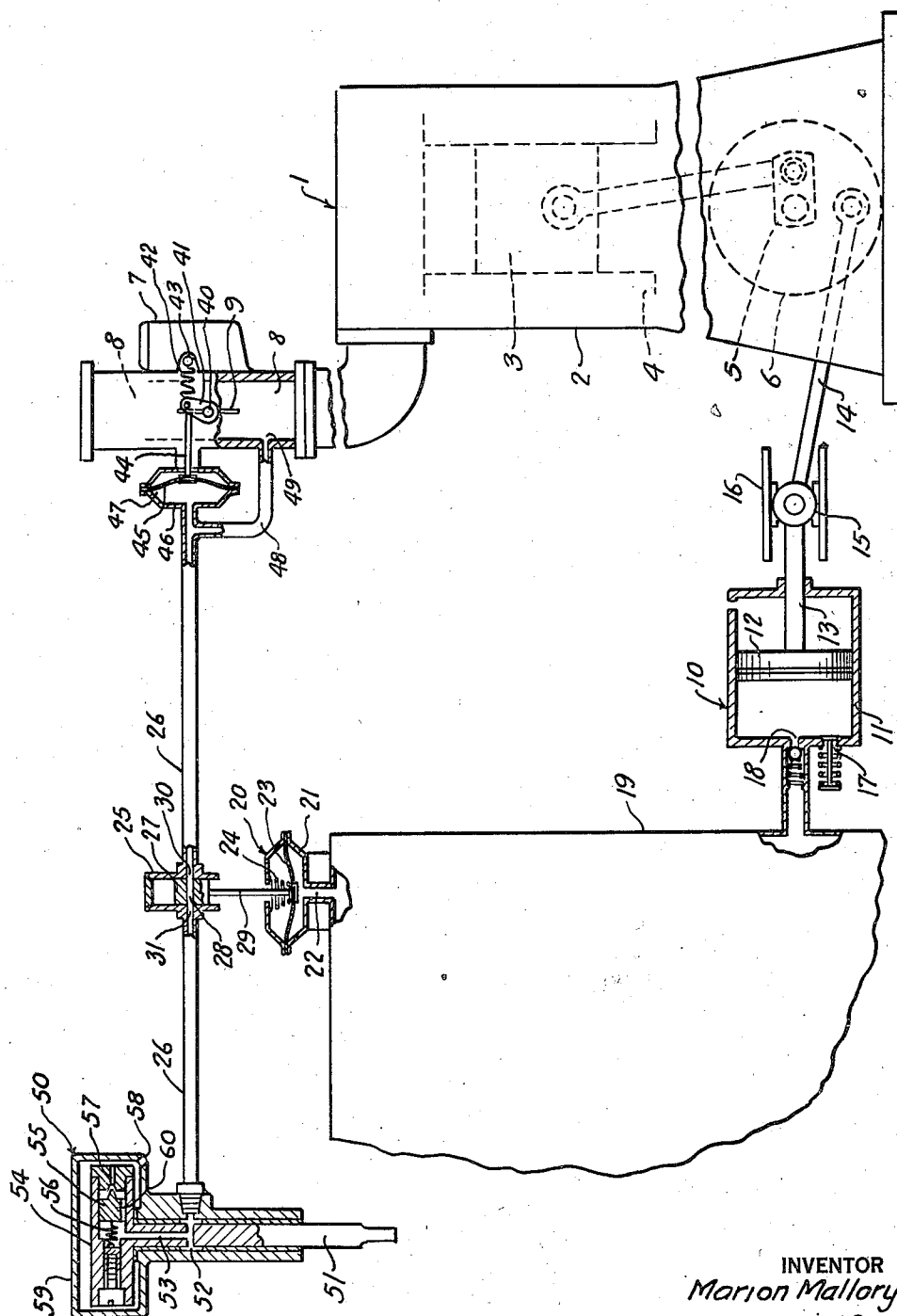


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M. MALLORY
AIR COMPRESSING SYSTEM
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INVENTOR
Marion Mallory

BY *Barnes, Kisselle, Laughlin & Laird*
ATTORNEYS.

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AIR COMPRESSING SYSTEM

Marion Mallory, Detroit, Mich.

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This invention relates to an air compressing system and more particularly to an air compressing system wherein the compressor is run by an internal combustion engine.

It is the object of this invention to produce such air compressing system which is very simple in structure and efficient and reliable in operation.

The single figure is a view showing my air compressing apparatus.

