J. F. ANDRES.

PUMP MOTOR.

APPLICATION FILED MAY 9, 1910.

994,101.

Patented May 30, 1911.

2 SHEETS-SHEET 1.

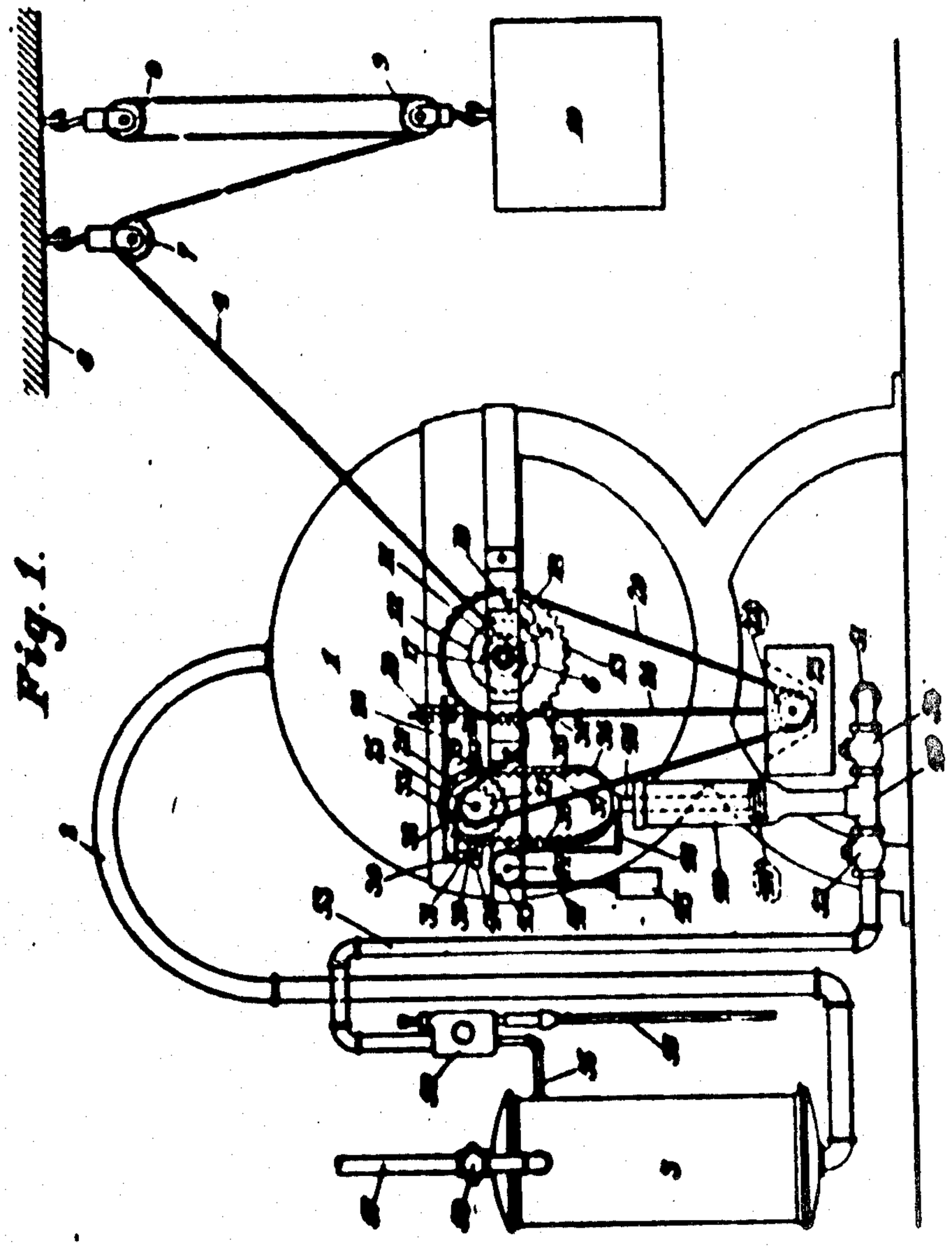

Fig. 1.

Witnesses:
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2 SHEETS-SHEET 2.

Fig. 2.

