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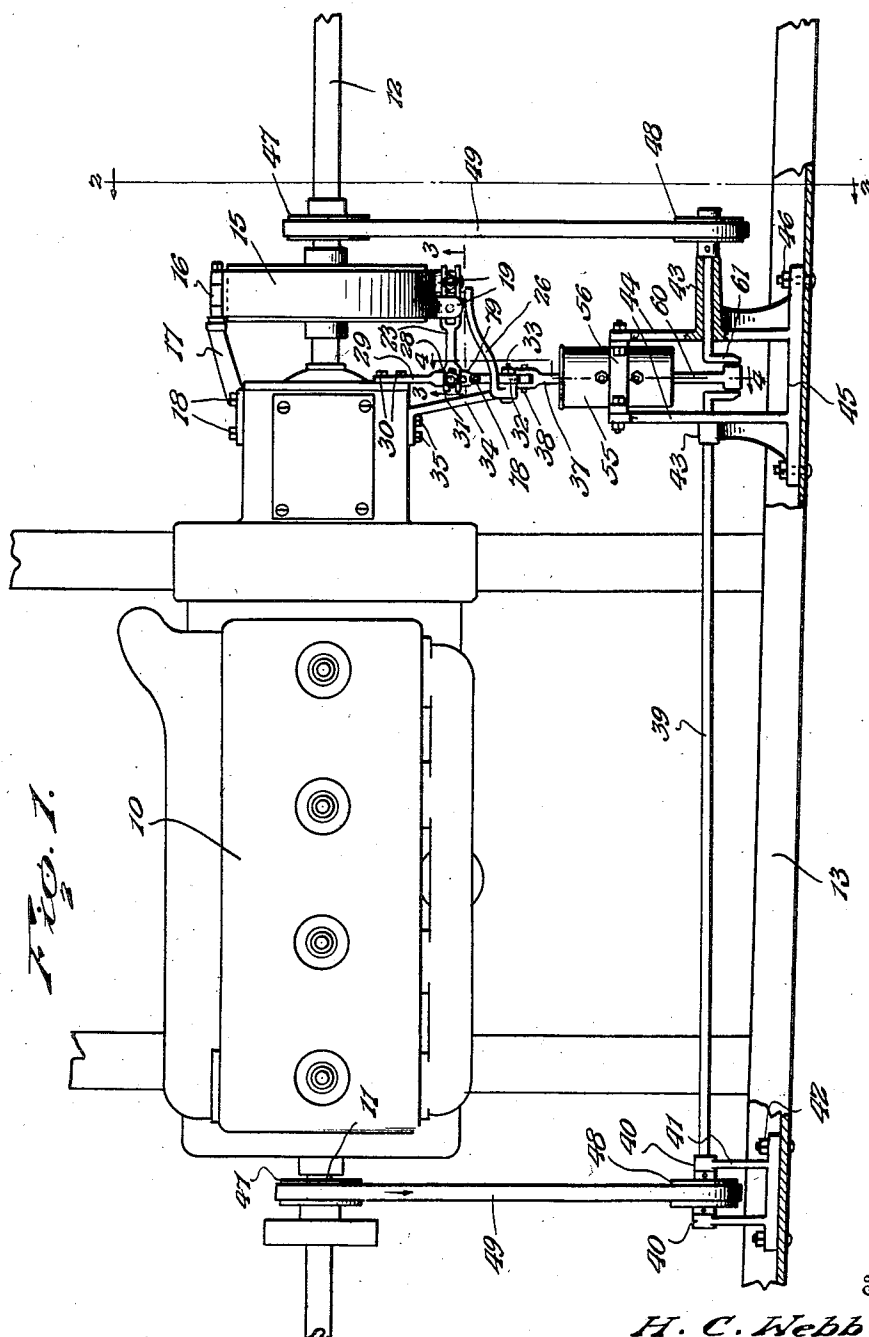
H. C. WEBB

1,958,356

AUTOMATIC PARKING BRAKE

Filed May 13, 1932

3 Sheets-Sheet 1



By *Lacey Lacey* Attorneys

May 8, 1934.