Referring more particularly to the drawings there is shown a conventional internal combustion engine 1 comprising cylinder 2, piston 3, connecting rod 4, crankshaft 5, flywheel 6, carburetor 7, intake passageway 8, throttle valve 9.

Engine 1 is arranged to drive a conventional air compressor 10 comprising cylinder 11, piston 12, piston rod 13, connecting rod 14 between flywheel 6 and piston rod 13, cross-head 15, cross-head slide 16, valve controlled air inlet port 17, valve controlled air exhaust port 18 into pressure tank 19.

Pressure tank 19 is provided with a pressure controlled device 20 comprising housing 21, conduit 22 connecting housing 21 with the inside of pressure tank 19, flexible diaphragm 23, compression spring 24, valve housing 25 having ports 30 and 31 connected into conduit 26, valve 27 having port 28 arranged under certain operating conditions to communicate with ports 30 and 31 and rod 29 connecting valve 27 with diaphragm 23.

The speed of engine 1 is controlled by a governor of the type which is operated by engine intake passageway pressure. The governor comprises the following elements: throttle valve 9 of the butterfly type, valve shaft 40, crank 41 fixed on shaft 40, tension spring 42 anchored at one end to crank 41 and at the other end to stationary post 43 and tending to hold valve 9 open, rod 44 connecting crank 41 with flexible diaphragm 45, servo-motor housing 46 cooperating with diaphragm 45 to form suction chamber 47, conduit 48 connecting suction chamber 47 with orifice 49 in the intake passageway 8, conduit 26 connecting suction chamber 47 with a centrifugal valve air bleed mechanism 50.

The centrifugal valve air bleed mechanism comprises the following elements: engine driven shaft 51, circumferential passageway 52 always in communication with conduit 26, T slot 53 continuously communicating with passageway 52, valve housing 54 fixed on shaft 51, centrifugally unbalanced valve 55, tension spring 56 tending to hold valve 55 open, air bleed port 57, port 58 in stationary housing 59, groove 60 in valve 55.

The operation of my device is as follows: As-

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suming that the pressure in tank 19 is substantially atmospheric and engine 1 has been set in operation. The tension of spring 24 is such that valve 27 will remain in the position shown with port 28 communicating with ports 30 and 31 until a predetermined pressure is reached in tank 19, say, for example 150 pounds per square inch. With valve 9 wide open the engine speed will accelerate until it reaches its governed speed whereupon centrifugally unbalanced valve 55 will tend to close air bleed orifice 57. Shutting off atmospheric air bleed 57 to suction chamber 47 will cause the intake passageway vacuum at orifice 49 to become established in chamber 47. Initially this vacuum will be caused by the flow of air by orifice 49 and, of course, increase as valve 9 moves toward closed position to hold the engine at its governed speed. If the speed of the engine falls slightly below its governed speed, then valve 55 will open slightly to air bleed chamber 47 and permit spring 42 to move valve 9 toward open position to increase the flow of motive fluid to the engine. As the pressure in tank 19 rises, the load on the engine increases. As the engine load increases, the governor responds to open valve 9 to increase the charge to the engine and maintain its governed speed, and vice versa as the load on the engine decreases the governor moves valve 9 toward closed position to decrease the charge to the engine and maintain the governed speed of the engine. Thus, the suction actuated governor as controlled by the centrifugal valve air bleed mechanism will maintain engine 1 at its governed speed until the pressure in tank 19 reaches a point where the pressure acting through diaphragm 23 against spring 24 will move valve 27 upwardly to disconnect orifice 28 from orifices 30 and 31 and thus close conduit 26, that is, shut off communication between suction chamber 47 and air bleed orifice 57. As soon as valve 27 closes orifice 30 the suction device will respond to intake passageway suction at orifice 49 and swing valve 9 to idle position. Valve 9 will remain in idle position until the pressure in tank 19 falls sufficiently to permit spring 24 to move valve 27 downwardly to place port 28 in communication with ports 30 and 31 whereupon the speed of the engine will now be controlled by the centrifugal valve air bleed mechanism and suction governor as above described.

Tank 19 can be provided with a safety pressure relief valve (not shown) which will open at a pressure substantially higher than the pressure at which valve 27 closes conduit 26. Such valve would operate only in case the pressure in tank 19 became dangerously high, such as might occur

if engine 1 ran at idle position for a rather long period and no compressed gas was withdrawn from tank 19.

The operation of compressor 10 is conventional in that air is drawn into cylinder 11 through port 17, compressed and then exhausted under pressure through port 18 into tank 19.