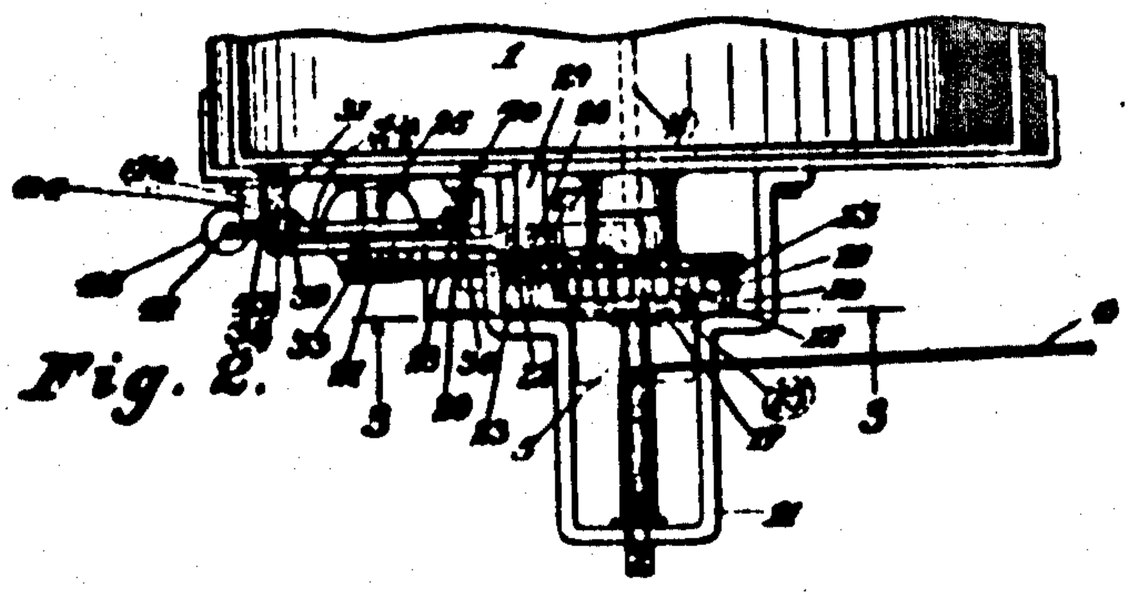
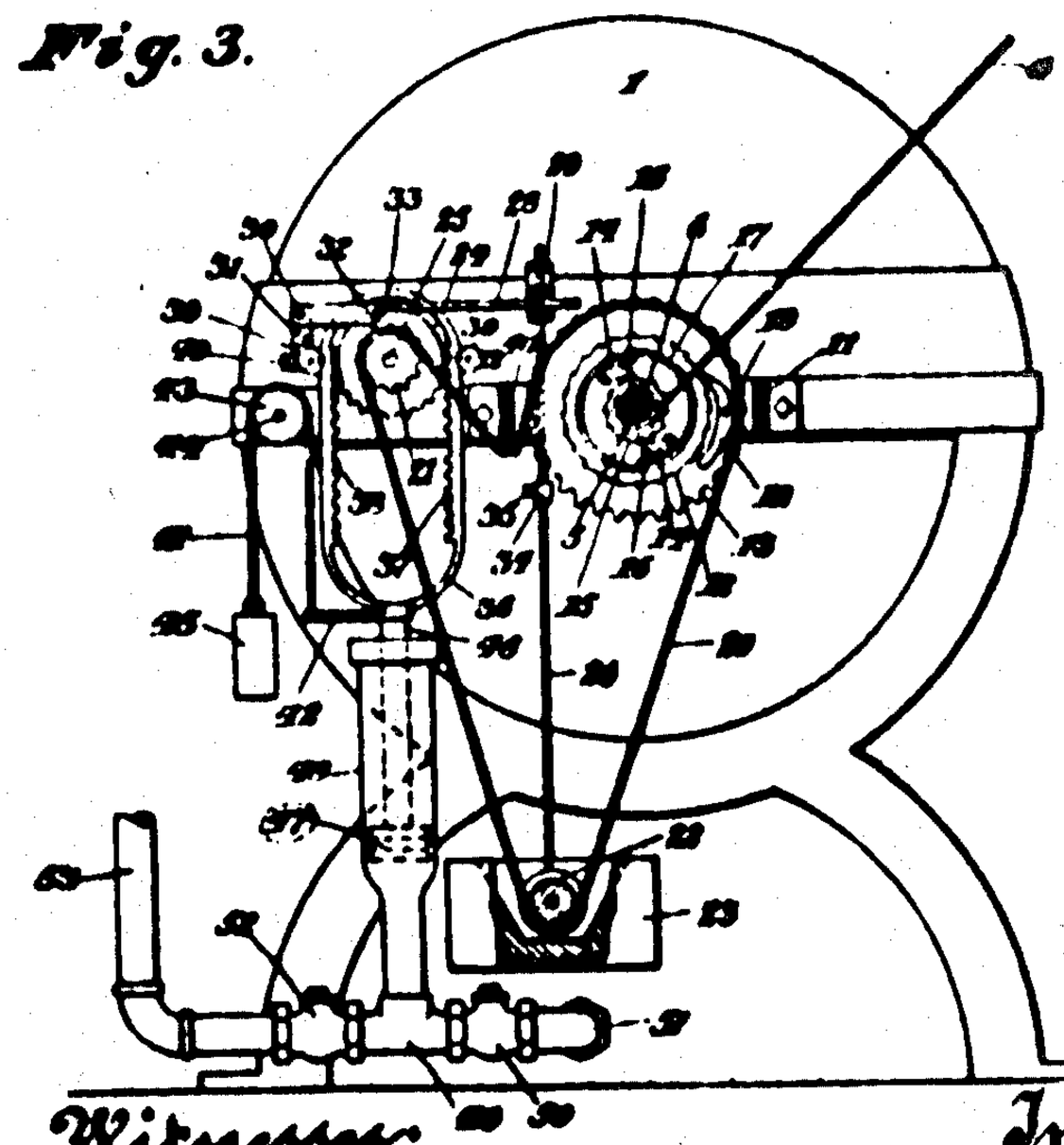


