Nov. 23, 1926. 1,607,657

T. C. WHITEHEAD

PUMP CONSTRUCTION

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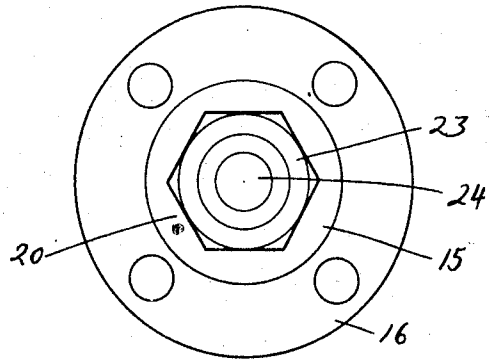

Fig. 2.

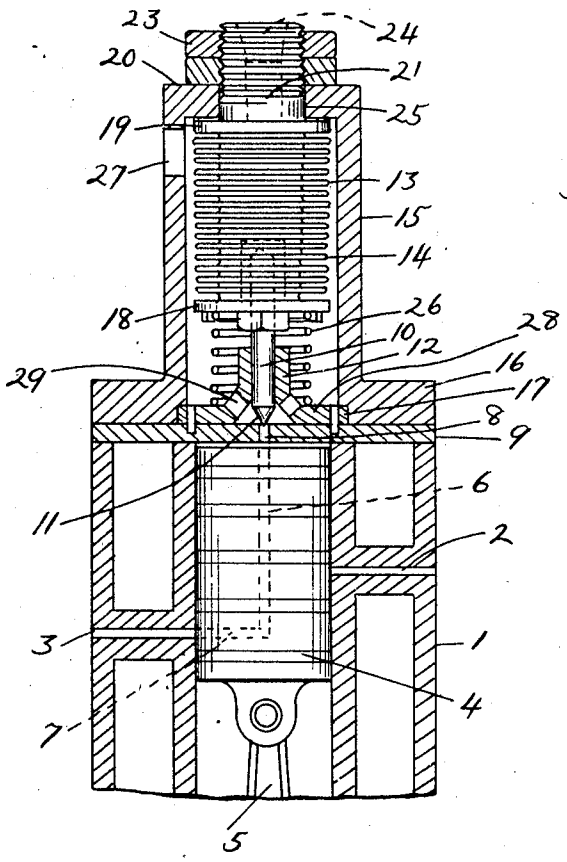

Fig. 1

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PUMP CONSTRUCTION.

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This invention relates generally to devices for relieving the compression within cylinders or chambers in which gaseous elements are compressed and refers more particularly to such devices that are designed for use in connection with the cylinders of refrigerating pumps for facilitating the starting operation of said pumps.

One of the essential objects of the invention is to provide a simple and efficient device that is adapted to be operated automatically for controlling the compression within the cylinder of a pump.

Another object is to provide a strong and durable device that can be manufactured at a very low cost.

With the above and other objects in view the invention consists in certain novel features of construction, combination and arrangements of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawing:—

Figure 1 is a central longitudinal sectional view through a pump and relief device embodying my invention;

Figure 2 is a top plan view of the relief device.

Referring now to the drawing in which like characters of reference designate corresponding parts through the several views, the numeral 1 designates a cylinder, preferably of a refrigerating pump having inlet and outlet passages 2 and 3 respectively for the gaseous refrigerating medium which is adapted to be compressed within the cylinder by means of a piston 4. This piston may be reciprocated within the cylinder by any suitable means such as a pitman 5 and is preferably provided with a longitudinally extending passage 6 which communicates with a transversely extending passage 7. Thus, when the piston is operated a partial vacuum will be formed in the cylinder upon the suction stroke until the inlet passage 2 is uncovered, whereupon the refrigerating gas will be admitted to the cylinder. On the reverse stroke of the piston the gas will be compressed until the transverse passage 7 in the piston registers with the outlet passage in the cylinder at the completion of the movement whereupon the compressed gas will be discharged through the outlet passage 3.