I claim:

1. A gas compressing apparatus comprising a compressor, an internal combustion engine for driving said compressor and having an intake passageway, a throttle valve for controlling the flow of motive fluid through said passageway, a device actuated by changes of pressure in the intake passageway on the engine side of said throttle valve and connected to said throttle valve for imparting movement thereto, an air bleed for said pressure actuated device controlled in accordance with the engine speed, said air bleed tending to close whenever the engine reaches a predetermined governed speed whereby the pressure actuated device moves said throttle valve toward closed position, a container for storing gas compressed by said compressor, and means responding to a predetermined gaseous pressure in said container for shutting off said air bleed whereby said pressure actuated device responds to intake passageway pressure to move said throttle valve toward idle position.

2. A gas compressing apparatus comprising a compressor, an internal combustion engine for driving said compressor and having an intake passageway, a throttle valve for controlling the flow of motive fluid through said passageway, a device responsive to the pressure in the intake passageway on the engine side of said throttle valve for imparting movement thereto, an air bleed for said pressure actuated device controlled in accordance with the engine speed and tending to close whenever the engine reaches a predetermined governed speed whereby the intake passageway pressure becomes established in said pressure actuated device which responds to move said throttle valve toward closed position and maintain the governed speed of the engine, a container for storing gas compressed by said compressor, and means responding to a predetermined gaseous pressure in said container for shutting off said air bleed and maintaining the same closed as long as a predetermined gaseous pressure obtains in said container whereby said first mentioned pressure responsive device responds to intake passageway pressure to move said throttle valve toward closed position to throttle down the speed of the engine.

3. A gas compressing apparatus comprising a compressor, an internal combustion engine for driving said compressor and having an intake passageway, a throttle valve for controlling the flow of motive fluid through said passageway, a device actuated by changes of pressure in the intake passageway on the engine side of said throttle valve and connected to said throttle valve for imparting movement thereto, an air bleed orifice for said pressure actuated device, a centrifugal unbalanced valve operated in accordance with the engine speed and tending to close said air bleed orifice whenever the engine reaches a predetermined governed speed whereby the pressure actuated device moves said throttle valve toward closed position, a container for storing gas compressed by said compressor, and means responding to a predetermined gaseous pressure in said container for shutting off said air bleed whereby said pressure actuated device responds to intake

passageway pressure to move said throttle valve toward idle position.

4. A gas compressing apparatus comprising a compressor, an internal combustion engine for driving said compressor and having an intake passageway, a throttle valve for controlling the flow of motive fluid through said passageway, a device actuated by changes of pressure in the intake passageway on the engine side of said throttle valve and connected to said throttle valve for imparting movement thereto, a conduit connecting said pressure actuated device with the intake passageway on the engine side of said throttle valve, an air bleed for said pressure actuated device controlled in accordance with the engine speed, said air bleed tending to close whenever the engine reaches a predetermined governed speed whereby the pressure actuated device moves said throttle valve toward closed position, a container for storing gas compressed by said compressor, and valve means mounted in series with said air bleed and between said air bleed and said pressure actuated device and responding to a predetermined gaseous pressure in said container for shutting off said air bleed whereby said pressure actuated device responds to intake passageway pressure to move said throttle valve toward idle position.

5. A gas compressing apparatus comprising a compressor, an internal combustion engine for driving said compressor and having an intake passageway, a throttle valve for controlling the flow of motive fluid through said passageway, a device actuated by changes of pressure in the intake passageway on the engine side of said throttle valve and connected to said throttle valve for imparting movement thereto, an air bleed for said pressure actuated device, a conduit connecting said air bleed with said pressure actuated device, a centrifugally unbalanced valve driven off the engine for controlling said air bleed in accordance with engine speed and tending to close said air bleed when the engine reaches a predetermined governed speed whereby the pressure actuated device moves said throttle toward closed position, a container for storing gas compressed by said compressor, a valve for closing said conduit to control communication between said air bleed and said pressure actuated device, and means actuated by changes in the gaseous pressure in said container and connected to said valve for closing the same whenever the pressure in said container reaches a predetermined pressure whereby the air bleed is closed and the first mentioned pressure actuated device responds to intake passageway pressure to move the throttle valve toward engine idling position, said means responding to a fall in the gaseous pressure in said container below a predetermined pressure and thereby opening said valve to again establish communication between said air bleed and the first mentioned intake passageway pressure actuated device.

MARION MALLORY.

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