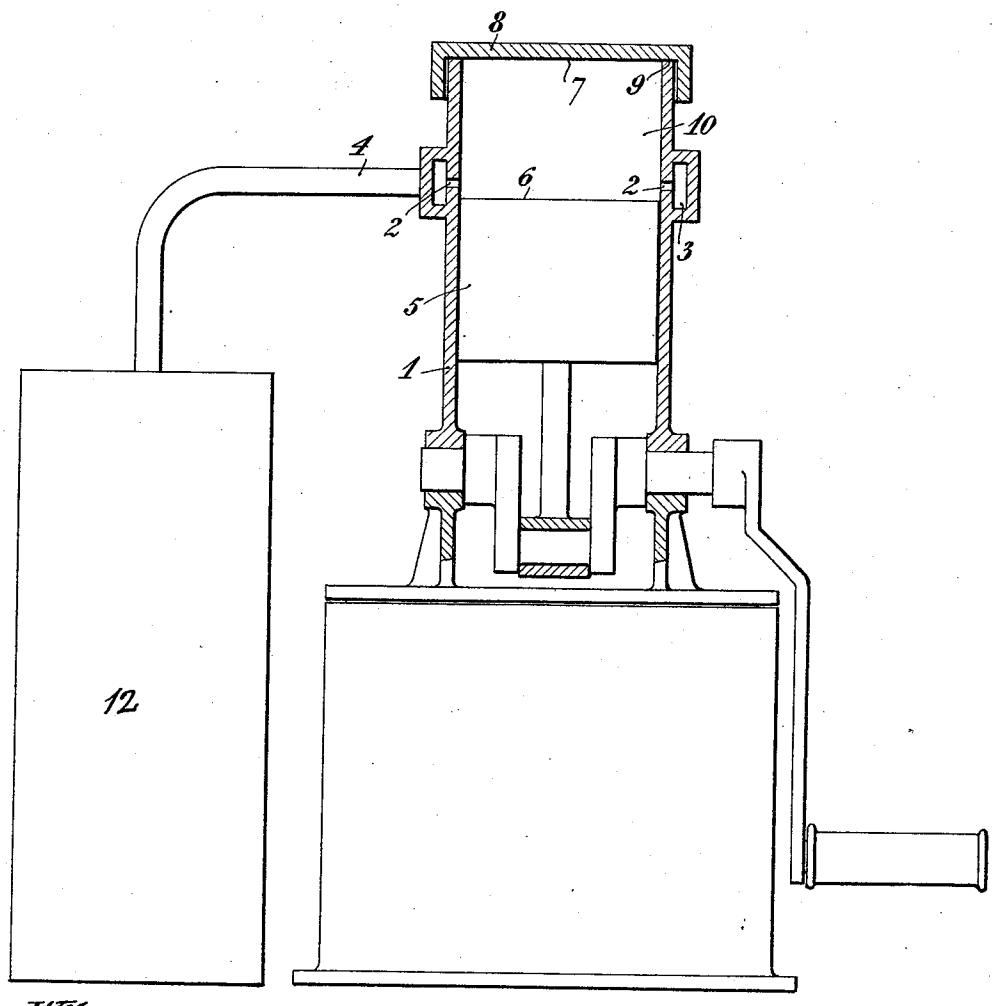
P. SCHOU.

AIR PUMP.

APPLICATION FILED JUNE 15, 1910.

**1,000,759.** Patented Aug. 15, 1911.




Witnesses.
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# UNITED STATES PATENT OFFICE.

PAUL SCHOU, OF COPENHAGEN, DENMARK.

## AIR-PUMP.

1,000,759. Specification of Letters Patent. Patented Aug. 15, 1911.

Application filed June 15, 1910. Serial No. 566,932.

*To all whom it may concern:*

Be it known that I, PAUL SCHOU, a citizen of the Kingdom of Denmark, residing in Copenhagen, in said Kingdom of Denmark, have invented certain new and useful Improvements in Air-Pumps, of which the following is a specification.

This invention relates to an improved piston air-pump by which by the special cooperation of the pump-piston with a movable cylinder-head the injurious space formed at the end of every stroke of the piston is reduced to zero so that on the return-stroke of the piston an extremely great rarefication of the air is obtained in a very simple manner.

In the accompanying drawing is shown one form of construction of a vertical piston air-pump, in which the figure represents a side-elevation, partly in section through the cylinder.

Referring to the drawing, 1 represents the pump-cylinder, which is provided in the usual manner with suction-openings 2 and an annular suction-space 3 which extends around the cylinder 1 and is connected with the suction-pipe 4 leading to a cooler 12. A tightly fitting piston 5, which is driven by a crank-shaft below the piston in the usual manner has a smooth upper face 6 that forms contact with the inner surface 7 of a movable cylinder-head 8, immediately before the piston arrives at the dead point of its stroke, and after the entire quantity of air or gas which has been sucked into the space 10 of the cylinder, has been forced out through the space between the upper edge 9 of the cylinder and the loosely fitting flange of the movable cylinder-head 8.

Inasmuch as the piston during the last portion of its stroke until it arrives at the dead point of its crank forms contact with the inner surface of the cylinder-head and exerts a slight lifting action on the same, the adjacent contacting surfaces of the piston and cylinder-head, which may be of any suitable shape, straight or curved, provided they correspond with each other, form such an intimate contact that no appreciable quantity of air or gases remains lodged between the same. Further, as on the return-stroke of the piston the cylinder-head 8, either by gravity or a suitable spring, or in any other manner, follows the movement of the piston until it is seated tightly on the upper edge 9 of the cylinder, and as up to this moment not the slightest quantity of air or gas can enter into the cylinder, the injurious space between piston-body and cylinder-head is reduced to zero in the most simple manner, so that during the further motion of the piston in downward direction beyond the suction-openings 2 and below the same—provided the piston is tightly packed—a practically complete rarefication of the air takes place in the space 10 of the cylinder, which by the continued stroke of the piston produces thereby in any space which is connected with the suction-pipe 4 a corresponding rarefication of the air.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

In a pneumatic pump, the combination of a cylinder, a piston guided in the same and having a stroke greater than the length of the cylinder, a pressure-valve located in the path of the piston when the same passes outside of the cylinder and the diameter of which is larger than the exterior diameter of the cylinder, and means for guiding said pressure-valve on the outside of the cylinder, said pressure-valve serving at the same time as the removable cover for the cylinder.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

PAUL SCHOU.

Witnesses:
I. HOFMAN-BANG,
E. MAURITZEN.