

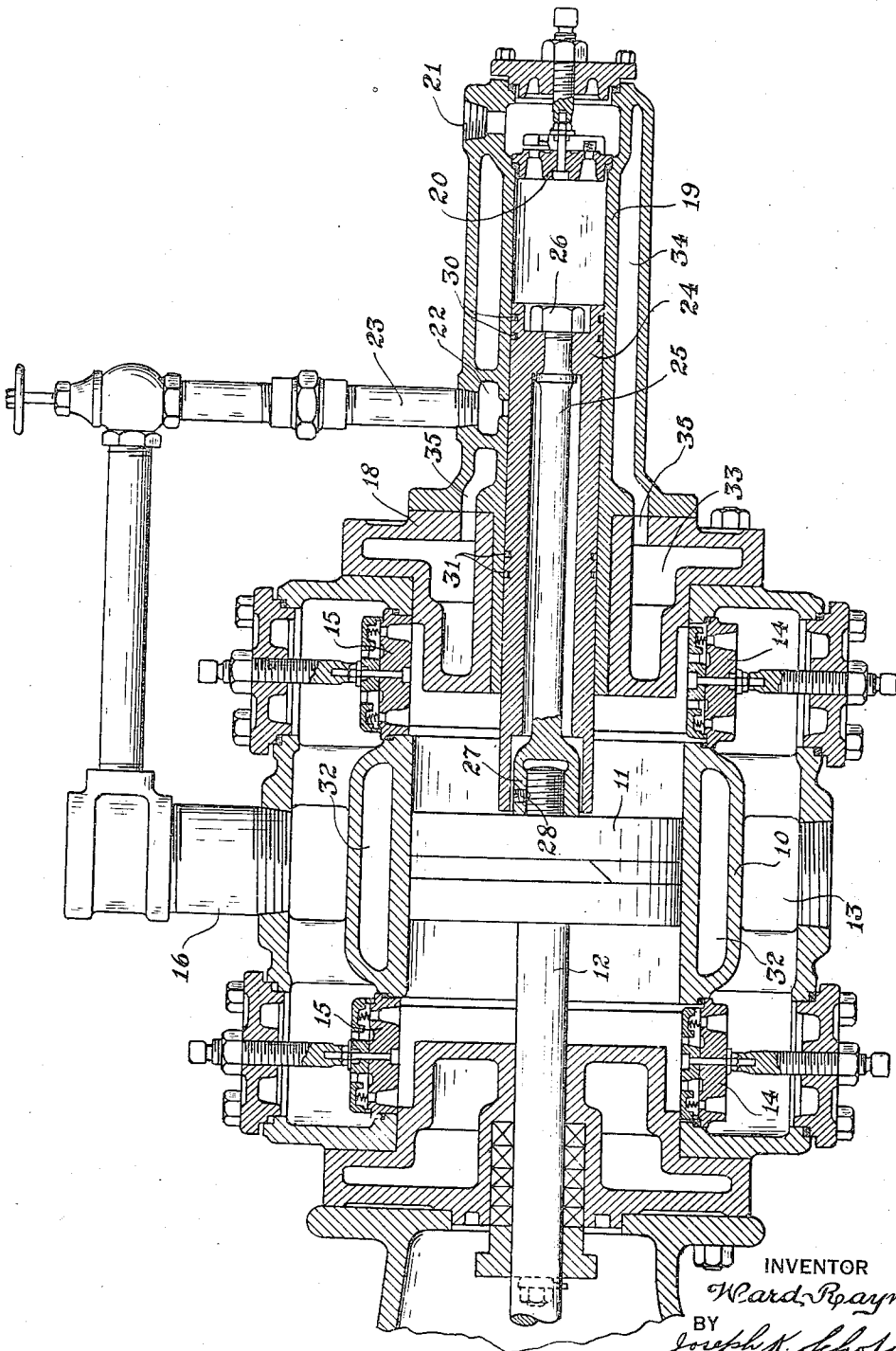
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W. RAYMOND

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COMPRESSOR

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COMPRESSOR.

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To all whom it may concern:

Be it known that I, WARD RAYMOND, a citizen of the United States, residing at Easton, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Compressors, of which the following is a specification.

This invention relates to compressors and in particular to an attachment for a compressor enabling a portion of the fluid discharged to be further compressed.

Frequently in the use of compressed air or other compressed fluid, a small quantity of fluid is required at a pressure materially above the pressure of the fluid normally supplied. Also the amount of fluid compressed to the higher pressure may be so small that a separate high pressure compressor would be extremely expensive and little used. It has therefore been proposed to provide an auxiliary cylinder adapted to be attached to a compressor and operated directly from the reciprocating parts of the main compressor. It is therefore an object of the present invention to provide an improved form of auxiliary or booster cylinder for a standard type of compressor.

More particularly it is an object of the invention to provide an improved form of attachment for this booster cylinder and its piston to the parts of the standard compressor.

Another object of the invention is to provide means to directly attach the booster cylinder to a cylinder head of special form mounted on the main compressor.

A further object is to attach the piston operating within the booster cylinder to the piston of the main cylinder so that it may have a limited amount of adjustment relatively thereto.