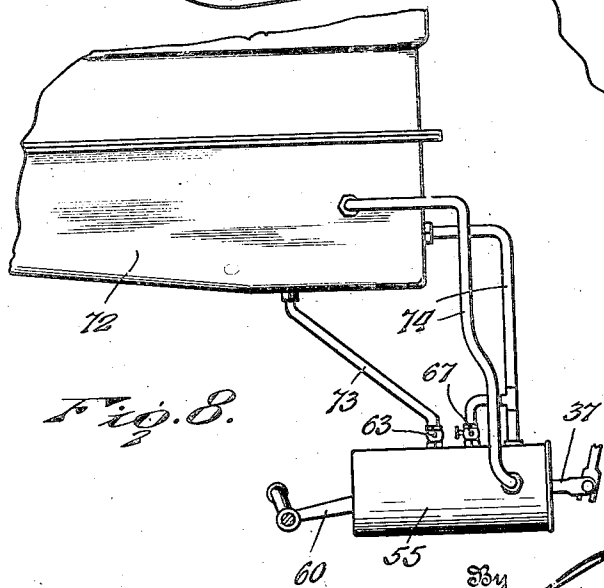
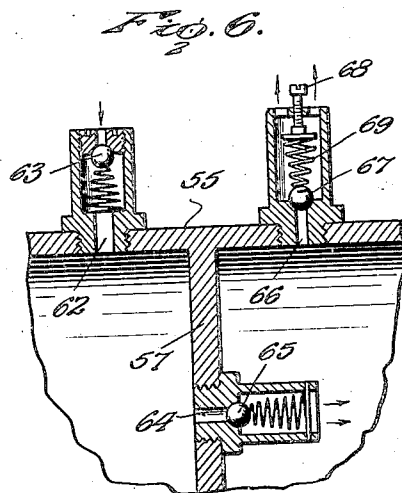
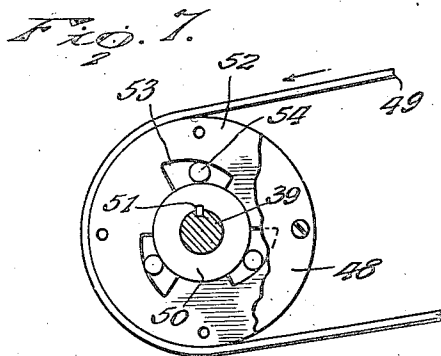
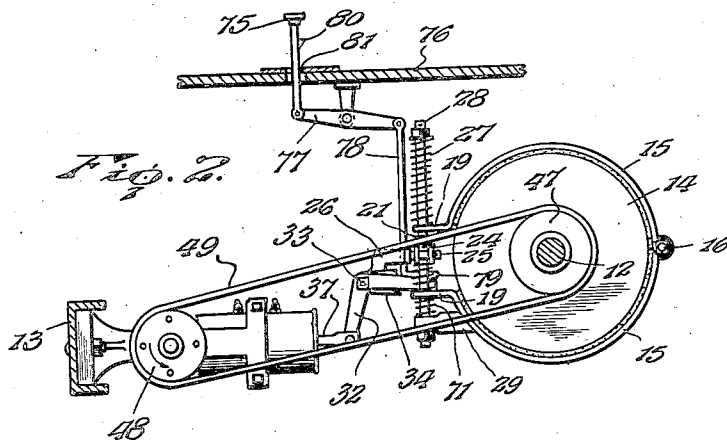
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3 Sheets-Sheet 2



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Fig. 3.

