No. 860,619. PATENTED JULY 16, 1907.

J. F. PAGENDARM.

TRANSMITTING MOTION.

APPLICATION FILED SEPT. 27, 1905.

2 SHEETS—SHEET 1.

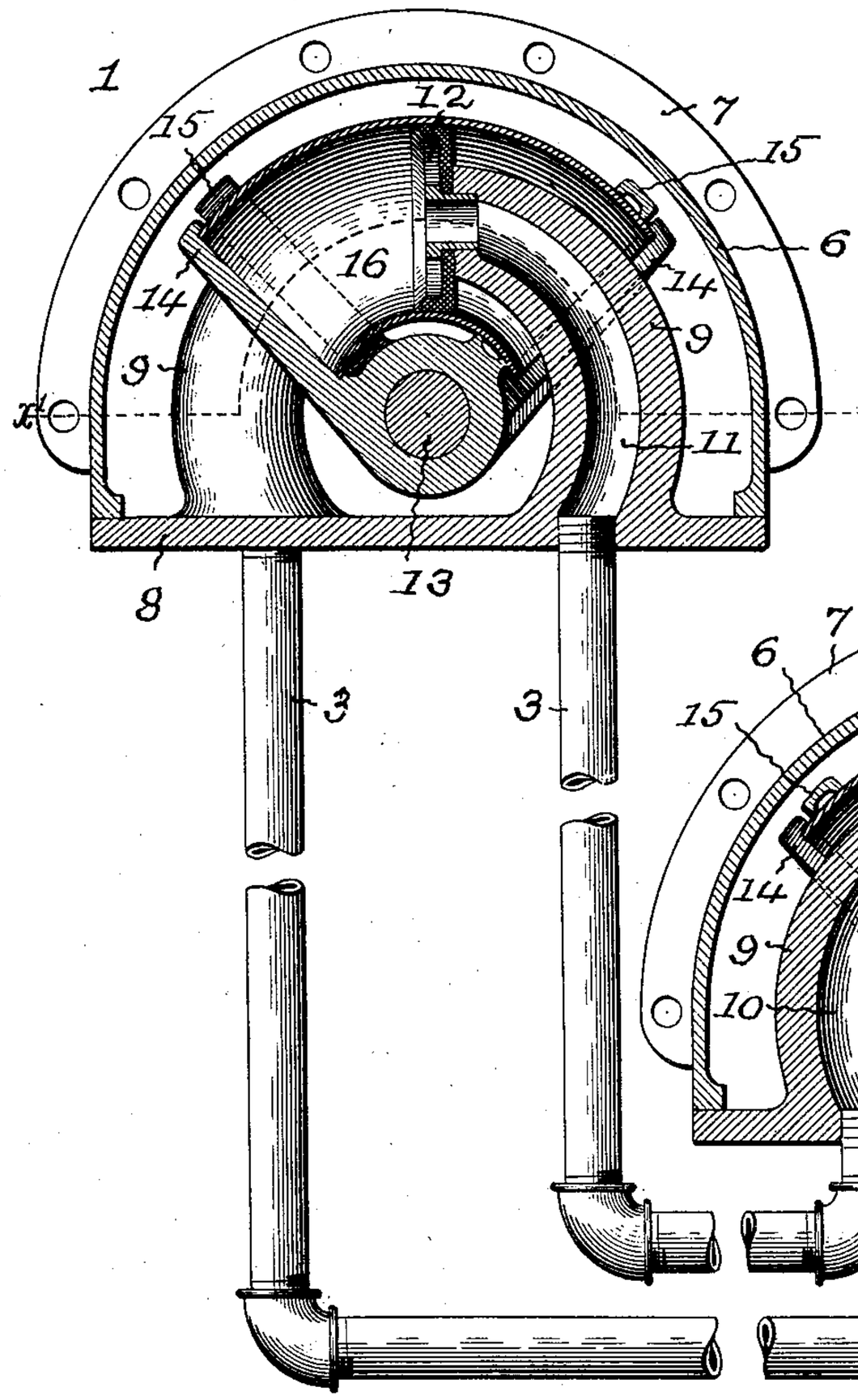


Fig. 1.

Fig. 2.