Fig. 3.



Witnesses:
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Inventor:
J. Frank Andres,
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His Attorney.

994,101. PUMP-MOTOR. J FRANK ANDRES, St. Louis, Mo., assignor to United States Safety Gas Machine Company, St. Louis, Mo., a Corporation of Missouri. Filed May 9, 1910. Serial No. 560,268.

To all whom it may concern:

Be it known that I, J FRANK ANDRES, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Pump-Motors, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to gas machines in which air and the vapors of hydrocarbon oil are combined in a carbureter or mixer to produce a gas possessing great heating qualities and high illuminating power.

The object of the present invention is to provide a motor that is intended to be used to operate a pump for forcing hydrocarbon oil to the aforesaid carbureter, and that is particularly adapted to be used in conjunction with a pump which supplies the carbureter with air.

In the accompanying drawings forming part of this specification, in which like numbers of reference denote like parts wherever they occur, Figure 1 is an end elevation of a gas machine with the motor in conjunction therewith; Fig. 2 is a top plan view, on an enlarged scale, showing the motor in connection with a rotary air pump; and Fig. 3 is a sectional view on the line 3—3, Fig. 2.

The air pump 1, which is preferably of the rotary type, forces the air through pipe 2 to the carbureter 3, the internal construction of said carbureter being similar to that of the one disclosed in my United States Letters-Patent, No. 876,678, granted January 14, 1908. A rope 4 is wound on a drum 5 that is loosely mounted on shaft 6 of said air pump, and passes over a sheave 7 fastened to a ceiling 8 or other support. Said rope passes over a pair of pulleys 9, one of said pulleys being secured to said ceiling and the other one of said pulleys being attached to a weight 10, which holds said rope in tension and causes drum 5 to rotate in one direction. A bracket 11 is secured to one end of pump 1 and is arranged to form a bearing for drum 5. The outer end of drum 5 projects from said bracket to allow a crank handle (not shown in the drawings) to be attached thereto for the purpose of rotating same in the opposite direction in order to rewind rope 4 on drum 5 after weight 10 pulls said rope to such extent that same is nearly unwound from said drum.