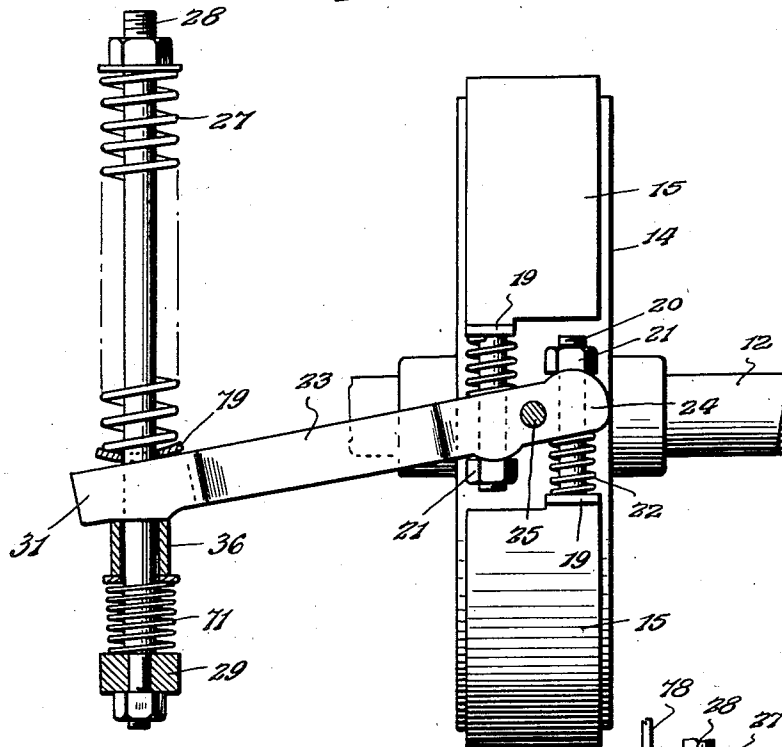


Fig. 4.

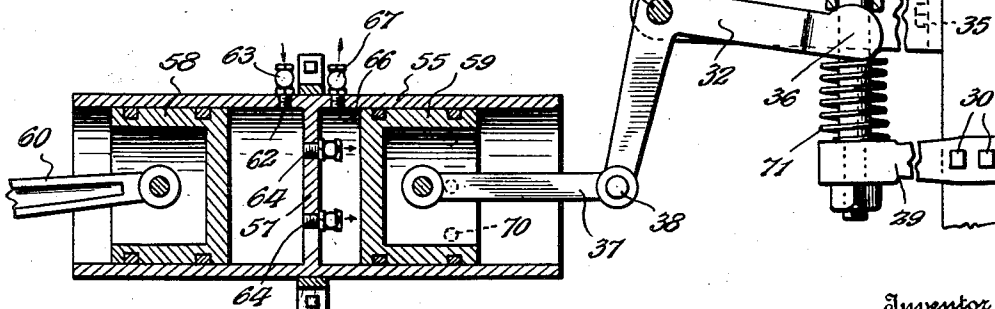
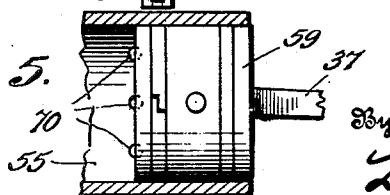


Fig. 5.



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UNITED STATES PATENT OFFICE

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AUTOMATIC PARKING BRAKE

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Application May 13, 1932, Serial No. 611,164

6 Claims. (Cl. 188—170)

This invention relates to automatic parking brakes for motor vehicles, and has for an object to provide novel brake apparatus adapted to hold the car when the motor stalls or the car is brought to a stop, and which includes a power driven pump for holding the brake released, and tension means for applying the brake when the pump stops.

A further object of the invention is to provide an automatic brake in which the pump will be continuously driven by the motor and drive shafts so that as soon as the motor starts the pump will release the brake, but if the motor stalls when the car is in motion the pump will be driven by the drive shaft until the car stops, to the end that the brake will not be applied when the car is in motion even if the motor stops, as for example, when the car is going down a hill, or is in traffic.

