June 1, 1937. J. DYKSTRA ET AL 2,082,538

THROTTLE HOOK-UP

Filed Oct. 17, 1931 2 Sheets-Sheet 1

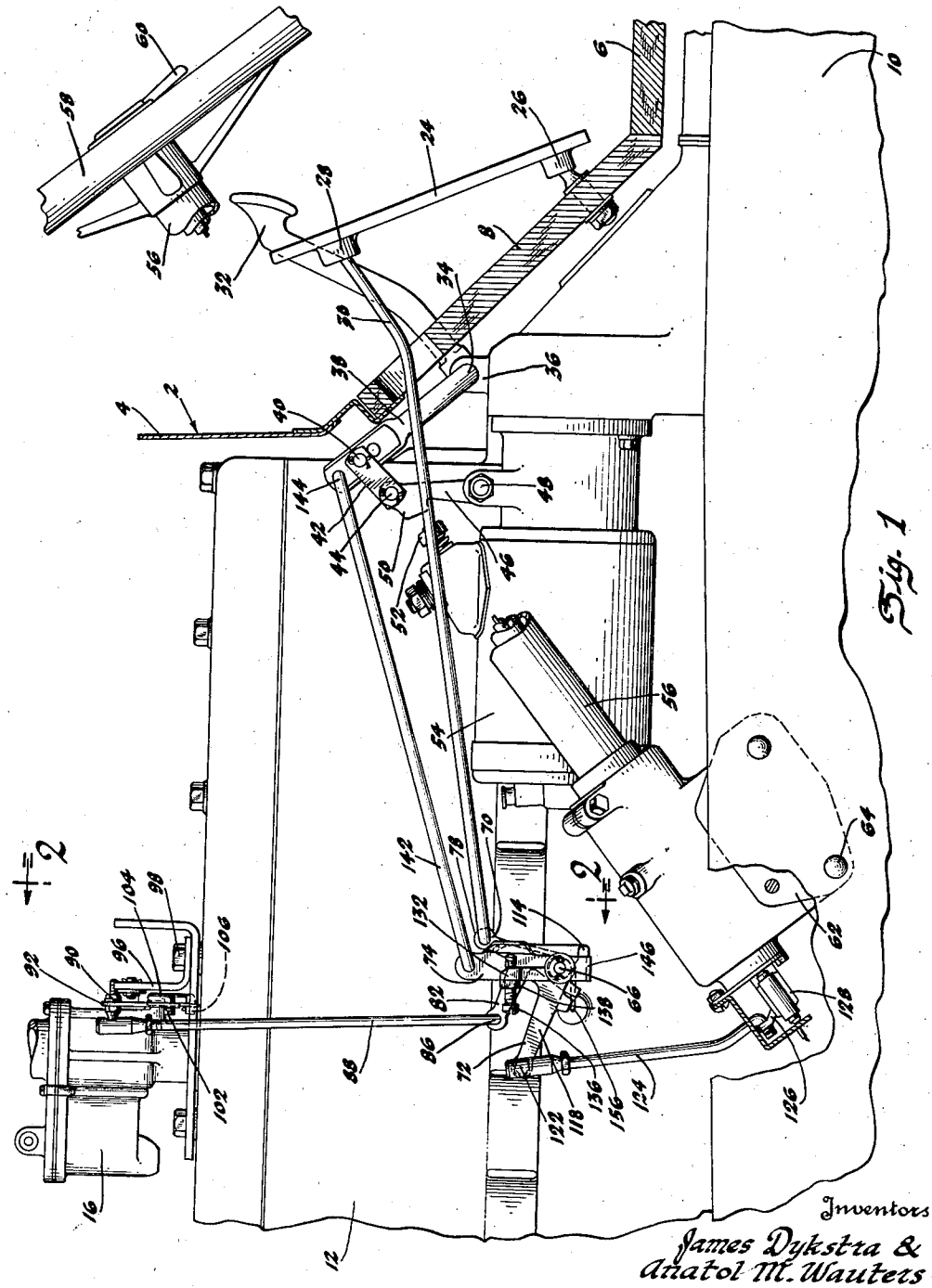

