

Jan. 11, 1938.

H. ALLEN

PUMP

Filed June 29, 1934

2,105,067

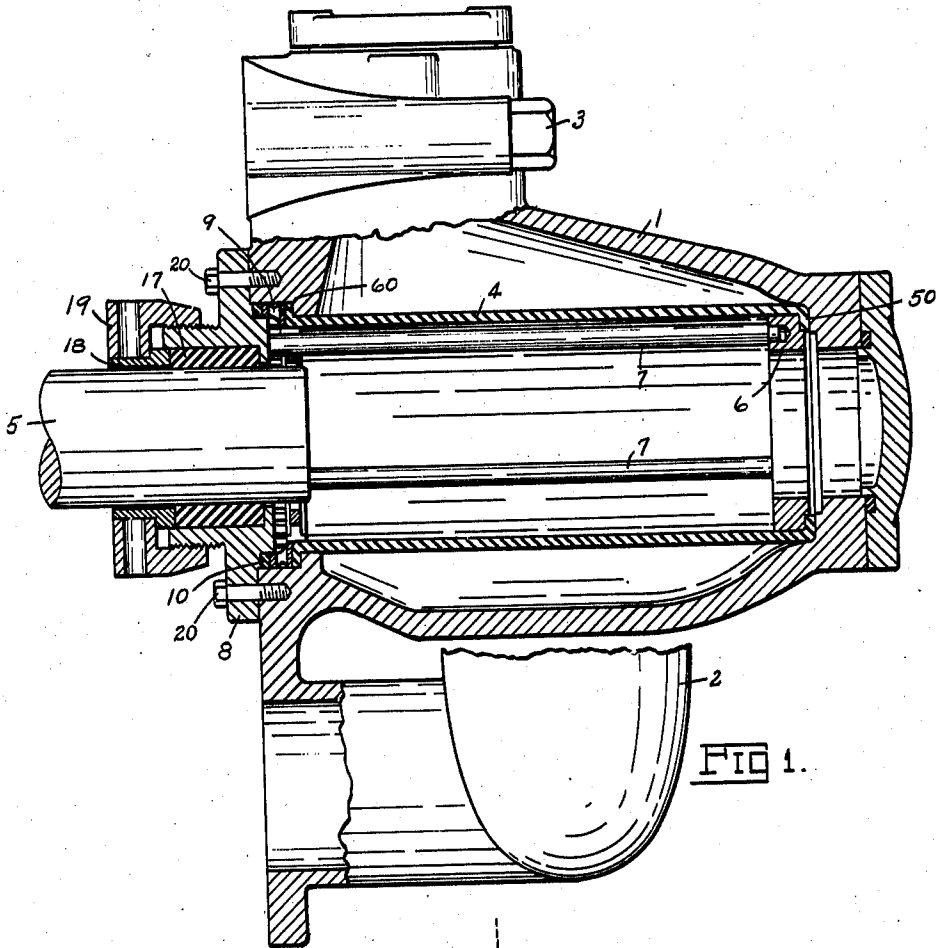
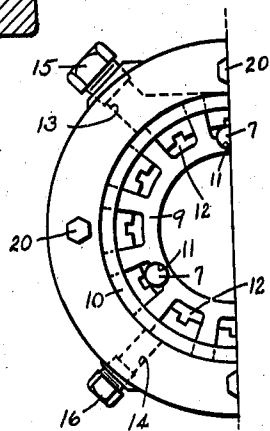


FIG 2.

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Patented Jan. 11, 1938.

2,105,067

UNITED STATES PATENT OFFICE

2,105,067

PUMP

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Application June 29, 1934, Serial No. 733,079

11 Claims. (Cl. 103-44)

This invention relates to pumps of the type shown by the patent to Stephens 1,832,258, that is, pumps designed for pumping abrasive and corrosive fluids.

It has for its specific object the provision of new and improved means whereby the expansible hollow pumping member may be mounted in its barrel and filled with pumping fluid.

Other objects will hereinafter appear.

The preferred embodiment of the invention is illustrated by the accompanying drawing, wherein Fig. 1 is a fragmentary partly sectional elevation of one barrel of a pump with the hollow expansible member mounted therein; and Fig. 2 is a half elevation of the pump barrel from the cylinder head end, the cylinder head being removed to show the sleeve-retaining ring.