A feature of the invention therefore comprises the special connecting means between the two pistons permitting proper operation of the pistons when not in exact alignment with each other.

Another object of the invention is to connect the piston of the main compressor with the piston of the auxiliary cylinder by means of a flexible connecting link extending from the head end of the main piston to the corresponding end of the booster or auxiliary piston. A feature of this connection is that it is slightly flexible and therefore permits

slight variations in position of the booster piston relative to the main piston.

Another main feature of the invention comprises the placing of packing rings upon the booster piston so disposed that leakage is prevented between the two cylinders. And another feature comprises directly connecting the cooling systems of the two cylinders.

With the above and other objects in view, my invention consists in the features of construction and operation set forth in the following specification and illustrated in the accompanying drawing.

In the accompanying drawing annexed hereto and forming a part of this specification, I have shown my invention embodied in a well known type of fluid compressor; the drawing, however, is not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

In the drawing the figure shows a longitudinal sectional view through a compressor provided with the present form of booster cylinder.

In the above mentioned drawing, I have shown but one modification of the invention which is now deemed preferable but it will be understood that changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

Referring more particularly to the figure of the drawing, at 10 is shown the cylinder of any standard or usual type of compressor having a piston 11 and piston rod 12. As these parts and the means for actuating the piston 11 within the cylinder 10 are conventional, further description is not thought necessary. The cylinder 10 is provided with an intake 13 and intake valves 14 preferably in the lower half thereof and with discharge valves 15 and discharge conduit 16 in the upper part. These parts all are, or may be, those usually found in compressors of standard form.

The main cylinder head 18 of the compressor shown in the drawing is provided with an axially extending opening through which extends one end of the auxiliary or booster cylinder 19. The cylinder head 18 is fastened in any desired manner directly to the cylinder 10, and the auxiliary cylinder 19 is attached to the cylinder head 18 so that

it extends in axial alignment with the cylinder 10. As presently described the alignment of these cylinders does not have to be precisely correct, means being provided to compensate for any inaccuracies in this adjustment.

At the head end of the auxiliary cylinder is a discharge valve 20 and beyond this valve is the discharge passage 21. At a mid position of the auxiliary cylinder 19 is the inlet passage 22 which may be in connection with the discharge conduit 16 of the main cylinder 10 by means of the connection 23.

Within the cylinder 19 operates a piston 24, the one shown being single acting and of trunk form. Piston 24 is preferably hollow and at its head end is fastened to a connecting rod or link 25 by means of the nut 26. The opposite end of the link or rod 25 is enlarged and provided with internal screw threads 27 which engage with the screw threads on the head end of the connecting rod 12. Preferably a small set screw 28 is provided to prevent loosening of the rod 25 relative to the rod 12.

It will be seen from the above that the two pistons 11 and 24 are connected by means of a relatively long flexible link or rod extending between corresponding ends of the two pistons 11 and 24. By means of this connection a certain limited amount of flexibility is permitted between the two pistons and should the two cylinders 11 and 19 be out of alignment slightly the pistons will operate satisfactorily.

Near the head end of piston 24 are packing rings 30 to prevent fluid being compressed by means of piston 24 flowing past the trunk piston and into the inlet passage 22. Also packing rings 31 are provided approximately mid-way along piston 24 forming pressure-tight means preventing fluid from the cylinder 19 or from the inlet 22 flowing back into the cylinder 10.

It will be noted from the drawing that cooling passages 32 are formed within the casting forming the cylinder 10 as is usual in this type of compressor. Also a passage 33 or opening is formed within the cylinder head 18 permitting a flow of cooling water

to be circulated through this head 18. As it is also desirable to provide cooling means for the cylinder 19 I preferably provide an annular opening 34 in the casting forming this cylinder 19. This opening 34 as shown may be directly in communication with the opening 33 in the cylinder head 18 by means of connecting passages 35. By these means a continuous flow of liquid from the cylinder head 18 may be circulated through the walls of the auxiliary cylinder without additional water connections.

What I claim is:

1. A compressor comprising in combination, a main cylinder having a piston therein, an auxiliary cylinder attached thereto, a cylinder head for said main cylinder having an axial opening therethrough, said auxiliary cylinder being attached to said cylinder head and extending into its opening, a trunk piston in said auxiliary cylinder, and means connecting said pistons whereby they may be operated by common driving means.

2. A compressor comprising in combination, a main cylinder having a piston therein, an auxiliary cylinder attached thereto, a cylinder head for said main cylinder having an axial opening therethrough, said auxiliary cylinder being attached to said cylinder head and extending into its opening, a trunk piston in said auxiliary cylinder, and a flexible link connecting corresponding ends of said pistons whereby they may be operated by common driving means while permitting operation while slightly out of alignment.

3. A compressor comprising in combination, a main cylinder having a double-acting piston therein, an auxiliary cylinder attached to said main cylinder, a single-acting piston in said auxiliary cylinder adapted to compress a portion of the fluid delivered from the main cylinder, means connecting said pistons whereby they may be driven by a common driving means, and pressure-tight means preventing fluid from passing directly between the cylinders.

In testimony whereof, I hereunto affix my signature.

WARD RAYMOND.