No. 693,727. Patented Feb. 18, 1902.

W. A. MAYBACH.

OIL PUMP.

(Application filed Mar. 28, 1901.)

(No Model.)

Fig. 1.

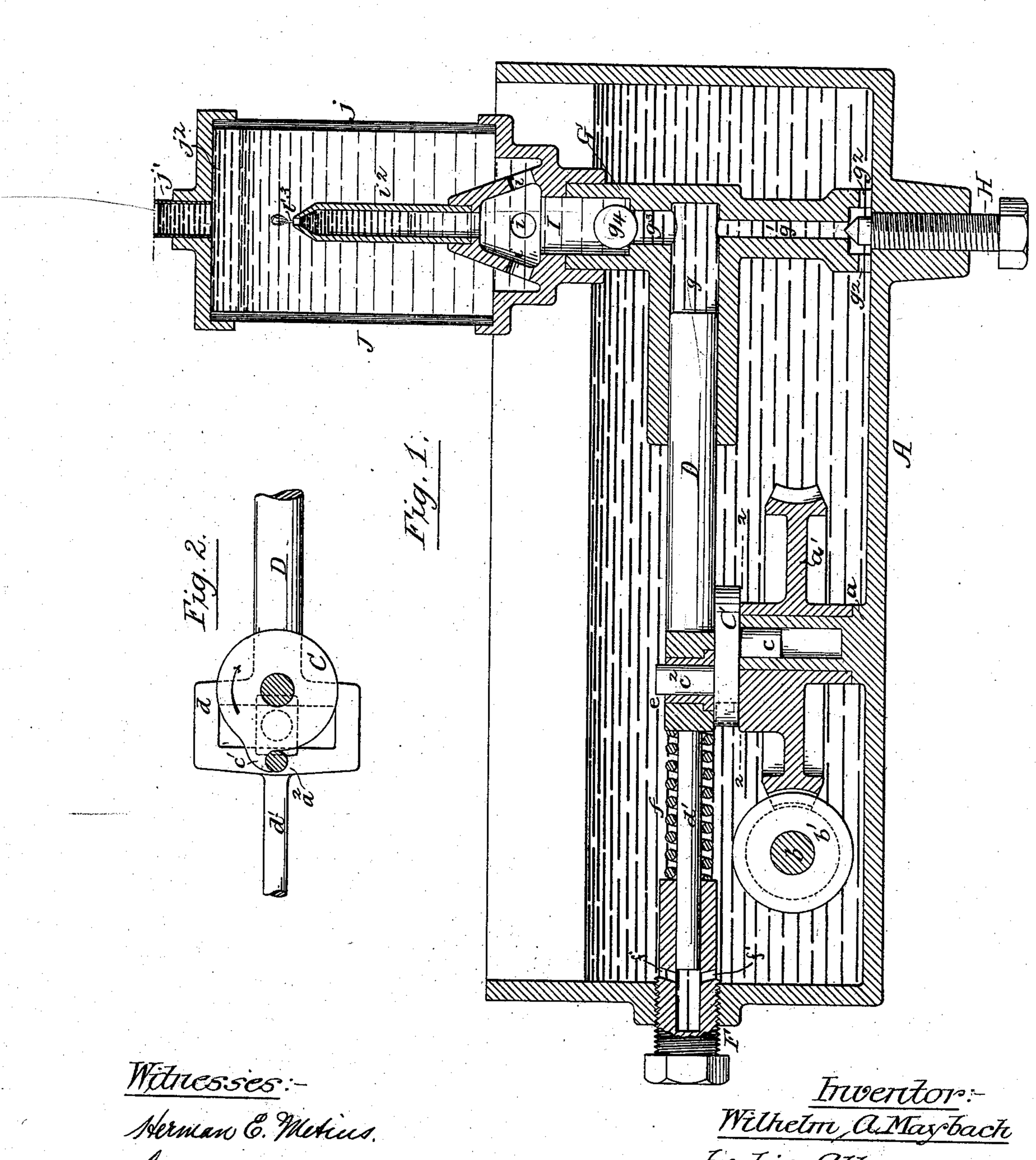

Fig. 2.

Witnesses:-

Herman E. Metcalf.

Louis M. F. Whitehead

Inventor:-

Wilhelm A. Maybach

by his Attorneys:-

Howson & Howson

UNITED STATES PATENT OFFICE.

WILHELM A. MAYBACH, OF CANNSTADT, GERMANY, ASSIGNOR TO DAIMLER MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

OIL-PUMP.

SPECIFICATION forming part of Letters Patent No. 693,727, dated February 18, 1902.

Application filed March 28, 1901. Serial No. 53,345. (No model.)

To all whom it may concern:

Be it known that I, WILHELM AUGUST MAYBACH, a subject of the Emperor of Germany, and a resident of Cannstadt, in the Kingdom of Würtemberg, Germany, have invented certain Improvements in Oil-Pumps, of which the following is a specification.