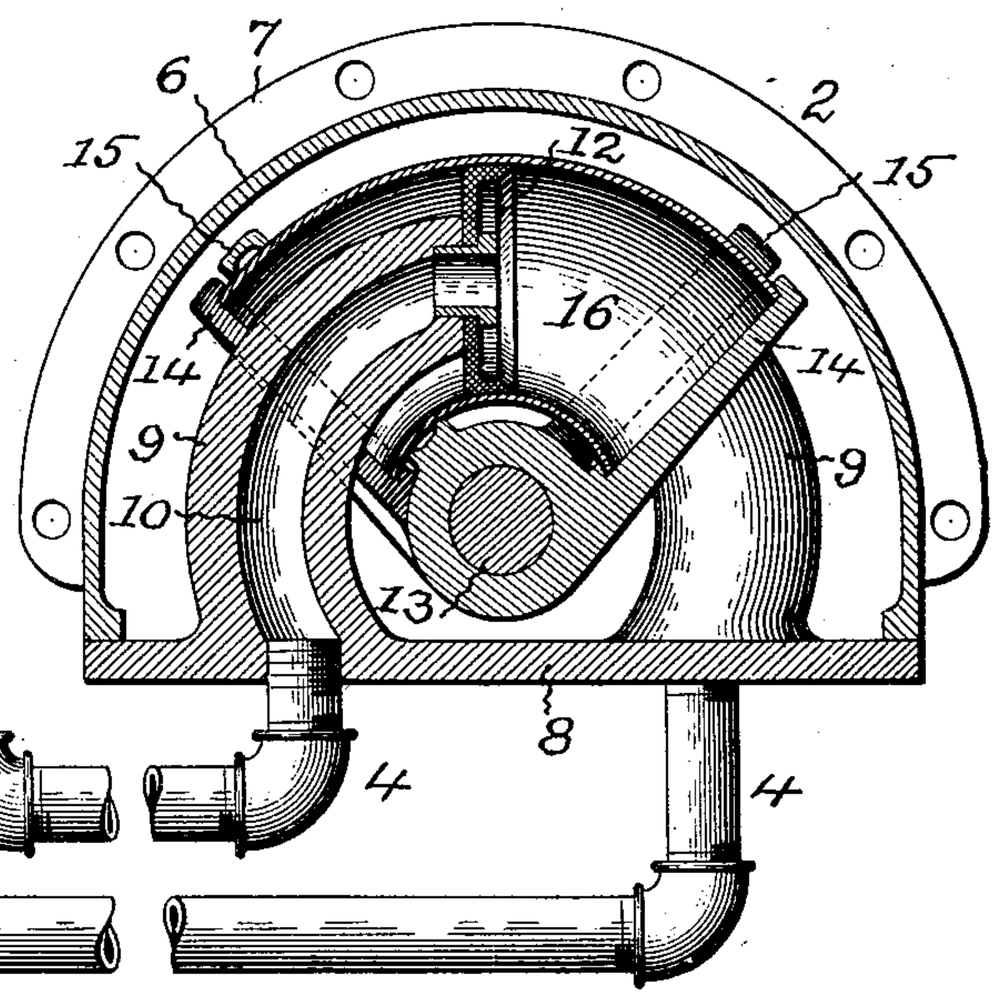
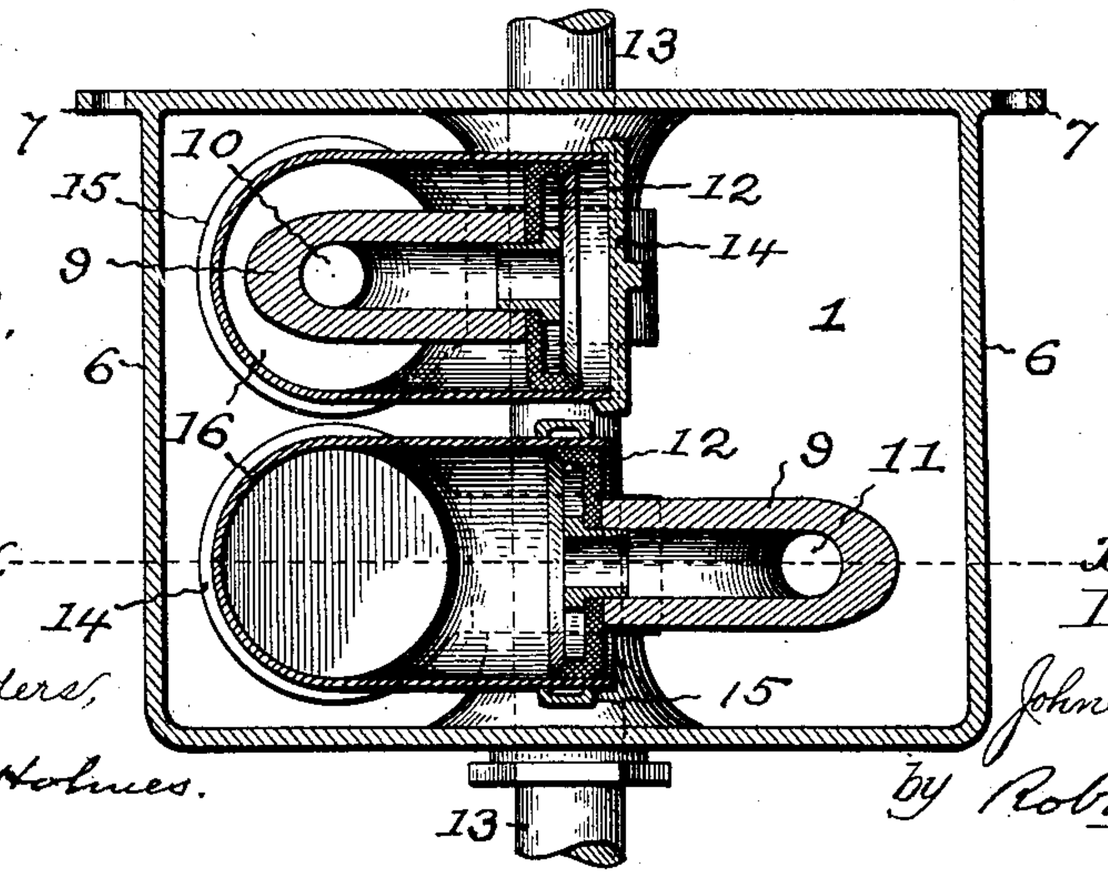