In the drawing the barrel of the pump is indicated at 1, and the valved inlet and outlet means at 2 and 3. Within the barrel 1 is the hollow expansible pumping member 4 which is filled with pumping fluid as hereinafter set forth, which pumping fluid is actuated by the reciprocating piston 5 to expand and contract the hollow expansible pumping member 4 to draw pumped fluid into the barrel through the inlet 2 and to expel it from the barrel through the outlet 3. When the piston 5 moves to the right on its discharge stroke, the hollow expansible member 4 is expanded, the valve (not shown) of the inlet means 2 remains closed and the valve (not shown) of the outlet means 3 opens, and the pumped fluid in the barrel 1 is expelled through the outlet means 3. When the piston moves to the left on its return stroke the hollow expansible member 4 contracts, the valve (not shown) of the outlet means 3 closes, and the valve (not shown) of the inlet means opens, and a fresh charge of pumped fluid is thereby drawn into the barrel 1 through the inlet means 2.

Referring now to the new and useful improvements provided by this invention, it will be noted that the member 4 has an internal annular flange 50 at one end, and an external annular flange 60 at the other end. The internal flange 50 is held in sealing engagement with the adjacent inner end of the barrel 1 by the first ring 6 which is in turn held in place by the rods 7 extending therefrom to and bearing against the removable head 8, the head 8 being secured in place by suitable bolts 20. The external flange 60 is held in sealing engagement with the shoulder of a counter-bore in the other or outer end of the barrel 1 by a ring 9 which is engaged by gasket 10 pressed inwardly by the head 8.

The flanges 50 and 60 serve to prevent leakage between the interior of the pumping member 4 and the space between said member and the barrel 1, and the gasket 10 serves to prevent leakage to the exterior of the barrel 1. When the head 8 is tightened in place by the bolts 20, the flanges 50 and 60 and gasket 10 are simultaneously compressed. The outer ends of the rods 7, which may be three or more in number, pass through the ring 9 into engagement with the head 8 through circumferentially spaced openings 11 (Fig. 2) in the ring 9; and the ring 9 is provided with fluid passageways 12 communicating with the inlet duct 13 and outlet duct 14 which are normally closed by plugs 15 and 16, respectively. As the pumping fluid escapes from the member 4 through the packing 17 (Fig. 1) held in place by the gland 18 and nut 19, through which the piston 5 reciprocates, it must be replaced at intervals, and if air enters the member 4 it must be permitted to escape. When the plugs 15 and 16 are removed, the duct 13 may be utilized for the admission of additional pumping fluid and for venting the air from the member 4, and the lower duct 14 may be used as a drain.

It will be obvious from the foregoing that if it is desired to replace the sleeve 4, this may readily be done, as the parts just described may be quickly and easily taken apart and assembled. And when the parts are assembled, the flanges 50 and 60 of the member 4 are between the pumping fluid in the member 4 and the pumped fluid in the space between the member 4 and barrel 1, and are therefore subjected only to a few pounds per square inch pressure differential. In prior constructions, the corresponding flanges were disposed between the pumping fluid and the atmosphere, and were subjected to a great pressure differential, and to sustain it were made of material harder than the body of the pumping member. The bonding of a hard flange to the softer material of the body of the member 4 presents difficulties, and lessens the life of the member 4. In view of the low pressure differential just referred to, the entire sleeve may be made of soft material.

The invention is not limited to the preferred embodiment herein disclosed. Various changes may be made within the scope of the following claims.

I claim:

1. A pump having a barrel; inlet and outlet means for said barrel; said barrel having a counter-bored opening in one end; a hollow expansible member insertible in said opening having an in-

ternal annular flange on one end to bear against that end wall of said barrel remote from said opening, and an external annular flange on its other end to bear against the shoulder of said counterbore; a support insertible into said member having a first ring to engage said internal annular flange and a second ring to engage said external annular flange; and a plurality of rods extending from said first ring into said second ring; a head on the counterbore end of said barrel engaging said rods; a gasket between said second ring and said head; adjustable means to move said head toward said barrel to compress said gasket and flanges; said second ring having fluid passageways extending substantially radially and circumferentially therethrough, and being in communication with the interior of said expansible member; said barrel having upper and lower ducts communicating with said passageways; pumping fluid in said expansible member, ducts and passageways; a piston reciprocable in said head and in co-acting relation with said pumping fluid; and means to pack said piston in said head.

2. A pump having a barrel; inlet and outlet means for said barrel; said barrel having a counterbored opening in one end; a hollow expansible member insertible in said opening having an internal annular flange on one end to bear against that end wall of said barrel remote from said opening, and an external annular flange on its other end to bear against the shoulder of said counterbore; a support insertible into said member having a first ring to engage said internal annular flange and a second ring to engage said external annular flange; a plurality of rods extending from said first ring into said second ring; a head on said barrel and engaging said rods; a gasket between said second ring and said head; adjustable means to move said head toward said barrel to compress said gasket and flanges; said second ring having fluid passageways extending substantially radially therethrough and arranged to provide means connecting the interior of said expansible member and the exterior of said pump; a piston reciprocable in said expansible member and through said head, and arranged to effect the expansion and contraction of said expansible member; and means to pack said piston in said head.

