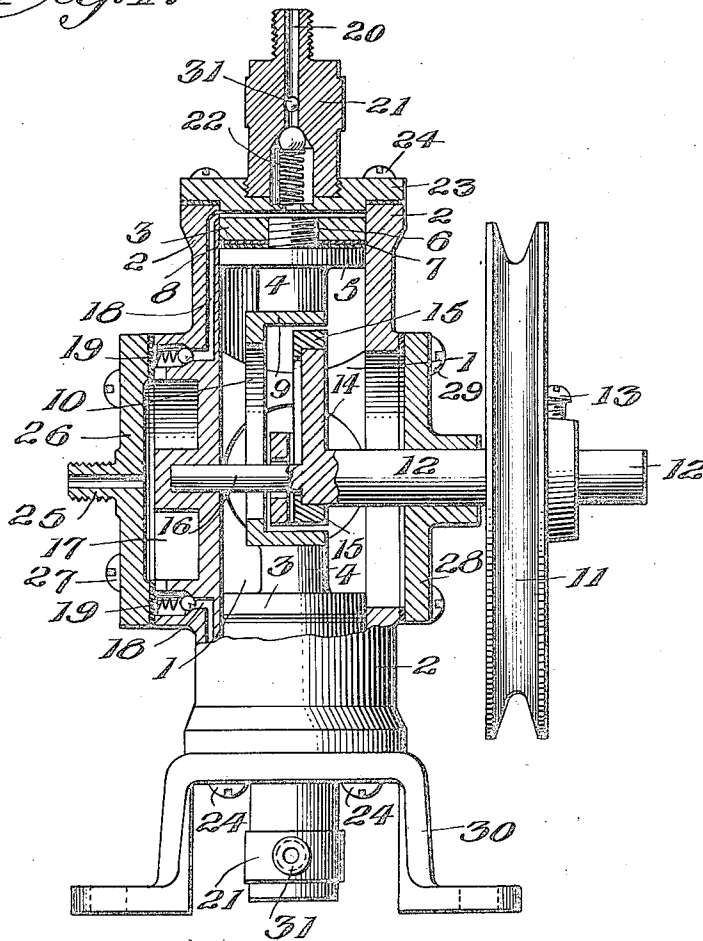


J. NOGUERA.
AIR COMPRESSOR.
APPLICATION FILED JULY 15, 1920.

1,383,657.

Patented July 5, 1921.
3 SHEETS—SHEET 1.

Fig. 1.



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Fig. 3.

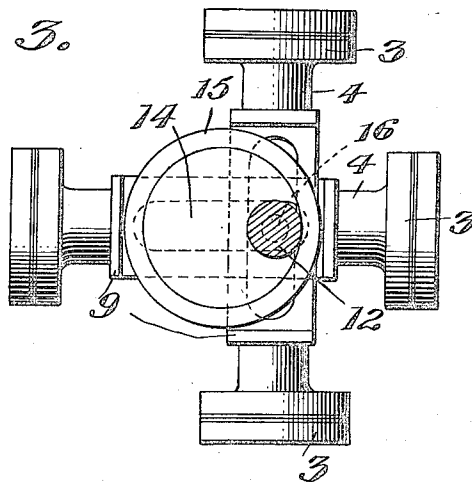
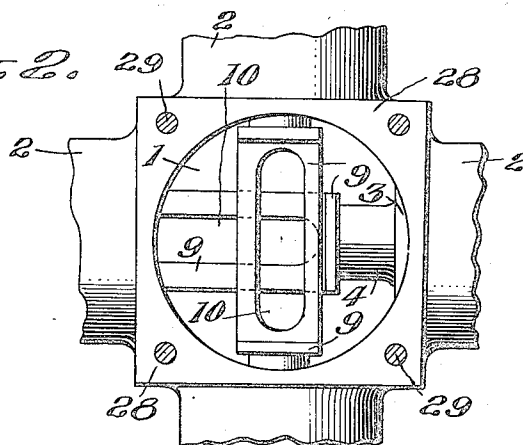


Fig. 2.