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

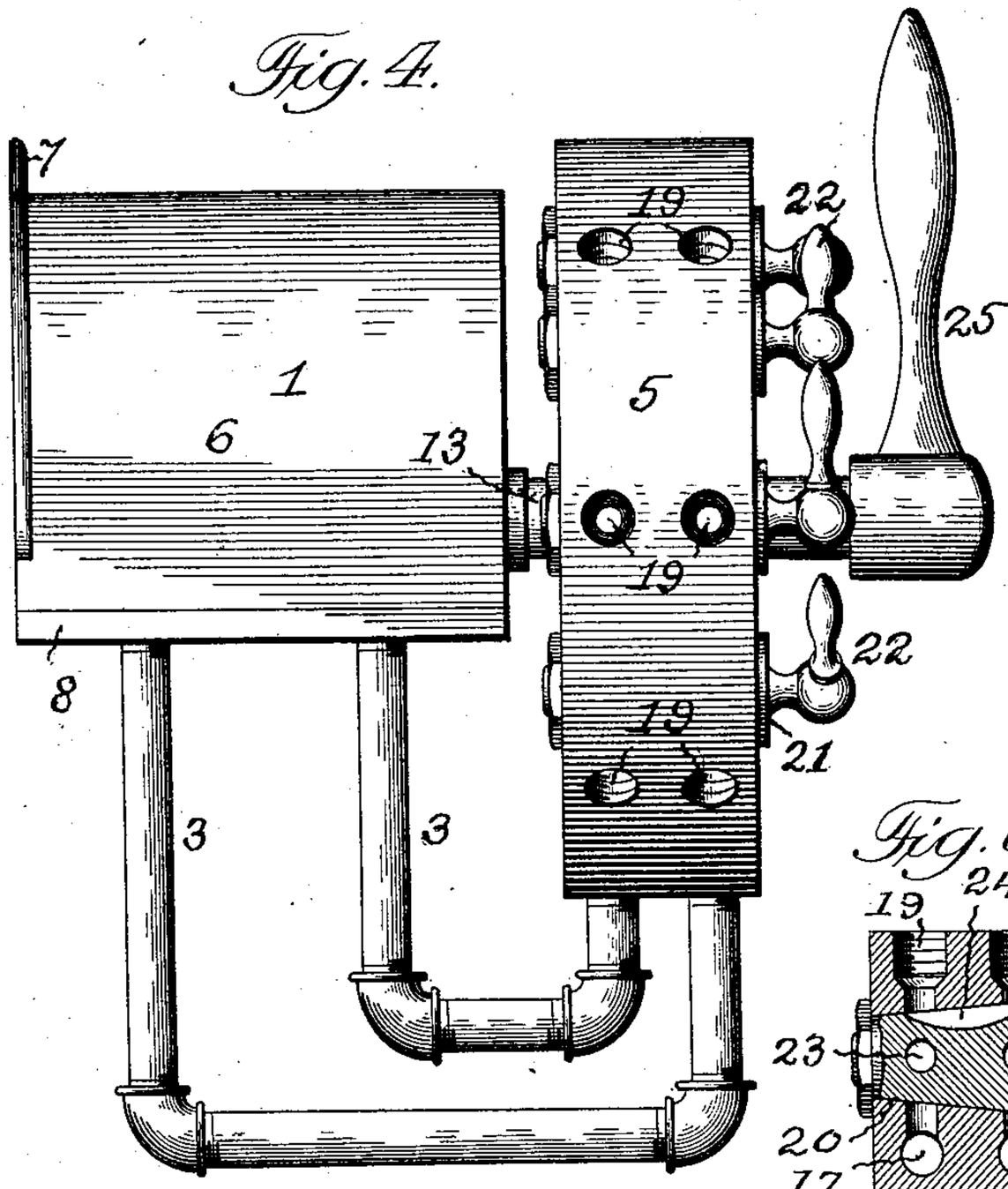


Fig. 5.