3. A pump having a barrel; inlet and outlet means for said barrel; said barrel having an opening in one end; a hollow expansible member insertible in said opening and having an internal annular flange on one end to bear against that end wall of said barrel remote from said opening, and an external annular flange on its other end to bear against said barrel adjacent said opening; a support insertible into said member and having a first ring to engage said internal annular flange and a second ring to engage said external annular flange; and a plurality of rods extending from said first ring into said second ring; a head on said barrel and engaging said rods; a gasket between said second ring and said head; adjustable means to move said head toward said barrel to compress said gasket and flanges; a piston reciprocable in said head arranged to effect the expansion and contraction of said member; and means to pack said piston in said head.

4. In a pump of the character described having a sealed barrel; inlet and outlet means for said barrel; a hollow expansible pumping member in said barrel having an internal annular

flange at one end and an external annular flange at its other end; of means to seal said flanges to the opposite ends of said barrel between a fluid confined within said member and a fluid in said barrel outside of said member, said means comprising a pair of rings engaging said flanges, rods extending from one of said rings to a point adjacent the other of said rings, and an element engaging said rods and said other ring and accessible from the exterior of said pump to cause said rings to compress said flanges.

5. In a pump of the character described having a barrel; said barrel having an open end and being otherwise sealed; inlet and outlet means for said barrel; and a hollow expansible pumping member in said barrel and having an internal annular flange at one end and an external annular flange at its other end; of means to seal said external flange to said barrel adjacent said opening, and said internal flange to the opposite end of said barrel, said means comprising rings engaging said flanges, rods extending from that ring engaging said internal flange to that ring engaging said external flange, a gasket on the exterior side of that ring engaging said external flange, and an adjustable head bearing against said rods and gasket.

6. A pump having a barrel; inlet and outlet means for said barrel; said barrel having a counterbored opening in one end; a hollow expansible member insertible in said opening and having an internal annular flange on one end to bear against that end wall of said barrel remote from said opening, and an external annular flange on its other end to bear against the shoulder of said counterbore; a support insertible into said member and having a first ring to engage said internal annular flange and a second ring to engage said external annular flange; and a plurality of rods extending from said first ring into said second ring; a head on said barrel and engaging said rods; a gasket between said second ring and said head; adjustable means to move said head toward said barrel to compress said gasket and flanges; said second ring having fluid passageways extending radially and circumferentially therethrough, and being in communication with the interior of said hollow expansible member and upper and lower ducts communicating with said passageways and extending exteriorly of the barrel; a piston reciprocable in said head arranged to expand and contract said member; and means to pack said piston in said head.

7. In a pump of the character described having a sealed barrel; and inlet and outlet means for said barrel; of a hollow expansible pumping member in said barrel having an internal annular flange at one end and an external annular flange at its other end; and means to seal said flanges to the opposite ends of said barrel between a fluid confined within said member and a fluid in said barrel outside of said member, said means comprising a pair of rings engaging said flanges, means extending from one of said rings to a point adjacent the other of said rings, and an element engaging said last named means and said other ring and accessible from the exterior of said pump to cause said rings to compress said flanges.

8. In a pump of the character described having a barrel; said barrel having an open end and being otherwise sealed; inlet and outlet means for said barrel; a hollow expansible pumping member in said barrel and having an internal annular flange at one end and an external annular flange

at its other end; and means to seal said external flange to said barrel adjacent said opening, and said internal flange to the opposite end of said barrel, said means comprising rings engaging said flanges, means extending from that ring engaging said internal flange to that ring engaging said external flange, a gasket on the exterior side of that ring engaging said external flange, and an adjustable head bearing against said last named means and said gasket.

9. In a pump of the character described having a sealed barrel; and inlet and outlet means for said barrel; of a hollow expansible pumping member in said barrel; said member having barrel engaging flanges; and means to seal said member in said barrel comprising rings to engage and compress said flanges to the barrel, a head for said barrel engaging one of said rings, and means engaging the other of said rings and said head independently of said last named ring.

10. In a pump of the character described having a sealed barrel; and inlet and outlet means

for said barrel; of a hollow expansible pumping member in said barrel; said member having flanges at its inner and outer ends directly engaging the walls of said barrel; a removable outer head for said barrel; means for clamping the inner end flange against the barrel walls including a member abutting the inner surface of said head, and means also engaging said head for clamping the outer end flange against the barrel walls.

11. In a pump of the character described having a sealed barrel; and inlet and outlet means for said barrel; of a hollow expansible pumping member in said barrel; said member having a flange at its inner end; means for sealing the outer end of said member to the barrel walls; a removable head for the outer end of said barrel, and means for clamping said inner end flange against the barrel walls, said clamping means directly abutting the inner surface of said head.

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