERRMANN.  
MECHANISM FOR ACTUATING PUMPS.

No. 575,299.

Patented Jan. 12, 1897.



Witnesses:  
Herbert Bradley.  
J. Harry S. Rohrer.

Inventor:  
Moritz Herrmann  
By E. B. Clark  
Atty.



# UNITED STATES PATENT OFFICE.

MORITZ HERRMANN, OF FRANKFORT-ON-THE-MAIN, GERMANY, ASSIGNOR  
TO THE FIRM OF OTTO FROMME, OF SAME PLACE.

## MECHANISM FOR ACTUATING PUMPS.

SPECIFICATION forming part of Letters Patent No. 575,299, dated January 12, 1897.

Application filed August 27, 1894. Serial No. 521,435. (No model.) Patented in Germany September 18, 1893, No. 74,813,  
and in Austria March 27, 1894, No. 44/2,054.

*To all whom it may concern:*

Be it known that I, MORITZ HERRMANN, mechanical engineer, residing at Frankfort-on-the-Main, Germany, have invented new and useful Improvements in Mechanism for Actuating Pumps, &c., (for which patents have been granted to me in Germany, No. 74,813, dated September 18, 1893, and patent of addition thereto, No. 77,631, dated December 2, 1893, and in Austria, Reg. No. 2,054, Vol. 44, dated March 27, 1894,) of which the following is a specification.

My invention relates to yielding mechanism for driving pumps and other apparatus; and it consists in means to secure the automatical stopping of the pump if the pressure of the raised liquid has attained a certain amount or degree and to automatically decrease the amount of raised liquid, according to the increasing pressure.

The mechanism is applicable to any machine where it is desired to have the machine stop if resistance resulting from the work to be done exceeds a certain amount. To this end I substitute for one of the rigid rods transmitting power from the crank-shaft to the pump-piston a rod which is pivotally connected at one end in the usual way to the crank, and having upon it a yielding connection which may consist of a guide-sleeve and a piston working in a cylinder of compressed air, said guide-sleeve moving in the direction of the axle of the rod and having pivotal connection either with the oscillating arm of an oscillating pump or with the piston-rod of a reciprocating pump. If motion is imparted to one end of the driving-rod by the crank-shaft, power is transmitted through the yielding connection by the other end of the rod to the pump or other mechanism to be driven. If the resistance of the piston-rod is greater than that of the yielding connection, (such as a piston in a compressed-air cylinder,) the rod will slide in the guide-sleeve, and thereby compress the piston in the air-cylinder until the force or resistance becomes equal to the resistance of the pumping-piston, and then motion is imparted to the latter. This object is easily attained by providing a pivotal con-

nection between the guide-sleeve on the driving-rod and the cross-head of a driven piston-rod or an arm fixed on the axle of an oscillating pump. Motion being imparted by the crank to one end of the driving-rod, the other end of the same will first slide in the guide-sleeve and thereby compress the piston and air in the air-cylinder, and if the strain or resistance so generated in the cylinder becomes greater than the pressure exerted by the pump-piston the latter will begin to move and the driving-rod will cease to slide in its guide-sleeve. If the pressure on the pump-piston is increased during its stroke, the driving-rod will slide farther in the guide-sleeve against the resistance of the compressed air until equilibrium is restored and motion again transmitted to the pump-piston.

In order to enable anybody skilled in the art to carry out my invention, I will now describe it in detail by reference to the accompanying drawings, illustrating it in different modified forms, in which—

Figure 1 represents a sectional elevation showing compressed-air cylinders and pistons in connection with the driving-rod and pump. Fig. 2 shows a modification of the mechanism. Figs. 3<sup>a</sup>, 3<sup>b</sup>, and 3<sup>c</sup> show different portions of the mechanism represented in Fig. 1. Figs. 4 and 5 represent, respectively, a side elevation and a top view of another modified form of the mechanism in connection with a compressed-air chamber.