A further object is to provide an automatic brake including novel ratchet drive connections for operating the pump from the motor shaft and drive shaft simultaneously so that if the motor is running and the car is not moving, the ratchet on the motor shaft will drive the pump, and if the motor stops and the car is moving the ratchet on the drive shaft will drive the pump, both ratchets being of the overrunning clutch type and compensating for differences in speed of the drive shaft and motor shaft.

A further object is to provide an automatic brake in which the pump may utilize either atmospheric air or oil from the crank case as the fluid medium to create pressure against the working piston for moving the brake releasing parts of the device.

A further object is to provide a foot pedal by means of which the automatic brake may be released when the motor is stopped and the car is not in motion and it is desired to move the car or free the wheels for any purpose.

With the above and other objects in view the invention consists in certain novel details of construction and combinations of parts hereinafter fully described and claimed it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming part of this specification,

Figure 1 is a plan view of the automatic brake in set condition,

Figure 2 is a cross section taken on the line 2—2 of Figure 1,

Figure 3 is an enlarged detail section taken on the line 3—3 of Figure 1,

Figure 4 is an enlarged detail section taken on the line 4—4 of Figure 1,

Figure 5 is a fragmentary section showing the method of quick fluid release,

Figure 6 is a detail section showing the check valves,

Figure 7 is a detail view of one of the ratchet pulleys, and,

Figure 8 is a view of a modified form of the invention wherein the fluid for actuating the working piston is pumped from the oil supply in the crank case.

Referring now to the drawings in which like characters of reference designate similar parts, 10 designates the motor, 11 the motor shaft, 12 the drive shaft, 13 the longitudinal member of the chassis or the frame, these parts being all of the usual motor vehicle construction.

Preferably the brake is mounted on the drive shaft 12 and comprises a drum 14 fixed to the drive shaft, and a pair of arcuate brake bands 15 hinged together, as shown at 16, and supported at the hinge by a bracket 17, which is bolted to the transmission housing, as shown at 18. The ends 19 of the brake bands are directed outwardly and are offset from each other vertically, as best shown in Figures 1 and 3. Each end is provided with an integral pin 20 which is equipped with a nut 21 and is also equipped with a spring 22.

A lever 23 is provided with a forked end 24 to receive both pins and is mounted on a pivot pin 25 carried by a bracket arm 26 formed integral with a bracket 34 carried by the transmission housing, as shown in Figure 1. The pivot pin is passed through the branches of the fork between the pins 20. When the lever is rocked in one direction it exerts pressure against the nuts 21 and moves the pins oppositely to each other to set the brake bands 15. Movement of the lever in the opposite direction on its pivot releases the brake bands by virtue of the springs 22 being compressed ahead of the forked end 24 of the lever by such movement and forcing the brake bands apart.

The brake is maintained set in normal condition, and is only freed when the hereinafter described power driven pump is in operation. To maintain the brake set a main helical spring 27 is mounted on a stationary upright rod 28 which is secured at the lower end to a bracket arm 29, best shown in Figures 1 and 2 and which is bolted to the transmission housing, as shown at 30. The lever 23 is provided with a forked free end 31 to receive the rod and form a seat for the spring. The spring exerts downward pressure upon the free end of the lever with resultant pressure of

the pivoted end of the lever against the nuts 21 to hold the brake bands set.

The brake is released when said pump starts and for this purpose a bell crank lever 32 is mounted on a pivot pin 33 which extends laterally from the above mentioned bracket 34, which latter is bolted to the transmission housing, as shown at 35. The bell crank lever is provided with a forked end 36 to receive the rod 28 below the forked end 31 of the lever 23. A piston rod 37, operated by the hereinafter described working piston in the pump cylinder, is pivotally connected to the bell crank lever, as shown at 38 and rocks the bell crank lever against the tension of the main spring 27 to shift the lever 23 and compress the springs 22 to release the brake bands 15 as above described.