Fig. 1

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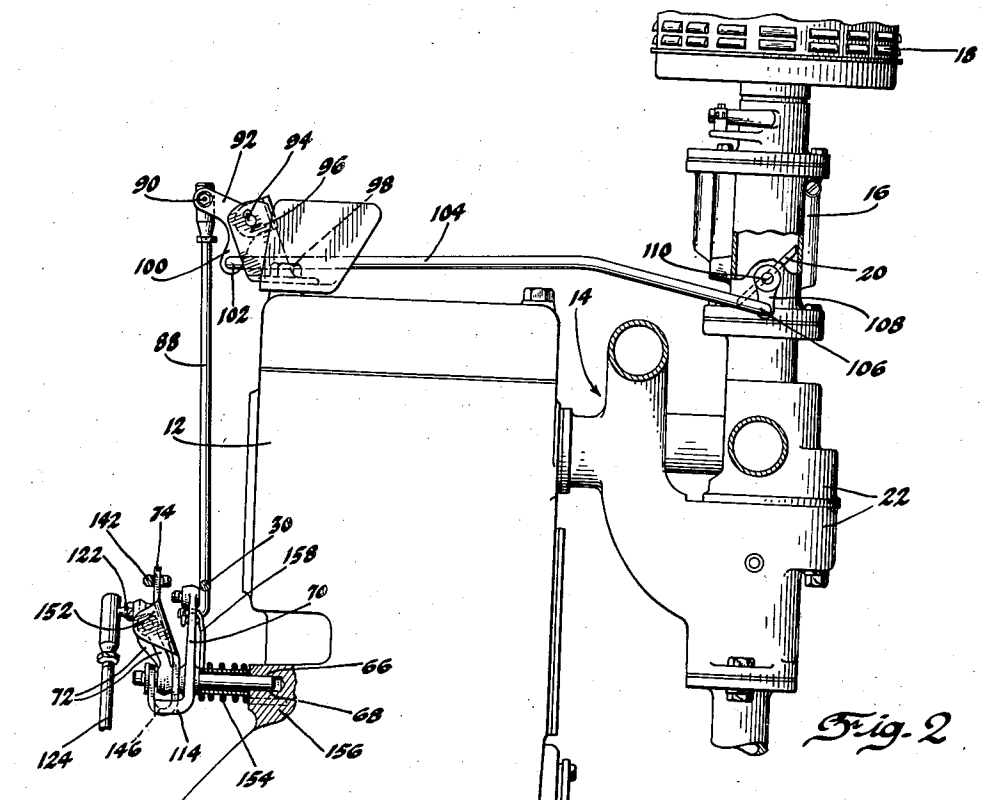