In the mechanism shown in Figs. 1 and 3<sup>a</sup> to 3<sup>c</sup>, inclusive, pistons working in compressed-air cylinders are used to form yielding connections between the driving-gear and an oscillating pump. The crank *a* is linked by the pin *a'* to the driving-rod *C*, upon which is placed the guide-sleeve or sliding sleeve *E'*. Two compressed-air cylinders *m* and *n* are rigidly connected to the opposite ends of the driving-rod *C* and receive the pistons *p* and *q*, which are connected by guide-sleeve *E'* and fit air-tight on the rod *C*. Air-valves *b' b'* are connected with the air-cylinders *m* and *n*, for permitting air to be drawn into said cylinders if a vacuum is produced and for permitting air to escape if the pressure exceeds the de-



sired limits. The guide-sleeve E' is pivotally connected by a pin F to the oscillating arm D of the oscillating pump. I preferably use the compressed-air cylinders and pistons in connection with the air-regulating valves b' for controlling the pressure in the air-cylinders.

Fig. 3<sup>a</sup> shows the extreme position of the crank a. Fig. 3<sup>b</sup> shows a subsequent position where air is compressed in the cylinder m, and Fig. 3<sup>c</sup> shows the beginning of the motion of the oscillating arm D.

Fig. 2 illustrates similar mechanism to that shown in Fig. 1, but in which only one compressed-air cylinder is employed.

A reciprocating pump is shown on enlarged scale in Figs. 4 and 5 in connection with the compressed-air cylinder and piston on the driving-rods and a compressed-air chamber or tank. Each driving-rod C is provided with a piston p, fitting into the compressed-air cylinder m'. This cylinder is integral with the guide-sleeve E''. The guide-sleeves E'' of both cylinders are rigidly secured to a pivotal pin F, which oscillates in the cross-head h, secured to the piston-rod Q. The end of each driving-rod C is provided with a nut and washer e to prevent the piston p from leaving the cylinder m'. A cylindrical case f is secured at one end of the guide-sleeve E'' and receives the end of the driving-rod C and is filled with compressed air. Compressed air is supplied to the cylinders m' through flexible pipes k by a tank or chamber K, which is fed by a small pressure-pump L, to restore the inevitable loss of air. Thus the pressure in the forced water-column can be easily regulated by regulating the pressure in the air-chamber K.

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

1. In mechanism for driving pumps and the like, the combination with the driving-gear and the driven apparatus, of a connecting-rod, a piston secured to said connecting-rod, a cylinder into which the said piston is fitted, the same having a valve to permit the escape of air at a predetermined pressure, and means whereby motion is transmitted from the connecting-rod to the pumping-piston, said means

consisting of a piston-rod or arm secured to said cylinder through a pivotal connection.

2. In mechanism for driving pumps and the like, the combination with the driving-gear and the driven apparatus, of a connecting-rod, a piston secured to said connecting-rod, a cylinder into which the said piston is fitted, an extension of said connecting-rod working within a boring in one end of the cylinder and provided with a stop thereon to limit the movement of said rod, means to transmit the motion of the connecting-rod to the pumping-piston, the same consisting of a piston-rod, or arm secured to said cylinder through a pivotal connection, a reservoir for compressed air connected with said cylinder and means to allow the escape of the compressed air at a predetermined pressure.

3. In mechanism for driving pumps and the like, the combination with a driving-crank, of a connecting-rod, a piston secured to said connecting-rod and a cylinder into which the said piston is fitted, means adapted to provide for compressed air at one side of the said piston and means to allow the escape of the compressed air at a predetermined pressure, an extension of the said connecting-rod, a chamber connected with the cylinder, to receive the extension of the connecting-rod, a stop carried by said extension within said chamber, and means to transmit the motion of the said cylinder to the pumping-piston, the same comprising the piston-rod or arm to which said cylinder is pivotally connected.

4. In mechanism for driving pumps and the like the combination with the driving-gear and the driven apparatus, of a connecting-rod and a piston-rod, the former pivotally connected with a cylinder, and the latter with a piston fitting into said cylinder, a reservoir wherein air at a predetermined pressure is kept, and a connecting-pipe between the chamber of the cylinder behind the piston and said reservoir, substantially as described.

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

MORITZ HERRMANN.

Witnesses:

JEAN GRUND,  
FRANK H. MASON.