June 30, 1931. W. H. HEWITT 1,812,787

BRAKING ATTACHMENT FOR VEHICLE MOTORS

Filed June 5, 1929

Fig. 1.

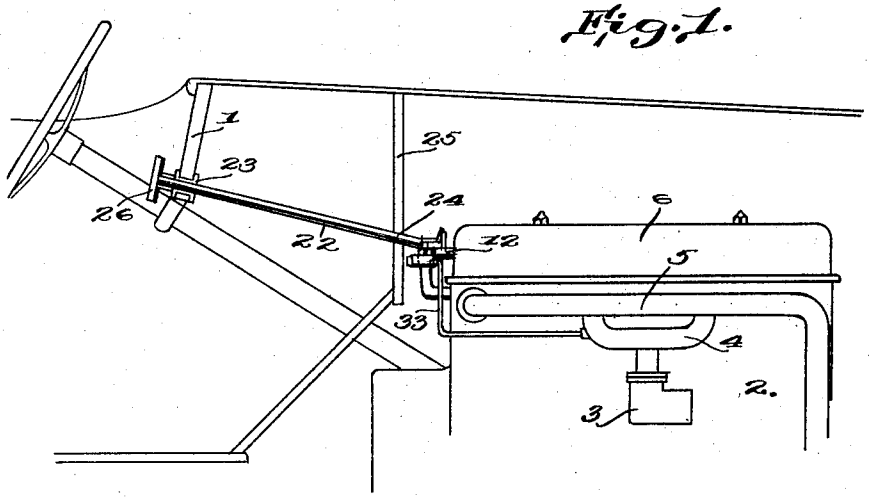


Fig. 2.

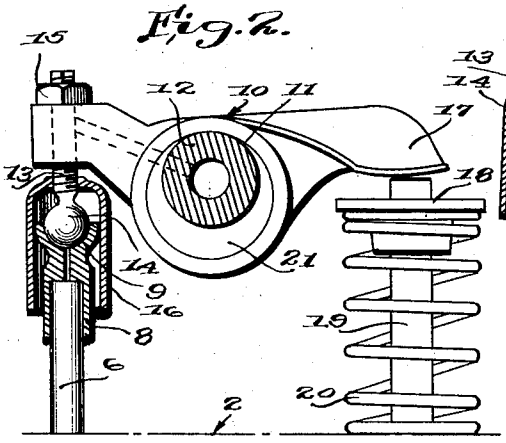


Fig. 3.

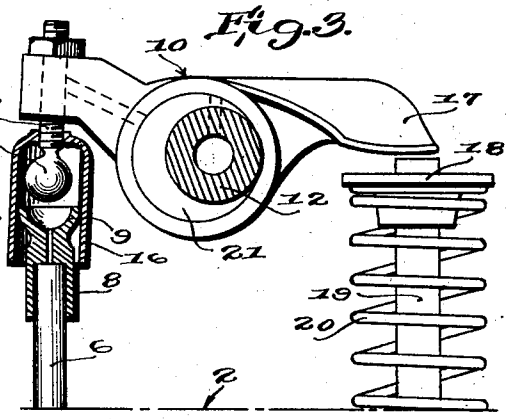
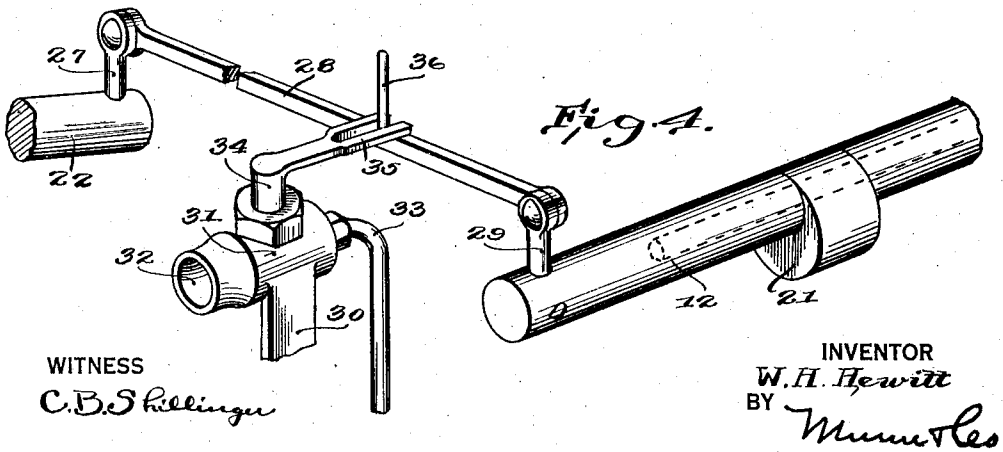