Fig. 2

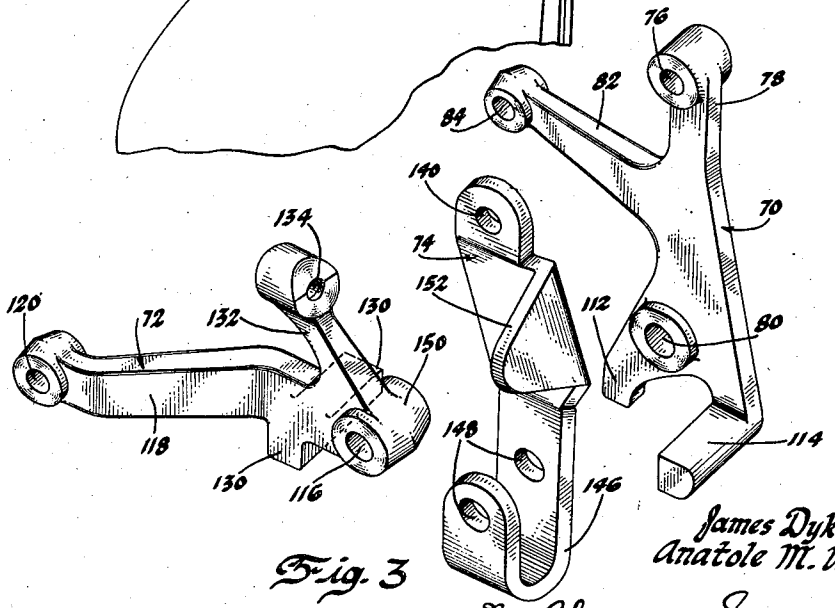

Fig. 3

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THROTTLE HOOK-UP

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7 Claims. (Cl. 123—179)

This invention relates to internal combustion engines and has particular reference to the combination or interrelation of the self-starting mechanism with the throttle operating means to facilitate starting.

The object of the invention is to interrelate the mechanism to operate the throttle of the carburetor with the starter so that when the starter is operated to start the engine, the throttle will be cracked wide open or any desired opening and on the release of the starting pedal, the throttle will return toward closed position but will remain open sufficiently wide to cause the engine easily to idle, or to give the engine a relatively fast idle.

The structure by which the object of the invention is accomplished consists of mounting on a rod or shaft secured to the engine block, three levers, one of which is connected by means of a rod to the starting device, a second by means of a rod to the accelerator pedal, and a third by means of a suitable linkage to the hand operated lever usually positioned on the steering wheel. A connection leads from the three levers to the throttle of the carburetor to operate the same. This latter connection is interrelated with the three levers so that it is operated each time any one of the three is operated.

On the drawings:

Figure 1 is a side view of a portion of the engine of an automotive vehicle with parts broken away to illustrate the invention.

Figure 2 is a view taken substantially on the line 2—2 of Figure 1 with the engine shown in full lines.

Figure 3 is a perspective expanded view of the three levers of the invention.

Referring to the drawings, the numeral 2 indicates the vehicle as a whole having the dashboard 4, the floor 6, and the inclined toe board 8. The usual chassis frame is indicated at 10 while 12 indicates the engine. The engine has interrelated therewith the usual intake and exhaust manifolds 14, the carburetor 16, the air cleaner intake muffler 18, the throttle valve 20, the fuel heater 22. Inside the vehicle, there is positioned the accelerator pedal 24 pivoted as at 26 at its rear end to the inclined portion 8 and at its forward end there is pivoted thereto at 28 the rod 30. The usual starter pedal is shown at 32 secured to a shaft 34 journalled in ears 36 secured to the flywheel housing. The shaft 34 has the angularly bent portion 38 to the end of which there is pivoted as at 40 a link 42, pivoted at 44 to an arm 46 pivoted at 48 to the motor housing. The arm 46 has the hook end 50 which, when the starter pedal 32 is operated, strikes the button or switch 52 to close the circuit to the motor 54 to start the engine through the usual gearing on the flywheel (not shown). The steering column is indicated at 56, the steering wheel at 58 and the hand throttle lever at 60, the latter preferably being mounted on the steering wheel. The steering column is preferably mounted by means of the brackets 62 to the chassis frame 10 by means of bolts 64. The parts so far described are conventional and per se form no part of the invention.

A shaft 66 is permanently mounted in the engine block as shown at 68 in Figure 2. On the shaft 66, there are journalled the accelerator lever 70, the hand throttle lever 72 and the starter lever 74. The three levers are best shown in the perspective view in Figure 3. The rod 30 from the accelerator pedal 24 is secured at its other end at the opening 76 in the arm 78 of the lever 70 and is suitably secured therein by means of a cotter key or otherwise. The opening 80 is for the reception of the shaft 66 while an arm 82, substantially at right angles to the arm 78, has an opening 84 in its end in which there is received the hooked end 86 of a link 88 connected at 90 to a bell crank lever 92 pivoted at 94 to a bracket 96 secured to the engine block 12 by means of the bolt 98. The other arm 100 of the bell crank lever has an opening for the reception of a hooked end 102 of a rod 104, the other end of which is hooked as at 106 into an opening in a lever 108 secured to a shaft 110 on which the throttle 20 is secured.