By now referring to Figure 1 it will be seen that a driven shaft 39 extends longitudinally of the chassis and is journaled at the forward end in spaced bearings 40 carried by a bracket 41 which is bolted to the chassis frame member 13, as shown at 42. The shaft is journaled at the rear end in spaced bearings 43 carried by spaced side members 44 of the pump cylinder supporting bracket 45 which is bolted, as shown at 46, to the chassis member 13. The driven shaft is actuated from both the motor shaft 11 and the drive shaft 12 of the vehicle. Two ratchet drive connections are employed, each a duplicate of the other, and each consists of a pulley 47 secured to the corresponding shaft of the vehicle and a ratchet pulley 48 secured to the driven shaft 39, both pulleys being connected by a belt 49. It will be understood that sprocket gears and chains, or equivalent shafts or gear trains may be utilized in lieu of the pulleys and belts so long as there is a ratchet connection between the shafts 11-12 and the driven shaft 39 to compensate for differences in speed.

Each ratchet pulley in the present embodiment is of the overrunning clutch type, best shown in Figure 7 and comprises a disk 50 which is fixed to the driven shaft 39 by means of a key 51 or otherwise. An annulus 52 is mounted concentrically upon the disk and is provided on the inner periphery with grooves 53 which receive rollers 54 that ride on the periphery of the disk. The grooves are of greater depth at one end than at the opposite end so that when the roller rides to the shallow end of the groove the annulus will be wedged upon and travel as a unit with the disk 50. When the roller rides to the deep end of the groove the annulus will be freed from the disk and idles thereupon in the usual manner.

A pump cylinder 55 is mounted between the side members 44 of the frame 45 by means of a band clamp 56. The cylinder is open at both ends, as shown best in Figure 4. A transverse wall 57 is disposed at the center of the cylinder. A pump piston 58 is mounted in one end of the cylinder and a working piston 59 is mounted in the other end of the cylinder. The working piston carries the above mentioned piston rod 37. The piston rod 60 of the pump piston is connected to a crank 61 carried by the driven shaft 39, as shown in Figure 1.

The cylinder 55 is provided with an inlet port 62 which is controlled by a check valve 63 to permit atmospheric air being drawn into the cylinder by the suction stroke of the pump piston 58. The transverse wall 57 is provided with ports 64 each controlled by a check valve 65 to permit the air being forced through the wall and against the working piston 59 during the compression stroke of the pump piston. The cylinder is

provided in the working piston chamber with an outlet port 66 which is controlled by a check valve 67 that is adjustable by means of a set screw 68 for varying the tension on the spring 69 thereof. The screw 68 may be adjusted so that when the pressure in the working piston chamber is built up to a predetermined degree excess pressure will be relieved through the outlet port 66.

As best shown in Figure 5, a plurality of ports 70 are formed in the wall of the cylinder 55 and these ports are exposed when the working piston is at its outer limit of movement when the car is traveling fast and afford quick silent release of excess pressure against the piston.

It will be observed that the pump piston 58 is operated continuously when the motor is running or when the car is moving and the motor is not running, by means of the ratchet drives. During this continuous operation of the pump piston atmospheric air will be drawn through the inlet port 62 and forced through the ports 64 against the working piston 57 to move the latter to its outer limit of movement and maintain it at this position whereby the bell crank lever 32 is rocked and held in operative position to maintain the lever 23 shifted to operative position for holding the brake bands 15 released. When the pump stops, as for example, when the car is brought to a stop and the motor cut off, the main spring 27 immediately expands and rocks the bell crank lever 32 to move the working piston 59 to inoperative position at its inner limit of movement, the air being expelled through the check valve control outlet 66 during such movement of the working piston. A helical spring 71 is mounted on the rod 28 below the forked end 36 of the bell crank lever to cushion the bell crank lever and working piston against the shock of the main spring expanding to set the brake bands.