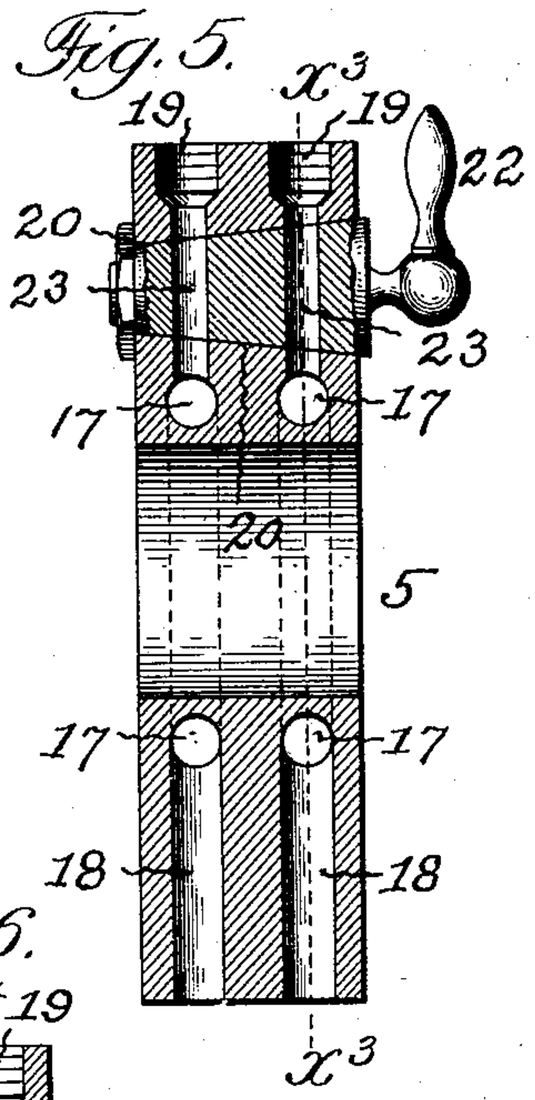


Fig. 6.

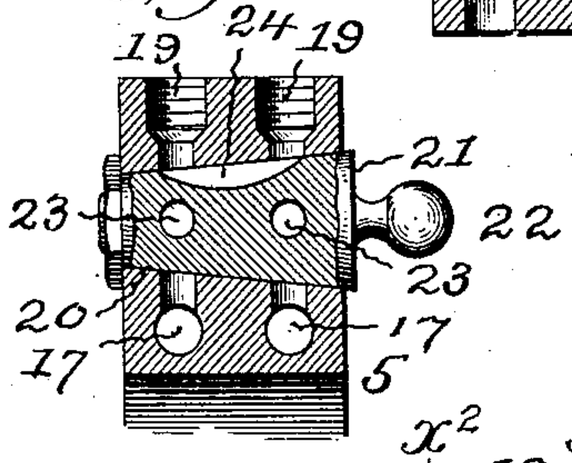


Fig. 7.

