

Aug. 25, 1931.

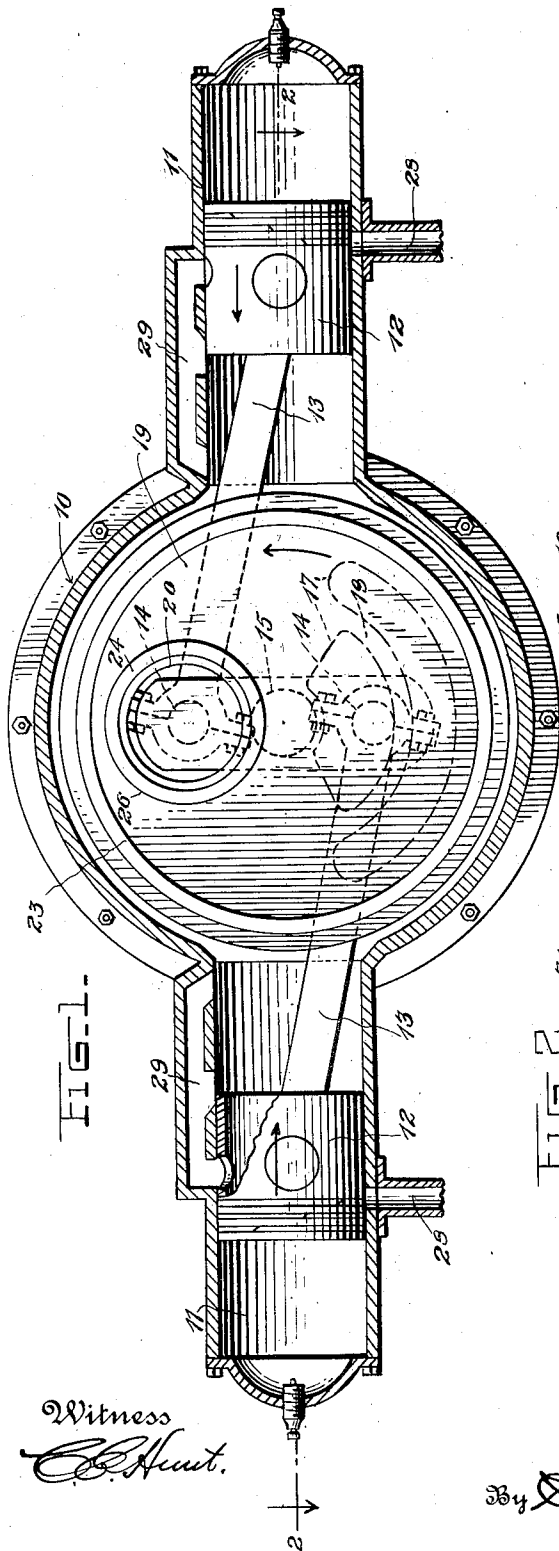
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1,820,093

ADMISSION VALVE FOR TWO-CYCLE ENGINES

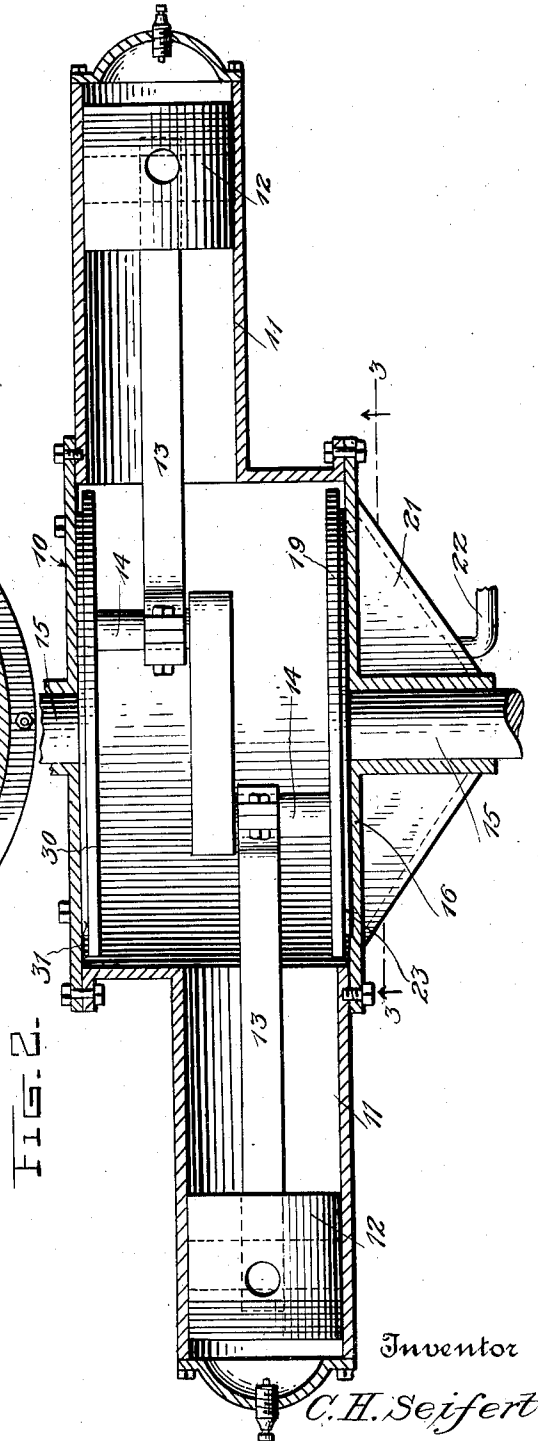
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2 Sheets-Sheet 1



