C. H. O. HAMANN.

MACHINE WITH ROTATORY AND OSCILLATING PISTONS.

APPLICATION FILED JULY 28, 1914.

1,150,430.

Patented Aug. 17, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

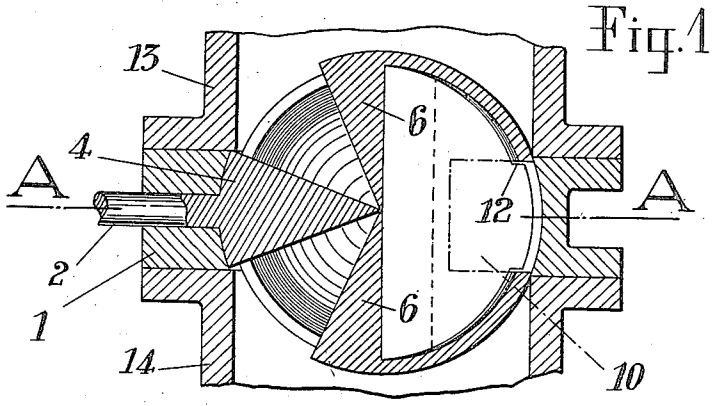
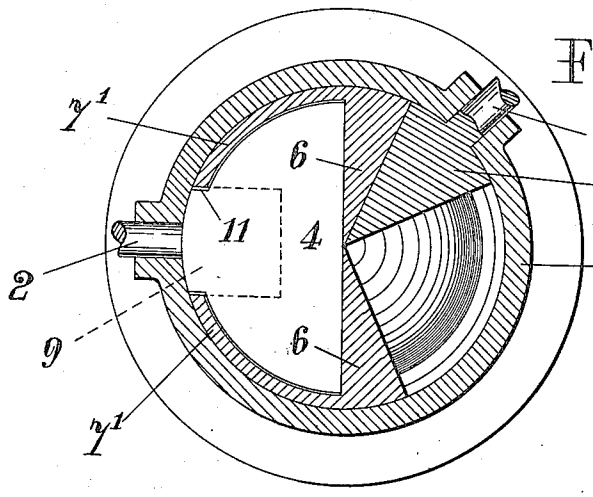
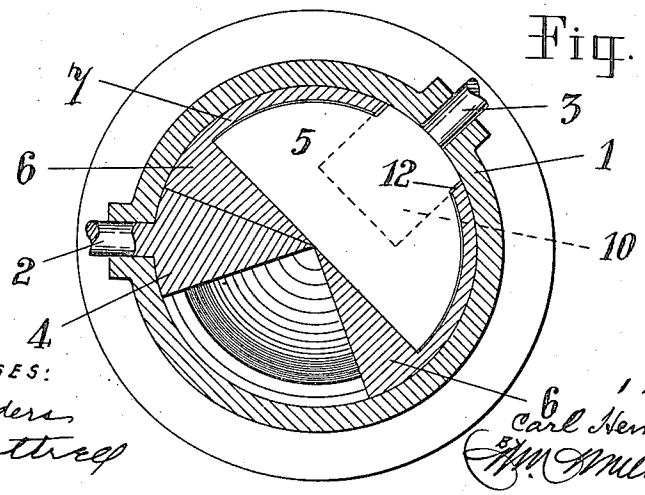


Fig. 2.



A-A

Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

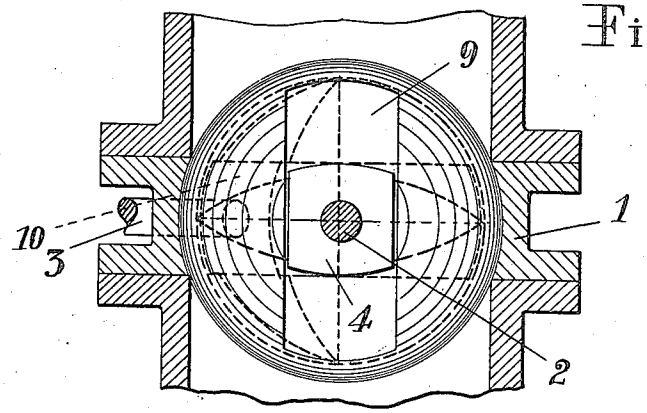


Fig. 5.

