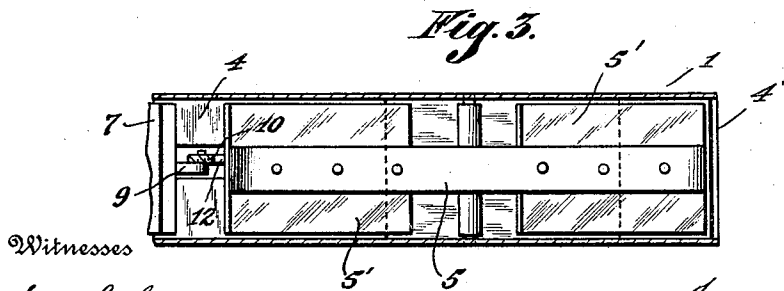
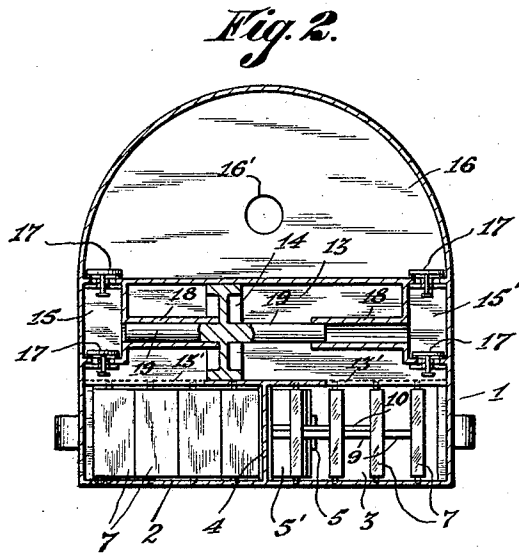
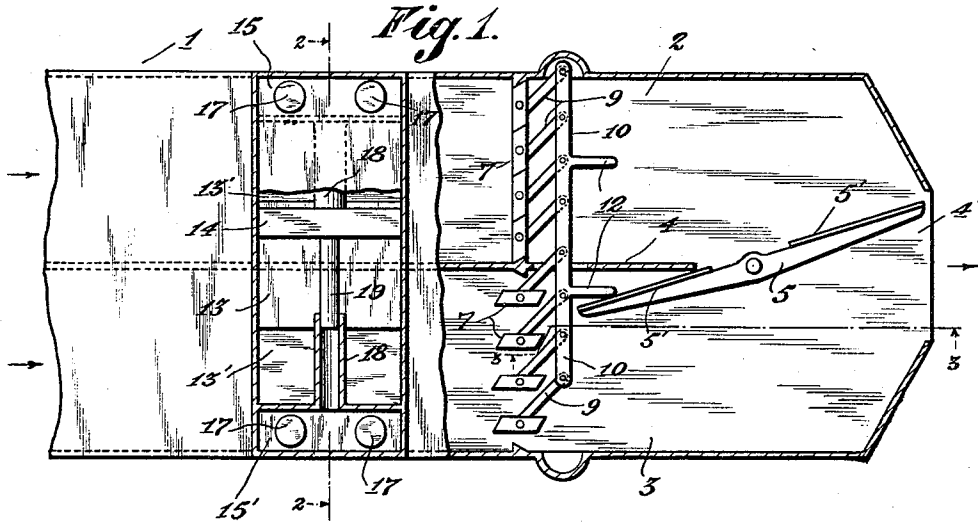


O. P. ROHR.
 COMBINED PUMP AND RAM.
 APPLICATION FILED JAN. 15, 1912.

1,057,778.

Patented Apr. 1, 1913.



Witnesses

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COMBINED PUMP AND RAM.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, OTTO P. ROHR, a subject of the King of Norway, and a resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Combined Pumps and Rams, of which the following is a specification.

My invention has for one of its main objects to provide novel valve mechanism for alternately closing the drive passages.

Another object resides in the provision of water impelling mechanism connected for operation through pressure generated incident to the closing of the valves in the drive passages.

With the above and other objects in view, to be referred to as my description progresses, the invention resides in the features of construction, arrangements and combinations of parts hereinafter described and succinctly pointed out in my annexed claims.

Referring to the accompanying drawing wherein like numerals of reference indicate like parts throughout: Figure 1 is a top plan with portions broken away, Fig. 2 is a vertical section taken on line 2—2 of Fig. 1, and Fig. 3 is a fragmentary longitudinal section taken through the delivery end portion of the drive pipe on line 3—3 of Fig. 1.

Referring to the drawing by numerals of reference, 1 indicates the drive pipe which is divided by a partition 4 into longitudinal sections or passages 2 and 3. Partition 4 terminates in advance of the reduced delivery opening 4' of pipe 1 and immediately beyond the same I fulcrum a lever 5, the said lever being provided on its opposite end portions with vanes 5'.

In advance of lever 5 I provide shutter valves 7, the same having their component parallel sections provided with end studs which are journaled in the upper and lower walls of the drive pipe, as shown.