In order that the compression in the cylinder may be relieved to facilitate the starting of the pump, I preferably provide a small vent 8 in the head 9 of the cylinder. For controlling the opening and closing of this vent, there is a needle valve 10 having a tapered lower end 11 adapted to seat upon the upper edges of the vent 8. This valve extends upwardly through a flanged tubular guide 12 mounted on the cylinder head 9 and is preferably operated automatically by means of a thermostat 13. As shown, the thermostat is in the form of an expansible chamber or bellows 14 that is preferably disposed within a tubular casing 15 which has a flange 16 at the lower end thereof surrounding the flange 17 of the guide 12 on the cylinder head. The closed lower end 18 of the chamber is secured to the valve 10, while the upper end 19 of the chamber preferably abuts the top 20 of the casing 15 and is provided with a tubular projection 21 that extends upwardly through an opening 22 in the casing top 20. Suitable nuts 23 are preferably threaded upon the projection 21 to hold the upper end 19 of the chamber firmly against the casing top 20 while a suitable plug 24 is preferably used to close the passage 25 in the projection 21. If desired, a predetermined quantity of ethyl bromide may be introduced into the chamber 14 through the passage 25 in the projection 21 to facilitate the expansion and contraction of the chamber 14, while a suitable coil spring 26 is preferably disposed between the lower end 18 of the chamber and the flange 17 of the guide and cooperates with the chamber when contracted to hold the valve 10 unseated. In order that the gas escaping through the vent 8 may pass into the casing 15 and then out through the port 27 in one wall thereof, the guide 12 is preferably provided at its lower end with an outwardly flared portion 28 that connects into the flange 17 and is provided with a plurality of small openings 29 in communication with the vent 8.

In use, when the pump is not operating and is cold the chamber 14 will be contracted, hence the valve 10 will be unseated and the compression in the cylinder will be relieved so that it will be comparatively easy to start the pump. However, after the pump is started the chamber 14 will become heated through operation of the piston within the cylinder, and, as a result, will seat the valve upon the upper edges of the vent 8 in the cylinder head and will retain the

valve in seated position during the normal operation of the pump. Thus, it will be readily apparent that the compression in the cylinder will be controlled automatically by a very simple and practical device which may be readily applied to the cylinder heads of any suitable pump, internal combustion engine and the like. Moreover, the relief device is composed of relatively few parts which may be easily and quickly assembled, hence, the cost of manufacture is reduced to a minimum.

While it is believed that from the foregoing description, the nature and advantages of the invention will be readily apparent, I desire to have it understood that I do not limit myself to what is herein shown and described, and that such changes may be resorted to when desired as fall within the scope of what is claimed.

What I claim as my invention is:

1. The combination with a cylinder having a vent for relieving compression, of means for controlling the opening and closing of said vent, said means including a valve engageable with the vent, a guide for the valve secured to the cylinder, and a thermostat for operating the valve.

2. The combination with a cylinder having a vent for relieving compression, of means for controlling the opening and closing of said vent, said means including a valve engageable with the vent, a casing into which said vent opens, and a thermostat within the casing for operating the valve.

3. The combination with a cylinder having a vent for relieving compression, of means for controlling the opening and closing of said vent, said means including a valve engageable with the vent, a casing enclosing the valve, a thermostat within the casing connected to the valve for operating the same, said thermostat having a tubular projection extending through the casing, and means for securing the extension to the casing.

4. The combination with a cylinder having a vent for relieving compression, of means for controlling the opening and closing of said vent, said means including a needle valve engageable with the vent, a tubular guide for the valve secured to the cylinder and having an opening communicating with the vent, a casing over the valve and guide and having an opening therein, and a thermostat within the casing for operating the valve, said thermostat being secured to said casing and to said valve.

In testimony whereof I affix my signature.

THOMAS C. WHITEHEAD.