My invention relates to certain improvements in pumps, and more particularly to an improved form of oil-pump constructed to be used to force a lubricant to various parts of a machine requiring the same.

The object of my invention is to provide a pump for forcing liquid in an intermittent stream to any desired points, which shall be simple in construction and which shall have a minimum number of moving parts, a further object of my invention being to provide means for accurately and easily regulating the quantity of liquid discharged by the pump.

In the accompanying drawings, Figure 1 is a sectional view of a reservoir, showing my invention in its preferred form when used as an oil-pump. Fig. 2 is an inverted sectional view on the line 2 2, Fig. 1.

It will be understood that while I describe and illustrate my invention as applied to an oil-pump I may with equal advantage and without departing from the said invention employ it for forcing a liquid through a system of pipes for any desired purpose.

In the drawings, A is a container or reservoir for oil, through which runs a shaft *b*, the same passing, if desired, through stuffing-boxes in the sides of said container. On this shaft is keyed a worm *b'*, meshing with a worm-wheel *a'*, which is mounted on a bearing *a*, formed in the present instance integral with and projecting inwardly from the bottom of the reservoir. This bearing *a* is made hollow, and projecting into its upper end is a pin *c* of a crank C, which is loosely mounted on top of the hub of the worm-wheel *a'*. This crank is disk-shaped in the present instance, having a projection or shoulder *c'* at one side, which is constructed to be engaged by a pin a^2, projecting from the upper surface of the hub of the said worm-wheel. The crank C also has a pin c^2, projecting from the side opposite to that on which is the pin *c* and eccentrically placed with relation to the latter. A piston or plunger D has at one end a slotted portion *d*, from which projects a guiding-rod *d'*, the said slotted part *d* having its sides constructed to form guides on which slides a block *e*. The pin c^2 of the crank C passes through this block, which is reciprocated on the guides as the crank is revolved. The guiding-section *d'* of the plunger is supported in a bearing-plug F, screwed in the present instance into the side of the reservoir and having its outer end formed to receive a wrench. There is a space within this plug beyond the end of the rod *d'*, and there are passages *f f* leading to this, freely connecting it with the reservoir, whereby the liquid in said space is permitted to flow in and out as the said rod is reciprocated. Between the bearing-plug F and the part *d* of the plunger is placed a spring *f*, supported on the guiding-rod *d'*, the pressure exerted by said spring upon the plunger being adjustable by means of the bearing F. The opposite end of the plunger or piston proper operates in and is supported by a cylinder *g*, formed in the casting G, supported in the reservoir A in any suitable manner. Communicating with this cylinder *g* is a passage *g'*, having in it a valve-seat and opening into the interior of the reservoir through ports or passages g^2. A valve H is constructed to fit the above-mentioned seat, and it extends through the bottom of the reservoir, being threaded and provided with a head by which it may be manipulated from the outside of the reservoir. Also communicating with the cylinder *g* is a passage g^3, having a valve-seat and valve g^4 and opening into a chamber I, in which there are openings *i i*.

To the upper part of the casting G is attached a cup, the sides of which are preferably of glass, the bottom thereof being formed so as to make the chamber I when fitted to the projecting part of the casting G. In an opening at the top of this chamber I is fitted a glass pipe or nozzle i^2, at the upper end of which is a small orifice i^3.

The top and bottom parts of the oil-cup J are tightly held to the glass part *j* thereof by any of the well-known means common to the

art, and there is a pipe j' leading from the top of the cup to the points at which oil is to be distributed.

The operation of my device is as follows: Oil or other liquid to be pumped is placed in the reservoir A, and the cup J is almost entirely filled with water, the same being retained therein by the valve g^4, which effectually prevents its escape into the reservoir. On turning the shaft b the worm b' thereon causes the worm-wheel a' to revolve on its bearing a, and the pin a^2, which projects from the upper face of the hub of said worm-wheel, engages the projection c' of the crank C. At the beginning of the suction-stroke of the pump this pin a^2 is in a position one hundred and eighty degrees distant from that shown in Fig. 2, and the continued revolution of the shaft b causes a relatively slow movement of said pin and of the crank C, which is made to turn in a direction indicated by the arrow in Fig. 2. During this suction-stroke oil is slowly drawn into the cylinder g through the opening g^2 and passage g', the cross-sectional area of the opening into the latter being regulated by the valve H. When the pin a^2 has reached the position indicated in Fig. 1, the movement of the plunger has compressed the spring f. As soon, therefore, as the pin a^2 has caused the projection c' of the crank to pass over a dead-point situated in the long axis of the plunger D this spring causes the said plunger to move suddenly forward, the crank being moved one hundred and eighty degrees almost instantly, since the block e slides in the guides of the part D and transmits motion of the plunger to it. As the worm-wheel continues to revolve, the pin a^2 comes up to and engages the projection c' and commences another stroke. It will be seen that during the suction-stroke of the pump oil is drawn into the cylinder g during a comparatively long period of time, and during the expelling stroke of the pump the plunger endeavors to force this oil out of the cylinder in a very much shorter time. The passage g is so proportioned as to make this impossible, and the valve g^4 is lifted and part of the oil escapes into the chamber I. Some of the water in this chamber is displaced thereby and flows out of the opening $i\,i$ to the interior of the cup J and the oil enters the tube i^2, escaping from the orifice i^3 thereof in globules or jets easily visible through the glass sides of the cup. As the pump continues to operate oil collects in the upper part of the cup at j^2, and finally filling the same flows out under pressure to the bearings or other mechanism to be lubricated. It will be seen that the amount of oil forced from the cylinder g into the chamber I at each stroke may be varied by the valve H, since the amount of oil flowing back into the reservoir through the passage g' depends upon the area of the opening at the valve end of the passage g'. For example, if the valve H is opened sufficiently to give a cross-sectional area into the passage g' equal to that of the passage g^3 approximately half of the oil would be forced into the chamber I and the rest flow back into the reservoir. The amount discharged also depends upon the amount of the compression of the spring f, and this may be varied at will by screwing the bearing-plug F in or out.