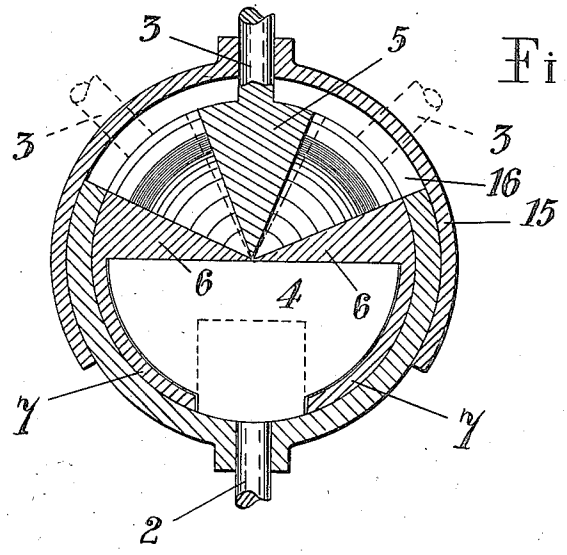
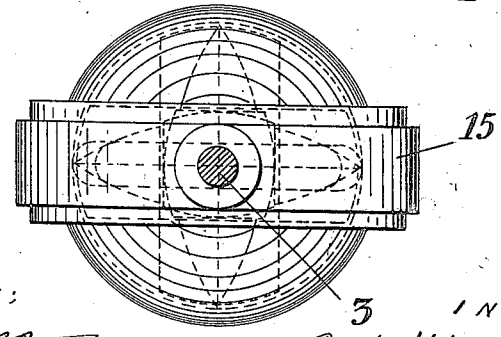


Fig. 6.



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MACHINE WITH ROTATORY AND OSCILLATING PISTONS.

1,150,430. Specification of Letters Patent. Patented Aug. 17, 1915.

Application filed July 28, 1914. Serial No. 853,781.

To all whom it may concern:

Be it known that I, CARL HEINRICH OTTO HAMANN, a subject of the German Emperor, and residing at Bergedorf, near Hamburg, in the German Empire, have invented certain new and useful Improvements in Machines with Rotatory and Oscillating Pistons, of which the following is a specification.

This invention relates to machines, having a rotary and at the same time oscillating piston which, as is known *per se*, consists of two spherical sectors which are journaled at an angle to one another and are pivoted similar to a universal joint to an intermediate piston in such manner, that on rotating the shafts the piston is also rotated and at the same time oscillated, so that between the surfaces of the piston and the sectors working spaces are created and again disappear. This machine which is constructed to be used as a power engine or pump or blower is practically useless it being impossible to obtain a sufficient and durable tight joint between the piston and the casing surrounding the same. According to the present invention this drawback is avoided by providing the intermediate disk or piston on both sides with spherical shells which embrace correspondingly shouldered spherical sectors in such manner, that merely slots or orifices remain, which allow of a connection of the spherical sectors with their shafts. These slots oscillate against the sectors when the latter rotate with their shafts and hereby form the inlet and outlet opening for the fluid acting either as driving fluid or being itself raised or forced by the machine. The new construction of the machine moreover has the advantage, that the casing is contracted to a ring of the breadth of the slots, so that it is possible to insert the machine freely into a tube having approximately the same diameter as the piston disk provided with the spherical shells. Above all it is of importance, that by these means a regulation and reversing of the running machine will be possible, which in the known machines of similar system was not possible since the distributing channels were arranged in the casing and had to be shifted together with the sectors in opening and closing them.

In the drawing two modes of construction are shown diagrammatically by way of example.

The connection of the spherical sectors with the intermediate disk is here carried out by a simple wedge guide. In practice it will be advantageous to use suitable hinges for this purpose.

Figure 1 is a vertical section through the machine in its central position. Fig. 2 is a section drawn to the line A—A of Fig. 1. Fig. 3 is a similar view as Fig. 2 in a different position, the shafts being rotated for 90°. Fig. 4 is an elevation of a machine, the casing with the pipes being alone shown in section. Fig. 5 is the section of a modification enabling a regulation of the amount of fluid running through the machine and also enabling the reversing of the engine, and Fig. 6 is an elevation of the same.