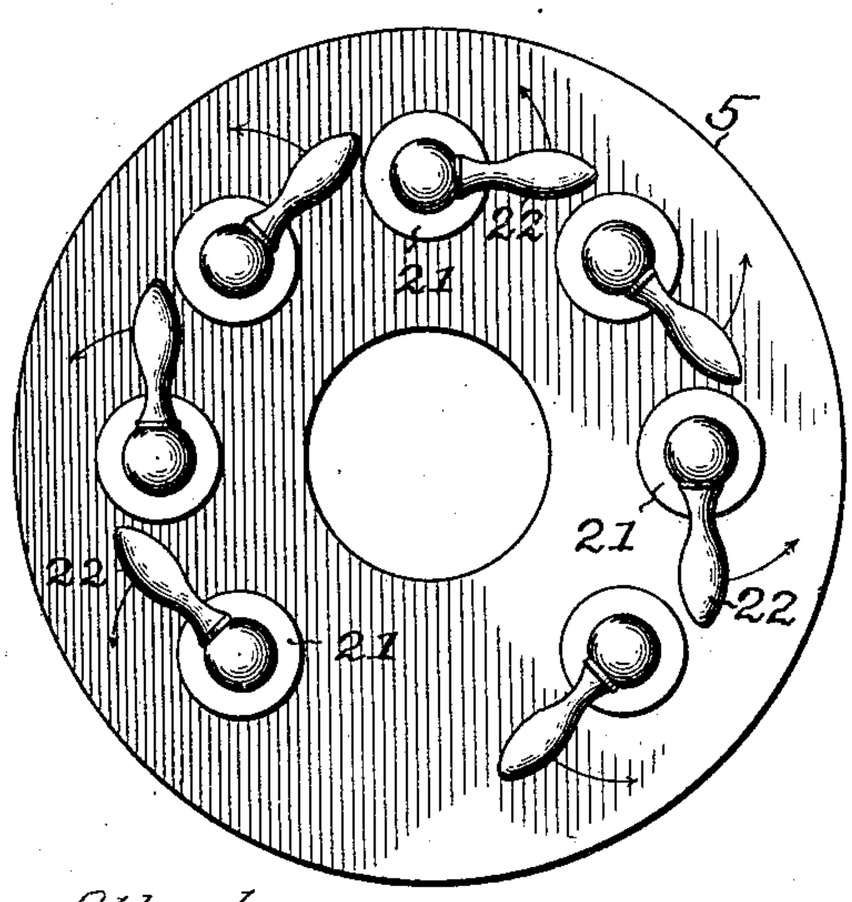
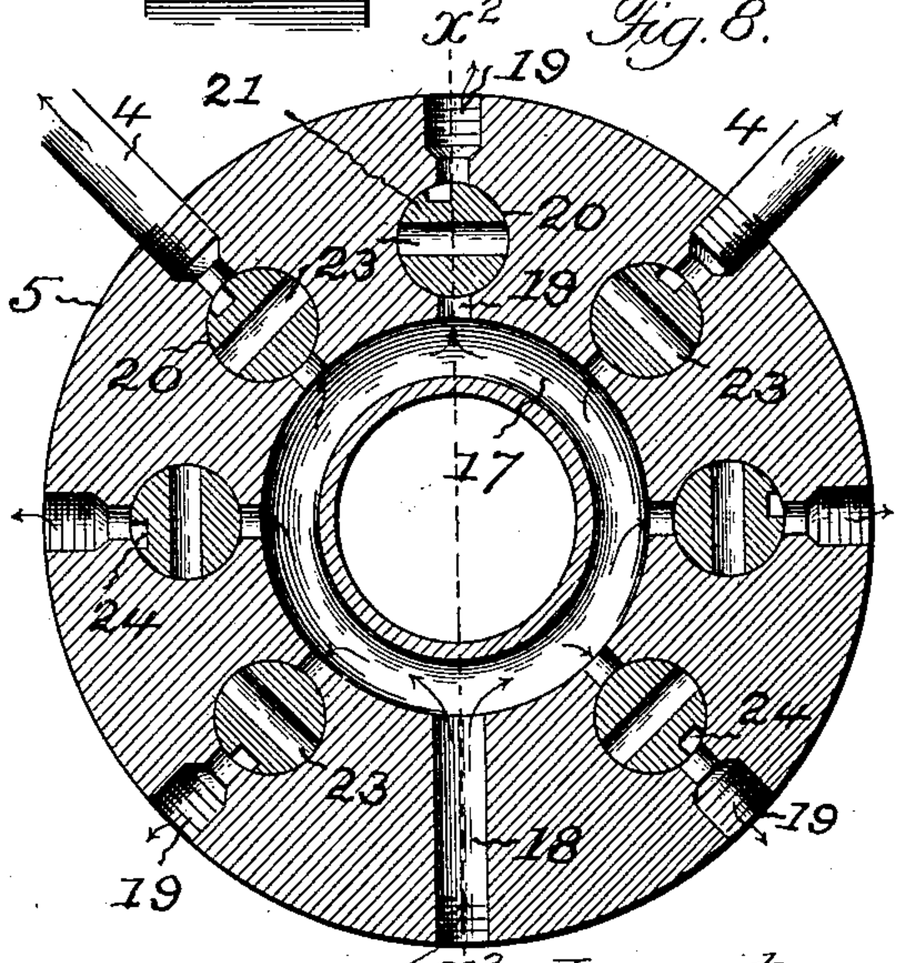


