Aug. 25, 1931. H. HUEBER 1,820,883

PUMP

Filed July 31, 1929

Fig. 2

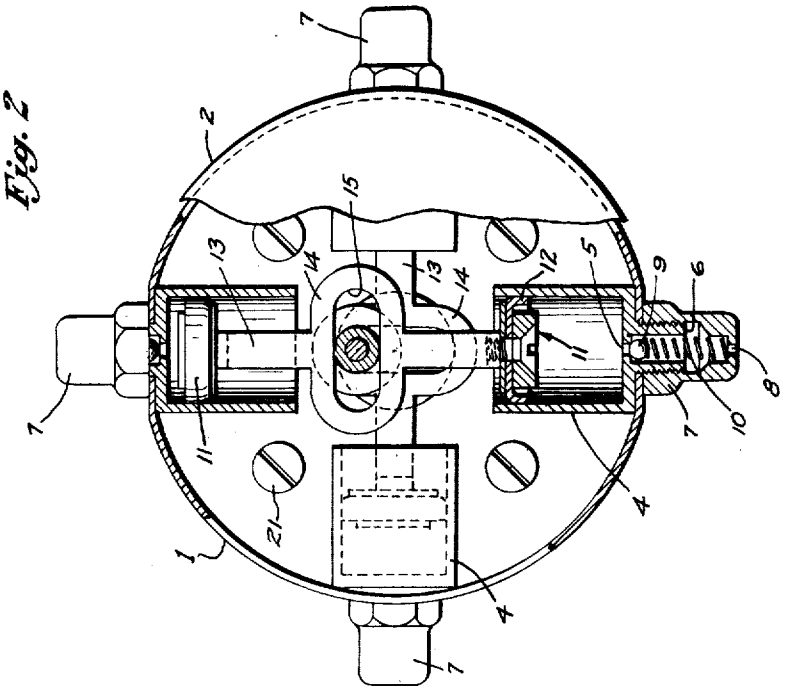
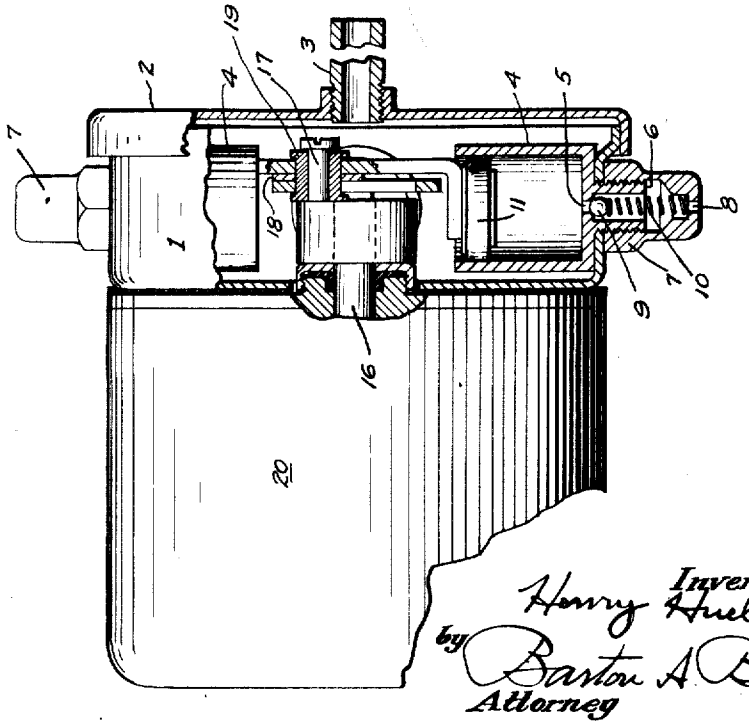


Fig. 1



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Patented Aug. 25, 1931 1,820,883

UNITED STATES PATENT OFFICE

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PUMP

Application filed July 31, 1929. Serial No. 382,522.