In the annular casing 1 that serves for opening the inlet and outlet channels, the two shafts 2 and 3 are journaled forming an angle between them and carrying the spherical sectors 4 and 5. The apexes of these sectors engage a corresponding groove in the intermediate disk 6, so that the latter on rotation of the sectors on the one hand follow this rotation and at the other hand are set in oscillatory movement, with regard to the surfaces of the sectors; thus between the surfaces of the disk 6 and of sectors working chambers are created in a known manner either for the fluid to be driven by the machine or for the motive fluid doing work respectively. The intermediate disk or piston 6 is provided with spherical shells 7 and 7^1 respectively, which embrace the sectors in such manner, that slots 9 and 10 are formed, allowing a connection of the sectors 4 and 5 with their shafts 2 and 3 respectively. The sectors 4 and 5 have shoulders 11 and 12 projecting into slots 9 and 10.

By arranging the spherical shells 7 and 7^1 respectively on the disk 6 it is possible to give the casing the shape of a guiding ring 1 the breadth of which need only be equal to the breadth of the slots, so as to form a good joint when these slots on rotation pass it. The fluid therefore can be conducted by pipes 13 and 14 the inner diameter of which need not be much smaller than the diameter of the disk 6. The shells together with the disks 6 form a full hollow ball with the exception of that part used for the opening or slots 9, 10. This ball allows of an excellent tight fit, the ball being adapted to rotate freely without being journaled absolutely tight within the guide ring.

The last surface and the film of fluid expanded over the same makes the joint very well tight, without creating any friction. The inlet and outlet orifices open quickly on account of which the raised amount of fluid will be correspondingly greater.

In Figs. 5 and 6 a modification is shown, by which an excellent regulation and even reversing of the machine will be possible. This object is attained by providing the casing 1 with a slot 16 for enabling the adjustment of one shaft 3 relatively to the other 2. In the position shown in full lines in Fig. 5 the shafts 2 and 3 are lying in one line and in this position no fluid can be raised though the shafts 2 and 3 are rotated, since the sectors 4 and 5 will merely cause a rotation of the disk 6 together with its spherical shells without creating an oscillatory movement with respect to the sectors necessary for forcing fluid through the machine. In the positions of the shaft 3 and the sectors shown in dotted lines the raising or forcing of the liquid will attain its maximum to one or the other side. Preferably the slot 16 allowing of the shifting of the shaft 3 will be closed by a suitable ring 15 working together with the shaft 3. The ring 15 may be considered a part of the casing 1. Evidently by shifting the shaft 3 the piston 6 will follow up the shafting in every position. When the edges of the slot 10 are parallel to the plane of the ring an adjustment will be possible without rotating the pawl. In all other positions a rotation of the ball will take place without hindering the adjustability in any way.

I claim:

1. A machine having a rotatory and oscillating piston, two spherical sectors pivoted to the piston, having the shape of a disk two shafts arranged at an angle and each attached to one of the said sectors, spherical shells attached to the said disk and embracing the spherical sectors, orifices in the shells.

2. A machine having a rotatory and oscillating piston, two spherical sectors pivoted to the piston, having the shape of a disk two shafts arranged at an angle and each attached to one of the said sectors, spherical shells attached to the said disk and embracing the spherical sectors, orifices in the shells, a casing having the shape of a ring and adapted to govern the in- and outlet passages, the annular casing corresponding in breadth to the said orifices.

3. A machine having a rotatory and oscillating piston, two spherical sectors pivoted to the piston, having the shape of a disk two shafts arranged at an angle and each attached to one of the said sectors, spherical shells attached to the said disk and embracing the spherical sectors, orifices in the shells, a casing having the shape of a ring and adapted to govern the in- and outlet passages, the annular casing corresponding in breadth to the said orifices, the casing being provided with a slot in which one shaft projects adjustably.

4. A machine having a rotatory and oscillating piston, two spherical sectors pivoted to the piston, having the shape of a disk two shafts arranged at an angle and each attached to one of the said sectors, spherical shells attached to the said disk and embracing the spherical sectors, orifices in the shells, a casing having the shape of a ring and adapted to govern the in- and outlet passages, the annular casing corresponding in breadth to the said orifices, the annular casing being divided, one part in which one shaft is journaled, being fixed and the other partly surrounding the first part and carrying the second shaft being rotatable to allow of an adjustment of the angle between the shafts.

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