A ratchet 12 is rigidly mounted on shaft 6 and is secured to a sprocket wheel 13 that is similarly mounted on said shaft. A pair of pawls 14 is attached to ratchet 12 and is held in engagement with the teeth of a ratchet 15 by means of springs 16 borne by ring 17 fastened to ratchet 12, said ratchet 15 being secured to drum 5 so that, when the pull of rope 4 causes drum 5 to rotate, ratchet 15 rotates with said drum and causes ratchet 12, sprocket 13, and shaft 6 to rotate therewith. A pawl 18 is pivoted at 19 to bracket 11 so that both ends of said pawl alternately engage the teeth of ratchet 12. The teeth of said ratchet 12 point in the opposite direction to that in which the teeth of ratchet 15 point, and when drum 5 is rotated by the pull of rope 4 in the manner hereinabove described, pawl 18 allows ratchet 12, sprocket 13, and shaft 6 to rotate therewith, but, while said drum is being rotated in the opposite direction to wind said rope thereon, pawl 18 prevents ratchet 12, sprocket 13, and shaft 6 from rotating backward, with the result that the teeth of ratchet 15 ride past pawls 14.

Sprocket 13 drives an endless chain 20 that travels in engagement with a sprocket wheel 21 and a flanged pulley 22, said pulley being journaled in a weight 23. Sprocket 21 is fastened to a sector-toothed wheel 24 and is loosely mounted on pintle 25 secured to the end of pump 1. Weight 23 holds the lower part of chain 20 in tension, thereby tending to rotate sprocket 21 and wheel 24 in the same direction as drum 5. A rod 26 borne by weight 23 extends through a slot 27 in lever 28 and passes through a perforation in a guide bracket 29 fastened to the casing of pump 1. Said lever is pivoted at 30 to a bracket 31 attached to the casing of said pump and is provided with a shoulder 32. Said shoulder normally engages a pin 33 borne by wheel 24 and, when sprocket 13 drives chain 20, said shoulder prevents wheel 24 and sprocket 21 from rotating, with the result that said chain raises weight 23, thereby causing rod 26 to move upwardly through slot 27 in lever 28 and, also, causing the upper part of chain 20 that extends between sprockets 13 and 21 to become slack. A collar 34 that is fastened to rod 26 by means of a set-screw 35 or the like moves upwardly with said rod and raises the end of lever 28, whereby shoulder 32 moves away from pin 33 and leaves wheel 24 and sprocket 21 free to rotate on pintle 25. When pin 33 is released in the manner just described, weight 23 descends rapidly and causes chain 20 to rotate sprocket 21 and wheel 24. As weight 23 moves downwardly rod 26 travels with it and moves collar 34 away from lever 28, thereby allowing lever 28 to descend, with the result that shoulder 32 engages pin 33 after wheel 24 and sprocket 21 make a complete revolution. Said sprocket 21 and wheel 24 are thus prevented from rotating farther until weight

23 is raised again and pin 33 is released in the manner hereinabove described.

A rack frame 36 is arranged to be operated by means of the sector-toothed wheel 24 and is provided internally with two rows of teeth 37 and 38, the teeth 37 being located opposite teeth 38. Said rack frame is guided in its movement by means of a pair of flanged rollers 39 that is pivoted to brackets 40, respectively, fastened to the casing of pump 1, one roller 39 being adjacent one side of frame 36 and the other roller being adjacent the other side of said frame. A flexible member 41 is fastened to an arm 42 borne by rack frame 36, and passes over a sheave 43 pivoted at 44 to the casing of pump 1. A weight 45 is attached to the end of member 41 in order to hold said member in tension so that rack frame 36 is held normally in position to cause teeth 37 to partly mesh with an end tooth of wheel 24, with the result that the other end tooth of said wheel is normally out of engagement with teeth 38. When wheel 24 makes a complete revolution in the maner hereinabove described, the teeth thereof move in engagement with the teeth 37 during part of the revolution, thereby causing rack frame 36 to move upwardly and to carry with it teeth 38. The teeth of said wheel then move out of engagement with the teeth 37 and into engagement with teeth 38, and, during the remainder of the revolution of said wheel, the teeth thereof move in engagement with teeth 38, with the result that rack frame 36 moves downwardly to its normal position, *i. e.*, teeth 38 disengage the teeth of wheel 24, and teeth 37 partly mesh with an end tooth of said wheel.