This invention relates to a pump of a multi-cylinder type, the present pump being primarily designed to provide a compact unit or assembly producing an ample supply of pressure suitable for the operation of small devices, such as certain automobile accessories.

Further, the invention has for its aims and objects to provide an efficient pump embodying a plurality of pump cylinders enclosed in a pump housing having a common inlet and acting to withdraw fluid from within the housing and expel it to the exterior thereof; to provide a pump housing with a radial arrangement of cylinders secured to the surrounding wall thereof and having their exhaust conduits or passages serving as supports for the several cylinders; to provide a common drive for the several pump elements; and to provide a simple, high-speed pump capable of being motor-driven and adapted for the production of negative pressure or suction, all tending toward simplicity in design and efficiency in operation.

The invention further resides in the detailed mounting of the cylinders, in the arrangement of the pistons and their cooperating drive, and in the structural features and combinations of parts hereinafter more fully set forth, reference being had to the accompanying drawings wherein,

Fig. 1 is a side view partly in section of the improved pump.

Fig. 2 is a partial transverse section through the improved pump.

Referring more in detail to the accompanying drawings, the pump housing comprises substantially a cylinder-supporting cup-shaped body 1 and a cover 2 in which the intake nipple 3 is secured, the cover 2 fitting the body 1 with an air-tight joint so that any fluid entering the interior of the housing will enter through the inlet 3 to which latter a section operated mechanism may be connected, such as a windshield cleaner.

Within the housing is a plurality of radially disposed cylinders 4 opening at their inner ends into the housing and closed at their outer ends except for the exhaust ports 5 which open through threaded nipples 6 into the atmosphere. These nipples are projected through openings provided in the surrounding wall of the body 1 and are adapted to receive cap nuts 7 which clamp the body wall against the adjacent ends of the respective cylinders and thereby constitute means for mounting the cylinders within the pump housing. Each clamping nut 7 is formed with an escape port 8 and the exhaust port 5 is closed against ingress of air by a valve 9 backed by a spring 10 which is confined between the nipple 6 and its nut. Consequently, outward movement of the piston 11 within the cylinder will unseat the valve 9 and expel fluid from the cylinders out through the ports 5 and 8, and when the piston moves inwardly the valve 9 will seat to close the port 5. The fluid within the housing will escape past the outwardly cupped packing 12 of the piston into the cylinder which will be expelled on the next outward movement of the piston. Thus, the fluid within the pump housing is constantly being removed to create an inflowing current of fluid at negative pressure through the inlet 3.

The cylinders are arranged radially and extend inwardly from the surrounding wall and body with their inwardly opening ends spaced apart to accommodate the drive mechanism therebetween. The pistons are here depicted as being coupled together in pairs by means of a piston rod 13 which is provided centrally with a transverse head 14 having a slot 15 also disposed transversely of the path of movement of the pistons. By this arrangement the cylinders are also grouped into pairs with the cylinders of each pair being arranged in alinement. The connecting rods of the pistons have their transverse heads 14

overlying each other, and their slots 15 crossing one another.

A drive shaft 16 carries a crank pin 17 for operating in the crossing slots 15 so that as the crank pin 17 revolves about the axis of the shaft 16 the piston rods will be given straight reciprocatory motion along paths of movement at an angle to each other. By this motion the several pistons will be successively moved radially outwardly and then inwardly for the production of negative pressure at the inlet 3. The crossing portions of the piston rods are spaced by an interposed washer 18, and for anti-frictional reasons a roller 19 is mounted on the crank pin 17. The drive shaft 16 is depicted as being the shaft of an electric motor 20 on the frame of which the pump housing is attached by screws 21.

By the plural arrangement of the small cylinders and their cooperating pistons a series of suction impulses will be provided in rapid succession so as to create practically a steady flow of negative pressure or suction through the housing intake 3 to which is connected the mechanism or apparatus to be operated by low pressure. The pump is small and compact and performs efficiently in its operation at high speed, as when driven by the electric motor 20. The parts are readily accessible by the removal of the cover 2, and the assembly is simple, the cylinders being supported by the protruding nipples 6 which also constitute the outlet or exhaust ports.