Witness

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2 Sheets-Sheet 2

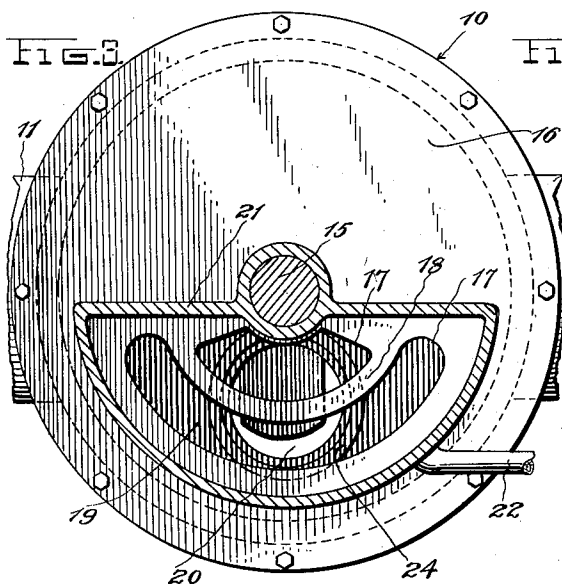
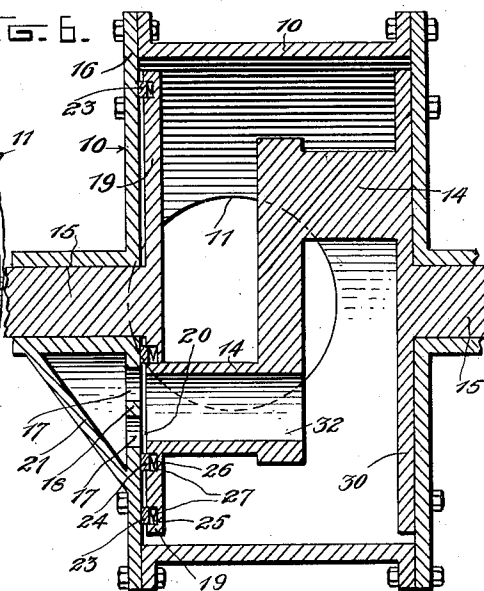
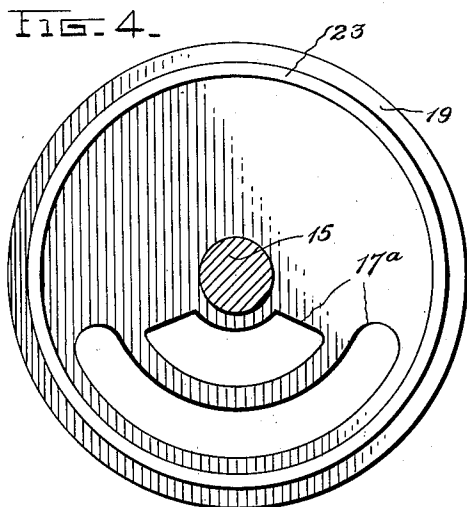
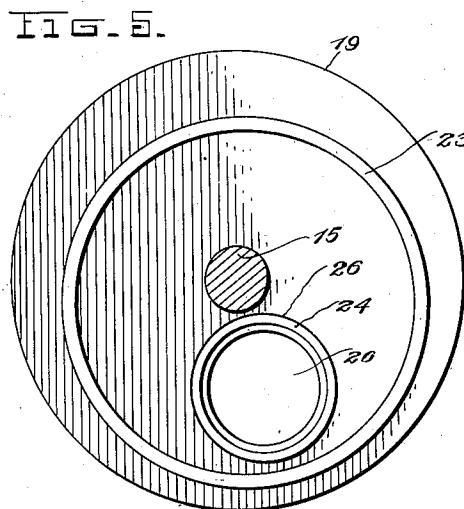
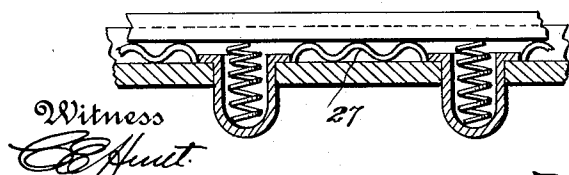