Fig. 4.



WITNESS

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BRAKING ATTACHMENT FOR VEHICLE MOTORS

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This invention relates to vehicle motor attachments designed to cause the motor of a vehicle to function as a brake, particularly in descending grades and has the advantage of saving wear on the usual braking mechanism, of uniformly applying braking force, and of cooling the motor.

An object of the invention is the provision of mechanism operable from the dash by the vehicle operator for effecting closure of the exhaust valves of the motor without interference with the normal action of their operating mechanism; and reversely, for reconditioning the valves for normal operation of said mechanism.

Another object of the invention is the provision in conjunction with mechanism as above described, of means coincidently operable to break the fuel suction through the carburetter from the intake manifold and to supply motor cooling air in lieu of fuel, and reversely to restore carburetter suction and cut off said cooling air suction.

It is a further object of the invention to provide mechanism for effecting the above described functions which may be attached to and form part of the motor without interfering with its normal operation or requiring special initial motor construction essential to its installation.

With the foregoing and other objects in view, the invention consists in certain novel features of construction, and combinations and arrangements of parts, as will be more fully hereinafter set forth and pointed out in the claims.

The nature of the invention will be more fully comprehended from the following detailed specification which is to be read in conjunction with the accompanying drawings forming part thereof, and in which:—

Figure 1 is a fragmentary diagrammatic view of the dash and motor of a vehicle with the device of the present invention applied thereto.

Figure 2 is a view in transverse section and on an enlarged scale showing a push rod, rocker arm, rocker arm shaft and exhaust valve with the eccentric on the rocker arm shaft in inoperative position permitting normal operation of the motor.

Figure 3 is a similar view with the normally stationary rock arm shaft partially rotated to shift the rocker arm into inoperative relation to its push rod and away from the exhaust valve to permit the latter to remain closed.

Figure 4 is a fragmentary perspective view of the dash operated mechanism and its operating connections to the air valve and rocker arm shaft.

The device of the present invention is designed for use in connection with vehicle motors of the overhead valve type employing rocker arms mounted on a stationary shaft and rocked through push rods from the valve cam shaft to depress and open the intake and exhaust valves against the tension of coiled springs normally effective to close said valves.

In Figure 1 of the drawings showing diagrammatically the dash and motor of a vehicle, the instrument board is indicated at 1 and the motor block at 2. The carburetter 3 is connected through the usual intake manifold 4 with the intake valve ports in the block. The exhaust manifold is shown at 5 and the cover for the rocker arms and shaft and the upper ends of the push rods and valves is shown coventionally at 6.

The construction and the mounting of the rocker arms, push rods and valves in the motor block are standard and need not be detailed in full. In Figures 2 and 3, I show a single push rod, rocker arm and exhaust valve, with the rock arm shaft modified in accordance with the present invention.

The push rod 7 mounts on its upper end a sleeve 8 formed at its upper end as a cupped head 9 of semi-spherical outer contour. The rocker arm 10 is formed intermediate of its ends with the enlarged sleeve portion 11 by means of which it is journaled upon the stationary rocker arm shaft 12 and at one end is formed with a vertical threaded stem 13 having a ball 14 at its lower end to seat in the cupped semi-spherical head 9 of the push rod 6. A lock nut 15 holds the stem 13 in adjusted position in the end of the rocker

arm. The rocker arm shaft is usually hollow from adjacent its rear to its front end to provide an oil passage through which oil is forced to its outer end, transverse oil ducts in the shaft and rocker arms carrying some of the oil to the stems 13 and thence to their ball ends 14.