Reference numeral 9 indicates arms fixed to the valve sections and pivotally connected at their free end portions by a connecting bar 10 which latter upon being properly adjusted will open one valve 7 and simultaneously close the other. This movement of bar 10 is effected through oscillatory movement of lever 5, the latter through action of the fluid in passages 2 and 3, being alternately brought into engagement with strike parts 12 of said bar.

Reference numeral 13 indicates a working

chamber for a piston 14, the said chamber being provided in its opposite end portions with ports 13' each communicating with a respective drive passage, as more clearly shown in Fig. 2. At the end portions of chamber 13 I provide pump chambers 15, 15' having intake ports in their lower portions which open in line with ports 13' for reception of water from the adjacent drive passages.

Reference numeral 16 indicates an air chamber the same being provided with a delivery port 16' and having communication with pump chambers 15, 15', through suitable outlet ports provided in the upper end portions of the latter. These inlet and outlet ports of pump chambers 15, 15' are controlled by suitable valves, as 17.

Reference numeral 18 indicates hollow extensions of chambers 15, 15' in which plungers 19, fixed to piston 14, are slidably received.

With the parts arranged as shown, wherein valve 7 controlling passage 2 has just been closed, a portion of the water will, incident to the sudden arresting of its flow, be forced upwardly through the related port 13' into piston chamber 13 and pump chamber 15 and act on piston 14 to move the same to the right, whereby one plunger 19 will force water from chamber 15' into air chamber 16. Simultaneous with this arresting of the flow in passage 2, passage 3 has been opened, and when the flow in this last named chamber becomes of sufficient strength, it will act on one vane 5' to swing lever 5 and thereby bring the other vane into forcible engagement with the related strike part 12 of bar 10, thereby effecting an operation of valves 7, to open passage 2 and close passage 3, at which time piston 14 will be operated to the left for impelling water from chamber 15 to chamber 16. During further operation of the apparatus, lever 5 swings back and forth to alternately open and close the drive passages 2 and 3.

Having thus described my invention what I claim as new, and desire to secure by Letters Patent of the United States of America, is:—

1. In apparatus of the character described, a drive passage, an air chamber, a fluid receiving chamber having valved connection with said drive passage and said air chamber, a plunger in said chamber for forcing the fluid therefrom, a valve in said

passage rearwardly of the connection of the latter with said receiving chamber, means for automatically operating said valve to and from its closed position, and means for
 5 operating said plunger in one direction arranged to be operated by the fluid in said passage incident to the closing of said valve.

2. In apparatus of the character described, spaced drive passages, valves for
 10 said passages, an air chamber, a valved connection between said air chamber and one of said passages in advance of the valve of the latter, a plunger interposed in said connection for forcing fluid into said air chamber,
 15 actuator means for said plunger arranged for operation by the fluid in the respective passages alternately, and means for automatically operating said valves to close said drive passages alternately.

3. In apparatus of the character described, spaced drive passages, valves for
 20 said passages, an air chamber, a pump chamber connected with said air chamber and with one of said drive passages, a plunger in said pump chamber, actuator means for
 25 said plunger arranged for reciprocation by fluid in said passages, and means for automatically operating said valves to close said drive passages alternately.

4. In apparatus of the character described, spaced drive passages, valves for
 30 said passages, an air chamber, a fluid receiving chamber connected with said air chamber and with one of said drive passages and
 35 provided with inlet and outlet valves, means connecting said first named valves for simultaneous movement of one to its open and the other to its closed position, means for automatically operating said valves to close said
 40 drive passages alternately, and means for forcing fluid from said receiving chamber into said air chamber controlled for operation by the fluid in said passages.

5. In apparatus of the character described, spaced drive passages, valves for
 45 said passages, a working chamber having each end portion connected with a respective drive passage, an actuator arranged in said chamber for movement lengthwise thereof
 50 by the fluid, means for automatically closing one of said valves and simultaneously opening the other, pump chambers each connected with a respective drive passage, and plungers in said pump chambers connected with
 55 said actuator for reciprocation thereby.

6. In apparatus of the character described, spaced drive passages, valves for
 60 said passages, a working chamber having each end portion connected with a respective drive passage, an actuator arranged in said chamber for movement lengthwise thereof by the fluid, means for automatically closing one of said valves and simultaneously opening the other, an air chamber, pump
 65 chambers having their inlet ports each con-

nected with a respective drive passage, said pump chambers having their outlet ports connected with said air chamber, valves controlling the flow of fluid to and from
 70 said pump chambers, and plungers in said pump chambers connected with said actuator for reciprocation thereby.

7. In apparatus of the character described, in combination with a pair of drive passages, valves for said passages, each of said
 75 valves being composed of a plurality of pivoted sections, means connecting the valve sections for movement in unison to open one valve and simultaneously close the other, and a pivoted actuator for said last named
 80 means arranged in said passages for oscillation by the fluid flowing therethrough, said actuator being pivoted substantially centrally of its length and provided on its opposite end portions with vanes each projecting into a respective drive passage.