FIG. 7.



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UNITED STATES PATENT OFFICE

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ADMISSION VALVE FOR TWO CYCLE ENGINES

Application filed November 3, 1930. Serial No. 494,389.

The invention relates to a new and improved disk valve and sealing means therefor, the valve being designed primarily for two-cycle internal combustion engines for the purpose of admitting gas to the crank-case during charge compressing strokes of the piston or pistons and for cutting off communication between the crank-case and the intake manifold during power strokes of said piston or pistons, whereby these strokes will compress the gas in the crank case, preparatory to admission of said gas to the cylinder or cylinders concurrently with discharge of exhaust gas therefrom.

It is the object of the invention to provide an unusually simple valve means, yet one which is effectively sealed against leakage, and with this object in view, the invention resides in the novel subject matter herein-after described and claimed, description being accomplished by reference to the accompanying drawings.

Fig. 1 is a vertical longitudinal sectional view through a two-cylinder-opposed, two-cycle internal combustion engine showing the relation of parts when the pistons are at substantially the center of their travel during their power strokes.

Fig. 2 is a horizontal sectional view on line 2-2 of Fig. 1, the pistons however and the connected parts being in the positions which they assume at the end of charge compressing strokes of said pistons.

Fig. 3 is a vertical sectional view on line 3-3 of Fig. 2, the rotary valve disk however being in the position which it occupies when the pistons have traveled substantially half way on their charge compressing strokes.

Fig. 4 is an elevation of a valve disk of different form than that shown in the preceding figures.

Fig. 5 is a view similar to Fig. 4 but showing a still further variation of the valve disk.

Fig. 6 is a vertical transverse sectional view (piston and connecting rod omitted) showing a hollow crank pin which may be employed for gas admission if desired.

Fig. 7 is a detail sectional view illustrating one of many ways in which the sealing rings

may be spring-pressed against the sealing faces which co-operate therewith.

In the drawings above briefly described, 10 denotes the crank case, 11 has reference to opposed cylinders joined to said crank case, 12 refers to the pistons in said cylinders, 13 to the connecting rods, and 14 to the crank pins of the crank shaft 15.

One rigid end wall 16 of the crank case is provided with a flat inner side, and said wall is provided with arcuate ports 17 divided by an arcuate bridge 18. Disposed at the inner side of the end wall 16 and rigid with the crank shaft 15 to rotate bodily with the latter, is a valve disk 19 having a flat outer face, said disk being formed with a preferably circular port 20 for periodic registration with the ports 17. These ports 17 communicate with an intake manifold 21 at the outer side of the end wall 16, and appropriate provision such as 22, may be provided for placing this manifold in communication with a carbureter (not shown).

The valve disk 19 carries a continuous sealing ring 23 of relatively large diameter compared with another sealing ring 24 which surrounds the port 20. Ring 23 is of such diameter that all of the ports 17 and 20 always lie within its radius, and the ring 24 of a relatively small diameter, lies always within said radius of said ring 23. The rings 23 and 24 are seated in annular grooves 25 and 26 respectively, formed in the valve disk 19, and any appropriate spring means 27 are provided to hold said rings in sealing contact with the flat inner side of the end wall 16. The ring 24 is of such diameter as to prevent any portion thereof from having a tendency to cant into the ports 17, and obviously the bridge 18 will hold said ring against movement from its proper plane of operation, which might otherwise take place.