Since in accordance with the present invention, provision is made for lifting the rocker arm to raise the ball 14 above and in inoperative relation to the upper end of the push rod 9, I provide a cupped sleeve 16 threaded upon the stem 13 and depending to enclose the ball 14, the sleeve 8 and its tappet head 9 therewithin to maintain them in alinement when the rocker arm with ball 14 and its stem are lifted as above described.

The other end 17 of the rocker arm overlies the tappet 18 on the upper end of the stem 19 of the exhaust valve whose spring 20 normally tends to move and hold the valve in closed position.

In accordance with the present invention, the rocker arm shaft, which is normally stationary and is hollow to provide an oil duct, is provided with eccentrics for effecting a bodily lifting movement of the rocker arms for the exhaust valves to inoperative position relatively to their push rods and valve tappets, and provision is made for effecting from the dash a rocking movement of the rocker arm shaft to effect this result through the eccentrics.

The rocker arm shaft 12 in standard motors of the overhead valve type is mounted in spaced bearing supports secured to the top of the cylinder block and extends through and serves as a bearing for the intermediate sleeved portion or hub 11 of the rocker arms. In accordance with my invention, those portions of the shaft 12 which extend through the hub sleeves 11 of the exhaust valve rocker arms are provided with eccentrics, of which one, only, is shown in Figure 4, and the exhaust valve rocker arms are provided with hub sleeves of corresponding and increased diameter to fit the eccentrics. In the position of normal operation of the motor with the exhaust valves, their push rods and rocker arms functioning, the eccentrics 21 will extend downwardly as shown in Figure 2. A half turn of the shaft 12, which will affect the rocker arms of the exhaust valves only, will effect a bodily lifting movement of the exhaust valve rocker arms to a point where their push rod engaging ball ends 14 are lifted above the range of operation of their push rods and will correspondingly lift the opposite ends of the rocker arms above the valve tappets 18 permitting the exhaust valves to remain closed. This last position of the exhaust valve rocker arms is shown in Figure 3.

The means which effects this turning movement of the rocker arm shaft is also, in accordance with my invention functions to open an air line to the intake manifold 4 above the carburetter with the result that suction through the carburetter by the motor is broken and air will be drawn in instead. With the exhaust valves closed, the air drawn in is alternately compressed and expanded as the pistons move up and down in their cylinders, and an effective braking action results, without wastage of fuel.

To attain these results, I have provided the following mechanical aids. A rock shaft 22 extends through a bushing 23 in the instrument board 1 and through a bore 24 in the dash 25 to terminate at its forward end adjacent the rear end of the motor block. The rear end of the shaft projects through the instrument board and mounts an operating handle 26 spaced from the instrument board by an appropriate sleeve as shown in Figure 1. The forward end of the shaft carries a crank arm 27 (Figure 4) pivotally connected by a cross link 28 to a corresponding crank arm 29 upstanding from the rear end of the rocker shaft 12 as shown in Figure 4 and providing a rocking connection between said shafts.

A bracket 30 suitably secured to the rear end of the motor block mounts on its upper end an air valve 31 having an air intake mouth 32. An air pipe 33 extends from the opposite end of the valve casing to and is plugged into the intake manifold 4. The usual valve plug bored to place the intake 32 and pipe 33 into communication is seated in the valve casing, the stem 34 of the plug having a crank arm offset forwardly therefrom and provided with a bifurcated front end 35 embracing a pin 36 upstanding from the link 28 intermediate of its ends.

A half turn imparted to the rock shaft 22 through its operating handle 16 on the instrument board will move the exhaust rocker arm eccentrics 21 from the position shown in Figure 2 to that shown in Figure 3 with the rocker arms lifted to and maintained in inoperative relation relatively to their push rods and exhaust valve tappets. At the same time, the longitudinal movement of the link 28 in transmitting rotary motion from the rock shaft 22 to the rocker arm shaft 12, will, through its pin 36 and the bifurcated crank arm 35, move the valve plug to open the air intake to the intake manifold 4 of the motor, thereby breaking suction from the cylinders through the manifold to the carburettor and preventing wastage of fuel as the compression of air in the motor cylinders is thus used as a braking force.