A piston-rod 46 is secured in any suitable maner to rack frame 36 and is arranged to actuate piston 47 of a pump 48, said pump being connected to a tee 49 or the like. Each revolution of wheel 24 causes rack frame 36 to make a reciprocation, with the result that piston-rod 46 moves with said rack frame and causes piston 47 to make a suction and a discharge stroke. A check-valve 50 is attached to one end of tee 49 and is connected to a pipe 51 that leads to a reservoir or other receptacle (not shown in the drawings) containing a hydrocarbon oil, said valve being adapted to open during the suction stroke of piston 47 and to close during the discharge stroke of said piston. A check-valve 52 is fastened to the other end of tee 49 and is arranged to close during the suction stroke of piston 47 and to open during the discharge stroke of said piston. A pipe 53 is connected to check-valve 52 in order to convey the hydrocarbon oil to a measuring device 54 that is preferably constructed like the measuring device constituting the subject-matter of my other application filed of even date. Said measuring device is connected to carbureter 3 by means of pipe 55 and is provided with a drain pipe 56 that carries the overflow of hydrocarbon oil in said device back to the source of oil supply. A pipe 57 leads from carbureter 3 to lighting or heating apparatus (not shown), and is provided with a controlling valve 58.

While this invention is particularly adapted to be used to operate a pump for forcing hydrocarbon oil to a carbureter of a gas machine, yet it should be understod that same can be utilized to operate a pump for other purposes, for example, pumping air, gases, or other liquids.

The operation of the apparatus is as follows: As the pull of weight 10 on the rope 4 causes sprocket 13 and shaft 6 to rotate in the manner hereinabove described, pump 1 compresses the air in the usual manner and forces same through pipe 2 to carbureter 3. Said sprocket rotates comparatively slow and drives chain 20 which raises weight 23 until collar 34 engages and lifts the end of lever 28, thereby releasing pin 33. Weight 23 then drops suddenly and causes chain 20 to rotate sprocket 21 and sector-toothed wheel 24 to rotate rapidly. Rod 26 moves downwardly with weight 23 with the result that collar 34 moves away from lever 28, thereby causing shoulder 32 of said lever to engage pin 33 after wheel 24 makes a complete revolution. Said wheel is thus prevented from further rotation until weight 23 is again raised and pin 33 is released. Each revolution of wheel 24 reciprocates rack frame 36 which actuates piston-rod 46, whereby said piston-rod causes piston 47 to make a suction and a discharge stroke. During the suction stroke of piston 47, valve 52 closes and valve 50 opens with the result that a quantity of hydrocarbon is drawn through valve 50 into pump 48. The discharge stroke of piston 47 closes valve 50 and opens valve 52, thereby causing the quantity of oil within pump 48 to flow through valve 52 into pipe 53 that conveys same to the measuring device 54. Said measuring device delivers a predetermined amount of hydrocarbon oil through pipe 55 to carbureter 3 and discharges any superfluous oil back through pipe 56 to the source of supply. The air combines with the vapors of the hydrocarbon oil within carbureter 3 and forms a combustible gas that is delivered through pipe 57 to lighting or heating apparatus.

Inasmuch as the consumption of the gas fluctuates, the speed at which shaft 6 rotates varies with the rate at which the gas is consumed, thereby causing piston 47 to force hydrocarbon oil to carbureter 3 only at intervals when the pressure in said carbureter reduces sufficiently to necessitate more air

and oil to be delivered thereto, in order to maintain the desired mixture of air and the vapors of the oil within said carbureter. This intermittent actuation of piston 47 saves a great amount of power that, obviously, would be necessary to actuate a continuously-operated pump if same were used. Due to the fact that said piston is actuated quickly, it forces the hydrocarbon oil in predetermined volumes to the carbureter instead of delivering a mixture of the oil and its vapors to said carbureter as occurs when a continuously-operated pump is used.

I claim:

1. In an apparatus of the character described, the combination of a revoluble member, a reciprocatory member actuated thereby, a continuously-driven flexible member adapted to rotate said revoluble member, a detent normally preventing the rotation of said revoluble member, and means operable by said flexible member adapted to actuate said detent to release said revoluble member.