Fig. 8.



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UNITED STATES PATENT OFFICE.

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TRANSMITTING MOTION.

No. 860,619. Specification of Letters Patent. Patented July 16, 1907.

Application filed September 27, 1905. Serial No. 280,315.

To all whom it may concern:

Be it known that I, JOHN F. PAGENDARM, a citizen of the United States of America, and a resident of San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Transmitting Motion, of which the following is a specification.

The present invention relates to a system of transmitting motion between points indirect or remote from each other by means of fluid pressure, and has for its object to provide a simple and efficient structural formation and combination of parts, whereby the motion imparted to motor at a central point or station is transmitted in a certain and positive manner to similar motors at remote points, and with which a simultaneous or serial action upon the receiving motors at such different remote points is regulated and controlled in a ready and convenient manner by the operator at the central point, all as will hereinafter more fully appear and be more particularly pointed out in the claims.

In the accompanying drawings:—Figure 1 is a vertical sectional elevation on line x—x, Fig. 3 of the driving hydraulic motor of the system. Fig. 2 is a similar view of the driven hydraulic motor of the system, and which in connection with the aforesaid driving hydraulic motor illustrates the primary form of the present system. Fig. 3 is a horizontal section on line x'—x' Fig. 1, of the hydraulic motor. Fig. 4 is a side elevation illustrating the combination of a driving motor and a multiple controlling valve in a complex form of the apparatus adapted to transmit motion to a number of remote points or stations. Fig. 5 is a detail vertical section on line x^2—x^2 Fig. 8, of the said controlling valve. Fig. 6 is a fragmentary view similar to Fig. 5, illustrating a pair of the radial passages of the controlling valve connected together by the by-pass, of the valve plug or head controlling said radial passages. Fig. 7 is a side elevation of said controlling valve. Fig. 8 is a detail vertical section on line x^3—x^3, Fig. 5, of said controlling valve.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings:—1 is the driving hydraulic motor arranged at the central or controlling point or station of the system; 2 is the driven hydraulic motor arranged at one of the remote points or stations of the system, and 3 are a pair of fluid transmission pipes leading away from the opposed ends of the driving motor, and adapted for connection to the opposed ends of the driven motor, or series of driven motors, as hereinafter more fully set forth, and so that with the manual operation of the driving motor in one or the other direction, will cause a corresponding movement of the driven motor or motors.

In the simple form of the present system, employing but a single driven motor, the pair of fluid transmission pipes 3, will extend in a direct manner between the driving and the driven motor; while in a more complex form of the present system employing a number of driven motors located at points remote from the central station as well as from each other, the said fluid transmission pipes 3, will be connected to a controlling valve 5 as illustrated in Fig. 4; and such controlling valve will in turn be connected by a number of pairs of branch fluid transmission pipes 4, individual to a similar number of the driven motors.