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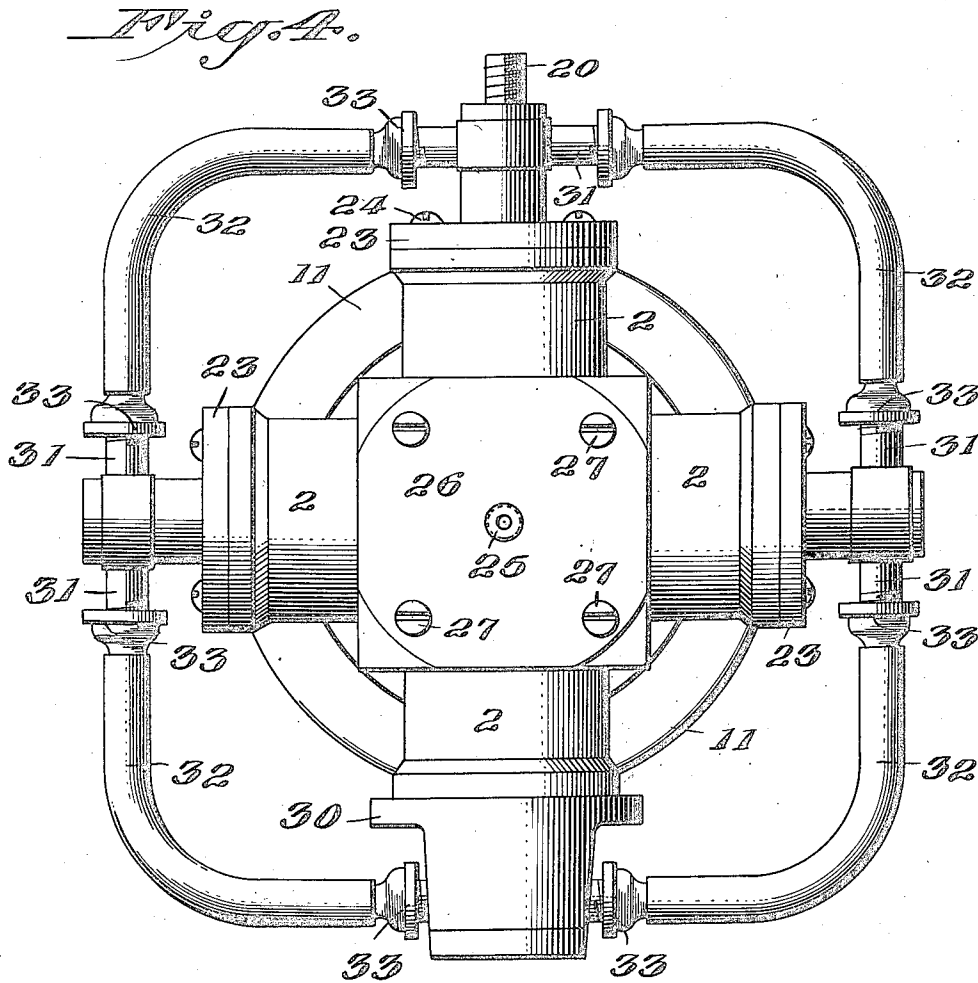
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UNITED STATES PATENT OFFICE.

JUAN NOGUERA, OF BUENOS AIRES, ARGENTINA.

AIR-COMPRESSOR.

1,383,657.

Specification of Letters Patent.

Patented July 5, 1921.

Application filed July 15, 1920. Serial No. 396,568.

To all whom it may concern:

Be it known that I, JUAN NOGUERA, subject of the King of Spain, residing at 372 Facuari street, Buenos Aires, Republic of Argentina, have invented certain new and useful Improvements in Air-Compressors, of which the following is a specification.

This invention relates to certain improvements in air compressors and has for its object the provision of an apparatus adapted to be used as a vacuum pump for the compression of air or similar fluids, of very simple construction and continuous operation, from which the difficulties inherent in the construction and operation of the air compressors of known construction have been eliminated.

The invention further has for object to provide an apparatus of the kind set forth, of large yield and economical in operation and not liable to readily get out of working order.

In order that the invention may be readily understood and carried into practice without difficulty, a preferred form of construction of the same has been shown in the accompanying drawings, in which:

Figure 1 is a side elevation, partially sectional, of an apparatus in accordance with this invention and constructed as a vacuum pump.

Fig. 2 is a front elevation of the middle part of the apparatus, with one of its caps removed.

Fig. 3 shows the pistons with their rods and the eccentric device for operating the same.

Fig. 4 is an outer front view of the complete apparatus.

In all the said figures, the same numbers of reference indicate like or corresponding parts.

In the form of construction shown, the apparatus consists of a central casing 1, having four cylinders 2 formed integral therewith and arranged at angles of 90 degrees apart. In the interior of said cylinders move the plungers 3, connected together pairwise, as hereinafter described, whereby alternating motion is imparted to the same. Each plunger consists of an enlarged cylindrical part 5, integral with a rod or stem 4 and provided on its outer side with a threaded extension 6, on which are arranged the washers 7 to provide for the tight play of the plunger, while on the end of said extension 6 a cylindrical cap 8 is screwed after the manner well known in this kind of

plungers. In order to arrange the plungers in line, their stems are joined together by connecting pieces 9, one of which is bent into the form of a U, each of said connecting pieces being provided at its opposite ends with lateral shoulders or projections on which operates the eccentric hereinafter to be referred to. These shoulders or projections are detachably connected with the plunger stems 4 in some suitable manner to permit the insertion and removal of the plungers. Each connecting piece is provided with an elongated slot 10 through which extends the driving shaft and which allows of the motion of said plunger rods. 11 indicates a drive pulley to which motion is imparted from any suitable source of power, said pulley being fastened to the shaft 12 by means of a screw 13 or in any other convenient manner.

It will be evident that motion may also be transferred to the shaft 12 by means of suitable arrangements other than that shown and described herein, independently of this invention. A strap 15 encircles an eccentric disk 14 which is mounted on or constructed integral with said shaft 12 the parts 14 and 15 thus conjointly forming an eccentric for operating the plungers of the pump. The shaft 12 extends at 16 beyond the opposite side of the eccentric and through the slots 10 of the connecting pieces 9, said shaft rotating in bearings mounted in the caps of the central casing 1.