2. In an apparatus of the character described, the combination of a revoluble member, a reciprocatory member actuated thereby, a continuously-driven flexible member adapted to rotate said revoluble member, a detent normally preventing the rotation of said revoluble member, a weight raisable by said flexible member, and means borne by said weight adapted to actuate said detent to release said revoluble member.

3. In an apparatus of the character described, the combination of a revoluble member, a reciprocatory member actuated thereby, a continuously-driven flexible member adapted to rotate said revoluble member, a rising and falling weight supported by said flexible member, a detent for preventing the rotation of said revoluble member during the upward movement of said weight, and means for actuating said detent to allow said revoluble member to be rotated by the downward movement of said weight.

4. In an apparatus of the character described, the combination of a sector-toothed wheel, a frame having racks adapted to be reciprocated by said wheel, said frame being adapted to be connected to a power-absorbing device, a flexible member adapted to rotate said wheel, a detent normally preventing the rotation of said wheel, means for actuating said detent to release said wheel, and means for driving said flexible member.

5. In an apparatus of the character described, the combination of a sector-toothed wheel, a frame having racks adapted to be actuated by said wheel, said frame being adapted to be connected to a power-absorbing device, a flexible member adapted to rotate said wheel, a detent normally preventing the rotation of said wheel, means for actuating said detent to release said wheel, and a weight arranged to hold a rack of said frame in mesh with said wheel when same is at rest.

6. In an apparatus of the character described, the combination of a sector-toothed wheel, a frame having racks adapted to be actuated by said wheel, said frame being adapted to be connected to a power-absorbing device, a flexible member adapted to rotate said wheel, a rising and falling weight supported by said flexible member, a detent for preventing the rotation of said wheel during the upward movement of said weight, and means for actuating said detent to allow said wheel to be rotated by the downward movement of said weight.

7. In an apparatus of the character described, the combination of a sector-toothed wheel, a frame having racks adapted to be actuated by said wheel, said frame being adapted to be connected to a power-absorbing device, a shaft, an endless flexible member driven by said shaft and arranged to rotate said wheel, a rising and falling weight supported by said flexible member, a detent for preventing the rotation of said wheel during the upward movement of said weight, and means for actuating said detent to allow said wheel to be rotated by the downward movement of said weight.

8. In an apparatus of the character specified, the combination of a revoluble member provided with a pin, a reciprocatory member actuated by the revoluble member, a continuously-driven flexible member adapted to rotate said revoluble member, a detent adapted to normally engage said pin, for preventing rotation of said revoluble member, and means operable by said flexible member for releasing said pin from such engagement.

9. In an apparatus of the character specified, the combination of a revoluble member provided with a pin, a reciprocatory member actuated by the revoluble member, a continuously-driven flexible member adapted to rotate said revoluble member, a detent adapted to normally engage said pin, for preventing rotation of said revoluble member, a vertically movable rod operable by said flexible member, and means carried by said rod for tripping said detent during the movement of said rod in one direction, to release said detent from such engagement.

10. In an apparatus of the character described, the combination of a revoluble member provided with a pin, a member adapted to rotate said revoluble member, a reciprocatory member actuated by said revoluble member, a detent normally engaged with said pin, to prevent rotation of said revoluble member, a vertically movable member

operable by the second-named member, and means carried by said vertically movable member for tripping said detent, to release the same from such engagement.

11. In an apparatus of the character described, the combination of a revoluble member, a member adapted to rotate the same, a reciprocatory member actuated by said revoluble member, a detent normally engaged with said revoluble member to hold the latter against rotation, a vertically movable rod actuated by the second-named member, and a collar secured to said rod and adapted to trip said detent when said rod moves in one direction, to release said detent from such engagement.

12. In an apparatus of the character described, the combination of a sector-toothed wheel, a frame having racks adapted to be actuated by said wheel, a flexible member adapted to rotate said wheel, a rising and falling weight supported by said flexible member, a detent for normally holding said wheel against rotation, a rod carried by said weight, and a collar secured to said rod for releasing said detent during the upward movement of said rod.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

J FRANK ANDRES.

Witnesses.

GLADYS WALTON,

JOSEPHINE SCHAEFER.