The hydraulic motors employed in the present system are of the double acting type, and with a view to a compact and powerful arrangement of parts, such motors are preferably of the construction shown in Figs. 1, 2 and 3, of the drawings, and comprise a structural formation and combination of parts as follows:—

6 is the motor casing preferably of a semi-cylindrical form, open at one side, as shown in Fig. 1.

7 is a marginal end flange on said casing, affording convenient means for securing the motor in a fixed position.

8 is a base plate secured to the open side of the casing 6, and adapted to carry the hereinafter described stationary motor pistons.

9 are a pair of stationary pistons, cast or otherwise attached to the base plate 8, in the opposed relation shown; such pistons are of a curved or segmental form and are arranged in substantially concentric relation to the pivot axis of the semi-rotary motor cylinders hereinafter described.

10 and 11 are the induction-eduction ports or ducts of the motor, formed in the base plate 8 and pistons 9, as shown, and having connection at the outer ends with a pair of the fluid transmission pipes 3 or 4, aforesaid.

12 are piston heads, preferably of the cup form shown, secured to the free ends of the pistons.

13 is the semi-rotary motor shaft journaled in the casing 6 and provided with pairs of radial heads 14, and arms 15, adapted to carry the pair of cylinders of the motor.

16 are the motor cylinders of a curved or segmental form carried by the radial heads and arms aforesaid, in concentric relation to the axis of the motor shaft 13, aforesaid.

In the present construction one end of each cylinder is closed by a head 14 while the other end is left open to receive the piston and its piston head, and such open end is supported in place by one of the radial arms 15, which for this purpose is made of a ring shape adapted to fit the exterior of the cylinder.

In the present construction the respective pistons

and cylinders in addition to having an opposed relation as above described, are arranged to one side or the other, as shown in Fig. 3, so that their free ends may lap past each other to afford a very compact arrangement of the parts.

The multiple controlling valve heretofore referred to will in the preferred form of the present invention comprise an arrangement of parts as follows:—

17 are a pair of annular distributing chambers formed in the body of the valve, in separated and parallel relation.

18 are a pair of radial passages having individual communication at their inner ends with the distributing chambers 17, and at their outer ends with the pair of fluid transmission pipes 3 of the driving motor 1 of the system.

19 are a series of pairs of radial passages formed in the body of the valve, and extending outwardly from the distributing chambers 17, with their outer ends adapted for connection with a series of pairs of fluid transmission pipes 4, having connection with the series of driven motors 2, of the system.

20 are a series of transverse orifices in the body of the valve in intersecting relation to the series of pairs of radial passages 19; such transverse orifices are preferably made tapering and constitute seats for a series of individual plug valves hereinafter described.

21 are the series of individual plug valves, above referred to, provided at one end with an operating handle 22, and intermediate of their length with pairs of transverse passages 23, in line with the radial passages 19 above described.

24 is a longitudinal recess or passage formed in the periphery of each plug valve 21, in angular relation to the transverse passages 23, thereof; each longitudinal passage has a length great enough to span a pair of the radial passages 19, controlled by said plug valve, so that when in register with said radial passages 19, the longitudinal passage 24 will form a by-pass between the pair of radial passages, as illustrated in Fig. 6, for the purpose hereinafter set forth.

25 is a lever or handle, secured to the shaft 13, of the driving motor for the convenient manual actuation of the same.