From the foregoing it will be understood that the operation of the plungers will be continuous and alternate, the apparatus according to the construction shown working as a four cylinder compressor or pump. At the left of the central casing 1 is provided a bearing in which rotates the extension 16 of the driving shaft. Surrounding the said bearing and on the outside of the casing is formed a cavity 17 of annular shape which constitutes an air chamber for the reception of the compressed air coming from each of the cylinders 2 and which passes through the ducts 18 leading from the outer ends of the cylinders, each duct being provided with a ball valve 19.

20 is the fluid inlet port formed within the threaded end of a nipple 21, screwed on the head of each of the cylinders 2. Said nipple contains the ball valve 22. The heads or caps of the cylinders, shown at 23, are secured to the ends of the same by means of the bolt screws 24.

25 is a nipple, provided with an outer thread, for the discharge of the compressed fluid from the compressor or pump, said nipple being formed integral with the cover or cap 26 which closes the chamber 17 and is fixed in position by means of screws 27.

28 is the cover for closing the central casing 1, secured in position by means of the screws 29. In said cover is formed a bearing for the shaft 12.

One of the covers or caps 23 of the cylinders, preferably the lower one, is constructed with an integral base plate 30, secured in position by means of screws, as are the caps of the other cylinders. Said cover may be provided with suitable means for securing the same to any support which may be desired; however, if deemed convenient, the caps or covers of all cylinders may be alike, in which case the base plate 30 is dispensed with.

In communication with the inlet opening 20 of the apparatus for the air or other fluid, through the part 21, are lateral threaded extensions or pipe sections 31 to which by means of threaded couplings 33 are connected the collecting pipes 32 which connect all the inlet ports of the cylinders.

It will be understood that when the apparatus is being used as a vacuum pump, as in the case shown, only one inlet port 20 for the admission of the fluid will be provided in one of the cylinders, instead of arranging an inlet in each of the cylinders.

When the apparatus is to be used as a compressor, the arrangement may be similar, although it may be convenient to eliminate the connecting pipes 32 and allow the air to enter directly into each of the cylinders.

2. For that purpose, it may be sufficient to simply remove said connecting pipes; or the nipple sections 21 may be formed with the inlet ports 20, in which case the lateral extensions 31 of the same are dispensed with.

All the covers of the cylinders and of the apparatus are provided with suitable packing washers, so as to assure a tight working of the apparatus.

As will be seen from the drawings, the apparatus according to this invention is of an extremely simple construction and access may be readily obtained at any time to all parts of the same, by simply removing the covers or heads 23 of the cylinders and the covers or heads 26 and 28 on both sides of the central casing 1.

The operation of this apparatus need not be explained, as the same will be specifically readily understood from the foregoing description. The uses to which the same can be applied, may also vary and the dimensions of the apparatus will depend upon such uses.

It will be evident that several modifications or changes of construction and details

may be introduced, without departing from the scope of this invention, as hereinafter claimed. Thus, instead of using four cylinders 2, a greater or lesser number of the same might be employed, arranged, however, in all cases pairwise, or diametrically opposite, as will readily be understood.

Having now described my said invention, I declare that what I claim as new and desire to secure by Letters Patent, is:

1. In an apparatus of the character described, the combination of a casing; a plurality of oppositely-located pairs of cylinders disposed radially of and connected to the casing; a piston working in each cylinder; a connecting rod between the pistons of each pair of cylinders, each rod having a central longitudinal slot and being provided at its ends with lateral shoulders projecting in the same direction; said rods directly crossing each other so as to cause intersection of their slots; a central drive shaft extending through said casing and said slots; a single eccentric fixed to said shaft for action directly against the shoulders of all of said rods to reciprocate the same and thereby the pairs of pistons connected to them; fluid inlet means associated with said cylinders; a collecting chamber in said casing; and a valve-controlled duct leading from each cylinder to said chamber to deliver to the latter the fluid compressed in said cylinders by said pistons.

2. In an apparatus of the character described, the combination of a casing; a plurality of oppositely-located pairs of cylinders disposed radially of and connected to the casing; a piston working in each cylinder; a connecting rod between the pistons of each pair of cylinders, each rod having a central longitudinal slot and being provided at its ends with lateral shoulders projecting in the same direction; said rods directly crossing each other so as to cause intersection of their slots; a central drive shaft extending through said casing and said slots; a single eccentric fixed to said shaft for action directly against the shoulders of all of said rods to reciprocate the same and thereby the pairs of pistons connected to them; a collecting chamber in said casing; a valve-controlled duct leading from each cylinder to said chamber to deliver to the latter the fluid compressed in said cylinders by said pistons; a nipple connected to the head of each cylinder and communicating with the interior of the cylinder, one nipple having an inlet port for the fluid to be compressed; and pipes connecting all of the nipples together to enable the fluid admitted to the ported nipple to be supplied therefrom to the remaining nipples.

In testimony whereof I affix my signature.

JUAN NOGUERA.