It is not essential that the pump utilize atmospheric air as the medium for actuating the working piston 59, since it will be seen by referring to Figure 8, that oil from the crank case 72 may be pumped through a pipe 73 into the cylinder 55 through the check valve 63 and be returned through the check valves 67 and 70 and return pipes 74 to the crank case. Two return pipes 74 are shown for the reason that it is believed that circulation of oil will be better facilitated. If desired, however, one pipe which is relatively greater in size than the pipes shown, may be employed.

Ordinarily the brake bands 15 are set and are only released when the pump is running. It is conceivable however, that it may be necessary to release the brake bands when the pump is not running and the car must be moved, and for this purpose, by referring to Figure 2, it will be seen that a foot pedal 75 is mounted on the floor 76 and is connected to one end of a rock lever 77, the opposite end of which carries a link 78 having at its bottom a notched foot 79, best shown in Figures 3 and 4, which straddles the rod 28 underneath the main spring 27. By depressing the foot pedal the link 78 will be lifted and will compress the main spring ahead of its foot 79 and thus relieve the brake bands of the pressure of the main spring. A stop tooth 80 is formed on the pedal to engage the floor plate 81 when the pedal is depressed and hold the main spring released.

From the above description it is thought that the construction and operation of my invention

will be fully understood without further explanation.

What is claimed is:

1. An automatic brake for motor vehicles, including a motor shaft, a drive shaft, a pump operatively connected to and continuously driven by said shafts, a brake, a working piston actuated by the pump and operatively connected to the brake to release the brake when the pump is in operation, and tension means operatively connected to the brake for applying the brake when the pump stops.

2. An automatic brake for motor vehicles, including a motor shaft, a drive shaft, a driven shaft, ratchet drive connections between the driven shaft and both the motor shaft and the drive shaft compensating for differences in speed of the drive shaft, and motor shaft, a pump operated by the driven shaft, a brake, a working piston actuated by the pump and operatively connected to the brake to release the brake when the pump is actuated, and tension means operatively connected to the brake for applying the brake when the pump stops.

3. An automatic brake for motor vehicle, including a brake, a power driven pump piston, a working piston, a common cylinder for the pistons open at both ends and having a transverse partition wall between the pistons, a check valve controlled inlet port in the cylinder for admitting a fluid during suction stroke of the pump piston, a check valve control port in said wall permitting passage of the fluid therethrough to exert pressure against the working piston during the compression stroke of the pump piston, a check valve controlled outlet port in the cylinder for releasing excess pressure against the working piston, a brake operatively connected to the working piston and adapted to be set when the piston is moved by pressure of the fluid thereagainst, and tension means operatively connected to the brake

for applying the brake when said pump piston is quiescent.

4. An automatic brake for motor vehicles, including a motor shaft, a drive shaft, a band brake on the drive shaft, a driven shaft, ratchet drive connections between the driven shaft and both the motor shaft and the drive shaft, a pump continuously operated by the driven shaft, a working piston actuated by the pump, a bell crank lever connected to said working piston, a rod at the free end of the bell crank lever, a pivoted lever for applying and releasing the band brake having the free end extending to said rod and superposed upon the free end of the bell crank lever whereby when the working piston is moved by the pump the bell crank lever shifts the pivoted lever to release the brake, and a main spring seated on the rod above said pivoted lever adapted to expand and move said pivoted lever to apply the brake when pressure against said working piston is removed by stopping of the pump.

5. An automatic brake for motor vehicles including a motor shaft, a drive shaft, a brake on the drive shaft, means operatively connected with the shafts and driven by either or both of said shafts for retaining said brake in released position, and means for setting the brake upon the stopping of said shafts.

6. An automatic brake for motor vehicles including a motor shaft, a drive shaft, a brake on the drive shaft, a power driven pump, means operatively connecting said pump with said shafts whereby said pump may be driven by either or both of said shafts for retaining the brake in a released position during rotation of either or both of said shafts, tension means for setting the brake upon the stopping of said shafts, and manually operable means connected with said tension means and shiftable for releasing the brake irrespective of movement of the pump.

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