The operation of the complex and preferred form of the present invention, is as follows:—With the apparatus set up and the motor cylinders, pipes, etc. filled with a suitable fluid, a movement of the operating handle 25 of the driving motor 1 in one or the other direction will cause one of the cylinders 16 to move over its piston and expel the fluid from such cylinder through a pipe 3 into the distributing chamber 17 of the controlling valve 5, and from thence through one or more of the radial passages 19 and distributing pipes 4 into a corresponding cylinder or cylinders of a driven motor or motors 2, to effect an operation of the same in one direction. Such movement of the operating handle 25 will cause a simultaneous travel of the companion cylinder of the driving motor 1 from off its piston, to draw the fluid into such cylinder from the corresponding cylinder or cylinders of the driven motor or motors 2, through the connecting set of pipes 4, distributing chamber 17 and pipe 3. With a movement of the operating handle 25 in a contrary direction, a like position of the companion parts, last referred to, takes place, so that a positive motion in both directions is assured in a practical operation of the apparatus. By an adjustment of the individual valve heads 21, to a position in which their pairs of transverse ports or passages 23 form open communications between the pairs of radial passages 19 and the pairs of annular distributing passages 17, the parts are in position for a normal action of the entire apparatus. By an adjustment of any one of the individual valves 21 to the position illustrated in Figs. 6 and 8, the communication between the driving motor and the particular driven motor is closed, and the by-pass 24 connects the particular pair of radial passages 19 so that such driven motor can be independently adjusted as required. By an adjustment of any one of the individual valves 21 to a position in which the pair of transverse passages 23 and by-pass 24 are out of register with the pairs of radial passages 19, the particular driven motor is cut-off from operation by the main driving motor, and locked in the position to which it had been previously adjusted.

The present invention is applicable to a great many uses in the practical arts, and among the many may be mentioned, the operation and control from a central station of a number of remote railway switches, gates or analogous appliances, also the control of a series of doors, and the like, from a central office or station of a building or plant.

Having thus fully described my said invention what I claim as new and desire to secure by Letters Patent is:—

1. In a fluid pressure apparatus for transmitting motion between remote points, the combination of a driving motor, a series of driven motors, fluid transmission pipes connecting said motors, and a multiple controlling valve arranged in said pipes near the driving motor, the said valve comprising a body portion formed with a pair of distributing chambers, having connection with the respective ends of the driving motor, and with a number of pairs of passages leading away from said distributing chambers and connected to the respective ends of the series of driven motors, and a number of individual valves controlling said pairs of passages, substantially as set forth.

2. In a fluid pressure apparatus for transmitting motion between remote points, the combination of a driving motor, a series of driven motors, fluid transmission pipes connecting said motors, and a multiple controlling valve arranged in said pipes near the driving motor, the said valve comprising a body portion formed with a pair of distributing chambers, having connection with the respective ends of the driving motor, and with a number of pairs of passages leading away from said distributing chambers and connected to the respective ends of the series of driven motors, and a number of individual valves controlling said pairs of passages and provided with by-pass recesses, substantially as set forth.

3. In a fluid pressure apparatus for transmitting motion between remote points, the combination of a driving motor, a series of driven motors, fluid transmission pipes connecting said motors, and a multiple controlling valve arranged in said pipes near the driving motor, the said valve comprising a body portion formed with a pair of annular distributing chambers, having connection with the respective ends of the driving motor, and with a number of pairs of radial passages leading away from said distributing chambers and connected to the respective ends of the series of driven motors, and a number of individual valves controlling said pairs of passages, substantially as set forth.

4. In a fluid pressure apparatus for transmitting motion between remote points, the combination of a driving motor, a series of driven motors, fluid transmission pipes connecting said motors, and a multiple controlling valve ar-

ranged in said pipes near the driving motor, the said valve comprising a body portion formed with a pair of annular distributing chambers, having connection with the respective ends of the driving motor, and with a number of pairs of radial passages leading away from said distributing chambers and connected to the respective ends of the series of driven motors, and a number of individual valves controlling said pairs of passages and provided with by-pass recesses, substantially as set forth.

5. In a fluid pressure apparatus for transmitting motion between remote points, the combination of a driving motor, a driven motor, and fluid transmission pipes connecting said motors, each motor comprising a pair of segmental pistons arranged in opposed and side by side relation, a pair of segmental cylinders fitting said pistons, a semi-rotary shaft, and arms and heads secured to said shaft and adapted to carry said cylinders, substantially as set forth.

6. In a fluid pressure apparatus for transmitting motion between remote points, the combination of a driving motor, a driven motor, and fluid transmission pipes connecting said motors, each motor comprising a pair of segmental pistons arranged in opposed and side by side relation, a pair of segmental cylinders fitting said pistons, a semi-rotary shaft, arms and heads secured to said shaft and adapted to carry said cylinders, a base plate supporting said pistons, and a segmental casing secured to said base plate and inclosing the pistons and cylinders, substantially as set forth.

Signed at San Francisco, Cal. this 20th day of September 1905.

JOHN F. PAGENDARM.

Witnesses:
A. K. DAGGETT,
HERMANN WREDE.