As the pistons 12 move outwardly (either initially or during their charge compressing strokes), the port 20 registers with the ports 17 and consequently gas is drawn into the crank case 10. By the time the outward travel of the piston is complete, port 20 has moved out of register with the ports 17 and as the pistons then travel inwardly, they com-

press the gas in the crank case, leakage back to the intake manifold 21 being then prevented by the novel sealing means 23 and 24. By the time the pistons 12 have moved inwardly sufficiently to open the conventional exhaust ports 28, they also open charge conducting ports 29, so that the compressed gas from the crank case 10 will enter the cylinders concurrently with discharge of exhaust gas therefrom. In practice, the pistons 12 will be provided with suitable baffles such as those customary in two-cycle engines, to prevent the incoming gas from traveling directly toward the exhaust ports 28, but as such baffles form no part of the present invention, they have not been illustrated.

It will be obvious that the valve arrangement above described could, if desired be duplicated at the opposite end of the crank case, and such duplication would merely involve mechanical skill and hence need not be illustrated. At said opposite end of the crank case, I have illustrated a disk 30 rigid with the crank shaft 15 and having a sealing ring 31 which prevents leakage around the adjacent crank shaft bearing. While referring to the latter, it may be stated that any appropriate bearings may be provided for the crank shaft, embodying means for receiving both radial and end thrusts.

Instead of having the arcuate ports 17 in the end wall 16 and the relatively small port 20 in the disk 19, a reversal may be employed, as will be clear from Fig. 4, showing the arcuate ports 17^a in the disk 19.

The ring 23 may or may not be concentric with the shaft 15 as will be clear by comparing Fig. 5 with a number of the other views. When the eccentric positioning of this ring shown in Fig. 5 is employed, it contacts with a larger area and hence has less tendency to wear a groove into the latter.

In the construction shown in Figs. 1 to 3, the port 20 is diametrically opposite the crank pin 14 to which the valve disk 19 is joined, but if desired, this particular crank pin may be axially aligned with the opening 20 as shown in Fig. 6, in which construction, said crank pin will be provided with a gas admission passage 32. This same view also illustrates the fact that the disk 30 need not necessarily be provided with the sealing ring 31 shown in Fig. 2.

I have illustrated a number of variations falling within the scope of the invention, and it will be understood to those skilled in the art that the improved valve mechanism could be embodied in still other forms, those shown however being sufficient to give an adequate understanding. It is to be understood however that the invention is not restricted to any specific details, except as claimed.

I claim:—

1. In a gas admission means for a two-cycle reciprocating engine of the type in which

gas is compressed in the crank case by the power strokes of the piston and admitted to the cylinder concurrently with discharge of exhaust gases from the latter; a disk member rigidly carried by the crank shaft at the inner side of a rigid end member of the crank case, said members having gas admission ports which register during charge-compressing strokes of the piston and are out of register during power strokes of said piston, relatively large diameter continuous sealing means between said members and so disposed that both of said ports lie always within its radius, and relatively small diameter sealing means between said members, said small diameter sealing means surrounding one of said ports and lying constantly within said radius of said large diameter sealing means.

2. In a gas admission means for a two-cycle reciprocating engine of the type in which gas is compressed in the crank case by the power strokes of the piston and admitted to the cylinder concurrently with discharge of exhaust gases from the latter; a disk member rigidly carried by the crank shaft at the inner side of a rigid end member of the crank case, said members having gas admission ports which register during charge-compressing strokes of the piston and are out of register during power strokes of said piston, a relatively large diameter continuous sealing ring between said members and so disposed that both of said ports lie always within its radius, a relatively small diameter sealing ring between said members, said small ring surrounding one of said ports and lying constantly within said radius of said large ring, both of said rings being groove-received and contacting with flat sealing faces, and spring means for holding said rings in contact with said sealing faces.

3. In a disk valve, relatively fixed and movable disk members disposed side by side and having ports adapted to register periodically as the rotatable member rotates, relatively large diameter continuous sealing means between said members and so disposed that the ports of both members always lie within the radius thereof, and relatively small diameter sealing means around the port of one member and lying always within said radius of said relatively large diameter sealing means.

In testimony whereof I affix my signature.
CHARLES H. SEIFERT.