8. In apparatus of the character described, in combination with a pair of drive passages, valves for said passages, each of said
 90 valves being composed of a plurality of pivoted sections, means connecting the valve sections for movement in unison to open one valve and simultaneously close the other, strike parts on said last named means, and an actuator for said valves pivoted substantially
 95 centrally of its length for oscillatory movement by the fluid in said drive passages for alternative engagement with said strike parts, for the purpose specified.

9. In apparatus of the character described,
 100 two drive passages, valves for said passages, each of said valves being formed of a plurality of pivoted sections having projecting arms, a bar pivotally connected to the arms of all of said valve sections for simultaneously
 105 closing one valve and opening the other, a lever having its pivot intermediate the drive passages, vanes on the opposite end parts of said lever, strike parts on said connecting bar arranged in the path of said
 110 lever, an air chamber, a piston chamber connected to receive fluid from said drive passages, a piston in said last named chamber, pump chambers having valved connection with said drive passages and said air chamber,
 115 and plungers operating in said pump chambers and connected with said piston for operation by the latter.

10. In apparatus of the character described, a box like drive pipe divided into
 120 longitudinal sections, a valve in each section of said drive pipe, said valves being composed of parallel pivoted sections having angular projections, the projections of the sections of one valve extending at angles
 125 contrary to those of the sections of the other valve, a connecting bar to which all of the projections of said valve sections are pivotally connected, a lever pivoted intermediate its ends and provided on opposite sides
 130

of its fulcrum with vanes each adapted for operation in a respective section of said drive pipe, strike parts on said connecting bar in the path of said lever, an air chamber, a piston chamber having ports each communicating with a respective section of said drive pipe, pump chambers each having valved connection with a respective section of said drive pipe and with said air chamber, a piston in said piston chamber, and plungers in said pump chambers connected with said piston for operation thereby.

11. In apparatus of the character described, a drive passage, a fluid receiving chamber having valved connection with said drive passage for reception of fluid therefrom, said chamber being also provided with an outlet port, a plunger in said chamber for forcing fluid therefrom, a valve in said drive passage rearwardly of the connection of the latter with said chamber, means for automatically operating said valve to and from its closed position, and means for operating said plunger in one direction arranged to be operated by the fluid in said drive passage incident to the closing of said valve.

12. In apparatus of the character described, a drive passage, a fluid receiving chamber having intake and delivery ports, the intake port of said chamber having valved connection with said drive passage, a plunger in said chamber for forcing fluid therefrom, a valve in said drive passage rearwardly of the connection of the latter with said chamber, means for operating said plunger in one direction arranged to be operated by the fluid in said drive passage upon closing of said valve, and means whereby said valve is automatically operated to and from its closed position.

13. In apparatus of the character described, a drive passage, a fluid receiving chamber having intake and delivery ports, the intake port of said chamber having valved connection with said drive passage, a plunger in said chamber for forcing fluid therefrom, a valve in said drive passage rearwardly of the connection of the latter with said chamber, a second chamber communicating with said drive passage forwardly of said valve, a piston connected with said plunger and arranged in said second chamber for operation in one direction by fluid from said drive passage incident to the closing of said valve, and means whereby said valve is automatically operated to and from its closed position.

14. In apparatus of the character described, spaced drive passages, valves for said passages, and means for closing said valves automatically including an actuator

fulcrumed substantially centrally of its length and provided on its opposite end portions with vanes each arranged in a respective drive passage for movement by the water lengthwise thereof.

15. In apparatus of the character described, spaced drive passages, valves for said passages, means connecting said valves for simultaneous movement of one to its closed position and the other to its open position, and an actuator for said valves arranged rearwardly of the latter for movement by the fluid in said passages, said actuator being fulcrumed intermediate its ends and provided on its opposite end portions with vanes each arranged in a respective drive passage.

16. In apparatus of the character described, spaced drive passages, valves for said passages, means connecting said valves for simultaneous movement of one to its closed position and the other to its open position, an actuator for said valves fulcrumed intermediate its ends and provided on opposite sides of its fulcrum with vanes each arranged in a respective drive passage, and strike parts connected for movement with said valves and arranged in the path of said actuator.

17. In apparatus of the character described, in combination with a pair of drive passages, valves for said drive passages connected for simultaneous movement of one to its open and the other to its closed position, impact receiving parts connected for movement with said valves, and means for striking said impact receiving parts to thereby operate said valves comprising a fluid operated member arranged rearwardly of said valves and being pivotally supported intermediate its ends and provided on its opposite end portions with vanes each projecting into a respective drive passage.

18. In apparatus of the character described, spaced drive passages, valves for said passages, a pump chamber provided with inlet and outlet ports, the intake port of said chamber having valved connection with one of said drive passages in advance of the valve thereof, a plunger in said pump chamber, actuator means for said plunger arranged for movement in relatively opposite directions by fluid in said drive passages, and means for automatically operating said valves to close said drive passages alternately.

Signed at Seattle, Washington, this 4th day of January, 1912.

OTTO P. ROHR.

Witnesses:

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