A reverse movement of the rock shaft, of course, restores the valves and rocker arms to normal motor operation conditions and coincidentally closes the air intake to the manifold cutting off suction through the carburettor. There is no interference with the normal timing and action of the motor parts

at any time and in either position of adjustment.

With the exhaust valve rocker arms lifted as described to close the exhaust valves, the cycle of operations with the usual four cycle internal combustion motor of a vehicle is as follows, the action with one cylinder and piston being typical.

On the first (and down) stroke of the piston, the intake valve opens and air is drawn into the cylinder. On the second (and up) stroke the intake valve is closed, the exhaust valve is closed and the air is compressed. On the 3rd stroke (2nd downstroke) the piston is moved downwardly freely by the gravity running of the vehicle with the compressed air expanding. On the 4th stroke (second upstroke), the exhaust valve being closed, the air is again compressed.

On the first (and down) stroke of the next cycle, the intake valve opens and the air pressure in the cylinder is restored to atmospheric and the cylinder cooled by the fresh air drawn in; on the second (and up) stroke, the air is compressed and so on as in the first cycle. With these cycles occurring in staggered sequence in the several cylinders of the usual multiple cylinder vehicle motor, it will be evident that a smooth and uniform braking action through compression is secured, without wastage of motor fuel and the danger of back-fire when the rock shaft is turned for normal motor operation and the ignition switched on.

The mechanism is essentially simple in its structural features and therefore may be economically manufactured. It may be used with standard forms of overhead valve motors without requiring departure from their design and construction. While the structural features disclosed represent a preferable form of the device, they are intended as illustrative of the invention rather than restrictive. Hence, it will be understood that changes are contemplated in its structure adapting the construction to different conditions of manufacture and use in consonance with the spirit of the invention and the scope of the appended claims.

What I claim, therefore, and desire to secure by Letters Patent is:—

1. An internal combustion motor having intake and exhaust valves, valve operating push rods, rocker arms connecting at their opposite ends with the push rods and intake and exhaust valves, a rocker arm shaft upon which said rocker arms are journaled intermediate of their ends, said shaft having those portions journaling the rocker arms of the exhaust valves formed as eccentrics effective in one position of the shaft to permit normal push rod actuation of both intake and exhaust valve rocker arms and valves, and effective in a rotated position of the shaft to permit normal push rod actuation of the rocker arms of the intake valves and inoperatively to position the exhaust valve rocker arms relatively to their push rods and valves, an air feed conduit communicating with the intake manifold of the motor and having a rotatable air inlet valve therein, and an operating member having connections with said rocker arm shaft and with said air valve effective in one direction of movement to rotate said rocker shaft to said exhaust valve closing position and coincidently to turn said air inlet valve to air intaking position, and reversely movable to turn said rocker shaft to normal valve operating position and coincidently to close said air inlet valve.

2. In a vehicle motor having normally closed intake and exhaust valves, individual rocker arms for moving individual valves to open position and motor operated push rods separate therefrom, for periodically engaging and moving individual rocker arms in valve opening direction, a rock shaft upon which said rocker arms are individually journaled intermediate of their ends, having eccentric portions thereon upon which the exhaust valve rocker arms, only, are journaled and by rotatory movement of which said exhaust rocker arms are moved to and from positions placing their opposite ends in push rod contacting and exhaust valve opening relation to other positions beyond the area of operating contact with said push rods and exhaust valves, manually operable means for effecting such rotatory movement of the rock shaft eccentrics, an air conduit separate from the carburetor intake communicating with the motor intake manifold and by-passing air thereto, and having an air inlet valve therein, and connections being said valve and said manually operable means operated by actuation of said means inoperatively to position the exhaust valve rocker arms for coincidently opening said air intake valve.

WILLIAM H. HEWITT.