When used for an accessory, such as a windshield cleaner of an automobile, the hose from the cleaner is slipped over the nipple 3 and the pump then set in operation. The air is drawn from the windshield cleaner into the pump housing 1 where it is readily expelled by the several cylinders to the atmosphere.

What is claimed is:

1. A suction pump comprising a substantially air-tight housing having an intake passage, a plurality of cylinders secured to the inner wall of the housing in opposing pairs and opening at their inner ends into the housing, said cylinders being unsupported inwardly from said inner wall and having exhaust ports opening to the exterior through the housing wall, a piston in each cylinder connected in tandem with the piston of the opposing cylinder, and means for imparting movement to the pistons.

2. A suction pump comprising a substantially cup-shaped body having a plurality of openings in the surrounding wall, a cover having an air-tight fit thereon and provided with an air inlet, a plurality of cylinders arranged radially within the body and having anchoring parts projecting outwardly through the openings of the body wall, clamping nuts on the protruding portions of said anchoring parts for securing the respective cylinders in position on the body wall, a valve controlled exhaust passage in each cylinder through its anchoring part, a piston in each cylinder, a piston rod connecting the pistons in pairs and provided with transverse slots, the transverse slot of one piston rod crossing the slot of the adjacent piston rod, and a drive shaft having a crank part engaged in the slots of said piston rods for operating the same.

3. A suction pump comprising a housing having a surrounding wall provided with spaced openings therein, a plurality of cylinders arranged within the housing and having outwardly projecting and tubular anchoring parts protruding through the openings of said housing wall, a cap nut engaging the protruding anchoring part of each cylinder and clamping against the outer wall of the housing for securing the cylinder in position against the inner wall of the housing, said anchoring part having an exhaust port and said cap having an escape opening, a valve seating inwardly to close the exhaust port of the cylinder against ingress of fluid, a spring confined by the nut and acting to seat the valve, pistons operating in the cylinders, and means for operating the pistons.

4. A suction pump comprising a housing having a surrounding wall provided with spaced openings therein, a plurality of cylinders arranged within the housing, means protruding through the openings of said housing wall for anchoring the cylinders to the wall, said anchoring means having an exhaust port therethrough for each cylinder, a valve seating inwardly to close the exhaust port of the cylinder against ingress of fluid, and means engaged with the protruding parts of said anchoring means for cooperating therewith in securing the cylinders to the housing, pistons operating in the cylinders, and means for operating the pistons.

5. A pump comprising a plurality of cylinders, a housing therefor having a port common to all the cylinders, said port opening into the housing and said cylinders also opening into the housing and having independent ports opening to the exterior atmosphere, pistons operable in the cylinders, each piston fitting its cylinder loosely and having flexible cupped packing cupped toward one end of its cylinder whereby upon movement of the piston toward the opposite end of the cylinder said cupped packing will flex to permit the passage of fluid by the piston, and a common drive for the several pistons.

6. A suction pump comprising a body having a surrounding wall provided with a plurality of openings, a plurality of cylinders arranged radially within the body and each cylinder having an anchoring part projecting from the outer end thereof and through an opening in said wall, said anchoring part having an exhaust passage therethrough, a valve in each exhaust passage closing inwardly, a clamping nut engaged on the protrud-

ing end of each part for cooperating therewith in securing the respective cylinder to the body wall, each cylinder being otherwise unsupported inwardly from the wall, said clamping nut having a passage therethrough in communication with the respective exhaust passage, a spring confined between each clamping nut and its associated valve for normally urging the valve to its seat, a piston in each cylinder having means to by-pass fluid thereby, and means for operating the pistons.

HENRY HUEBER.

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CERTIFICATE OF CORRECTION.

Patent No. 1,820,883. Granted August 25, 1931, to

HENRY HUEBER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, lines 31 and 37, for the word "drawings" read drawing, and line 44, for the word "section" read suction; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of October, A. D. 1931.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)

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