I claim as my invention—

1. The combination in a pump, of a cylinder, a piston, means for operating the pump, a rotatable piece connected thereto, a reciprocating piece engaged by said rotatable piece and engaging the piston whereby it is caused to accomplish its forward or pressure stroke in a relatively shorter time than that required for its suction-stroke, an inlet and an outlet passage to the cylinder, and an automatic valve in the outlet-passage, the inlet-passage being smaller in section than the outlet-passage and thereby allowing the pump to operate without an automatic valve in the same, substantially as described.

2. The combination in a pump, of a cylinder, a piston, means for operating the pump, a rotatable piece connected thereto, a reciprocating piece engaged by said rotatable piece and engaging the piston whereby it is caused to make its pressure-stroke in relatively less time than that required by its suction-stroke, an inlet and an outlet passage to the cylinder and an automatic valve in the outlet-passage, the inlet-passage being provided with means for varying the quantity of fluid discharged on said pressure-stroke and being smaller in section than the outlet-passage thereby allowing the pump to operate without an automatic valve in said inlet-passage, substantially as described.

3. In a pump the combination of a cylinder, a piston, admission and outlet passages to said cylinder, said admission-passage at all times freely communicating with the fluid-containing portion of the cylinder, means for varying the cross-sectional area of the admission-passage, continuously-rotating driving mechanism, a reciprocating piece connected to the piston and mechanism connecting said piece with the driving mechanism whereby the piston is caused to accomplish its travel in one direction in a relatively different time from that required for its travel in the opposite direction, substantially as described.

4. The combination of a cylinder, a piston operating therein, a crank connected to said piston, mechanism independent of the crank but constructed to periodically engage the same for turning it, and a spring arranged to be compressed during the suction-stroke of the piston and to move the piston on its pressure-stroke independently of the turning mechanism, substantially as described.

5. The combination of a cylinder, a plunger having a rearwardly-extended portion, a guide for the same, and a spring on said extended portion, an enlarged section on the rear of the plunger, having in it a slot, a block there-

in, a crank having a pin constructed to engage the block, with detachable means for turning the crank, the said spring being compressed by said turning means during a part of the revolution thereof and expanding to move the plunger independently of the turning means during the remainder of the revolution of said means, substantially as described.

6. In a pump the combination of a cylinder, a plunger therein, mechanism turning at a uniform rate for operating the pump, a crank movably attached to the plunger and detachably connected to the said operating means, the plunger being moved by the operating mechanism during its suction-stroke, and having means whereby it is moved independently of said mechanism during its discharge-stroke, substantially as described.

7. The combination in a pump for moving a fluid of a cylinder, a piston, an outlet-passage leading from the cylinder, a check-valve therein, a passage for the admission of fluid to the cylinder, said passage being at all times open to the same and of a cross-section relatively less than that of the outlet-passage, mechanism for reciprocating the piston, and a continuously-rotating device detached from the piston but constructed to periodically engage the same, with a device constructed to cause said piston to accomplish its pressure-stroke in a less time than that occupied by its suction-stroke substantially as described.

8. The combination of a cylinder, an inlet and an outlet thereto, a plunger having a slotted and a guiding section, a block constructed to be reciprocated in the slotted section, a crank for moving said block, a driving-wheel for the pump and a connection between said wheel and the crank, a spring on the guiding-section of the plunger, the same acting to separate the connection between the wheel and the crank once in every revolution thereof and piping connected to the cylinder for conducting the fluid pumped to the desired points, substantially as described.

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

WILHELM A. MAYBACH.

Witnesses:
WM. HAHN,
H. E. REICHARDS.