Referring again to Figure 3, it will be noted that the lower end of lever 70 has the flat lug 112 and the angularly extending lug 114, the purpose of which will be later described.

The hand throttle lever 72 has the opening 116 for the reception of the shaft 66. An arm 118 has the opening 120 in its end in which there is received the socket of a ball head 122 swiveled to the end of a rod 124. The other end of the rod 124 is hooked into an opening in a crank-arm 126 secured to a tube 128 extending through the steering column 56 and up to the hand wheel 58 and it has a hand lever 60 mounted at its other end. The lever 72 has the downwardly and outwardly extending lug 130 which engages with the lug 112 on the lever 70. The lever 72 has the extending arm 132 having a screwthreaded opening 134 in which there is received the adjusting screw 136 secured in adjusted position

by means of the lock nut 138. The purpose of this screw will be later decribed.

The starter lever 74 has the opening 140 at its upper end in which there is hooked the end of a rod 142, the opposite end of which is hooked into the portion 38 of the shaft 34 as indicated at 144. The lower portion of the lever 74 is U-shaped as indicated at 146 and both legs of the U have the openings 148 for the reception of the shaft 66. The bearing portion of the lever 72, indicated at 150, is received in the U portion 146 between the openings 148. The U-shaped portion 146, therefore, extends considerably below the shaft 66. The lever 74 has the lug or ear 152 extending away therefrom, the purpose of which is to strike against the end of the screw 136. Referring to Figures 2 and 3, the lug 114 of the lever 70 fits against or is adapted to be moved by the lower end of the U-shaped portion 146.

The operation of the structure is as follows: Assuming that the engine is not running and cold and it is desired to start, the operator presses the starter pedal 32 which will cause the hook 50 to press the button at 52 to start the motor 54 which in turn will turn over the engine. The movement of the lever 32 will simultaneously move the rod 142 which will swing the lever 74 on the shaft 66 and cause the U-shaped portion 146 to strike the lug 114 which will swing the lever 70 to cause the linkage 88, 92, 104 to operate the throttle to wide open position. The lug or ear 152 on the lever 74 at a given time, depending upon the adjustment of the screw 136, will strike the end of the screw to operate the lever 72 which in turn will operate the hand lever 60 by means of the linkage 124, 126 and column 128. The operation of the starting pedal 32 to start the engine will, therefore, simultaneously operate the accelerator pedal 24 and the hand operated throttle 60. When the starter pedal 32 is released, the coil spring 154, secured at one end 156 in the engine block and having its other end 158 hooked about the lever 70, will throw or return the parts toward the position shown in Figure 1. The starter pedal 32 will be thrown to its normal or retracted position while the accelerator pedal 24 will be moved rearwardly until the lug 112 of the lever 70 strikes against the lug 130 of the lever 72. When these two lugs meet, the throttle operating mechanism will be stopped from further movement for the reason that the spring 154 is of insufficient strength to move the hand throttle 60 and its interrelated linkage. Owing to the fact that the ear 152 has moved the lever 72 a given distance and as the spring is unable to return the mechanism to this given distance, the throttle will be returned only from wide open position to the position in which it is held by the lever 72. This position is sufficient to permit normal idling of the engine. If the operator wishes to return the throttle to fully closed position, it will be necessary manually to operate the lever 60 to move the link 72 to its initial position.

By a consideration of Figure 3, it is to be noted that if the operator desires to use the accelerator pedal to operate the throttle, this can be done without interfering with the starting pedal for the reason that the lever 74 will not be operated when the accelerator pedal 24 moves the link 30 to operate the lever 70. When the lever 70 is operated the throttle will be operated in the usual way from the link 88 but, as the lug 114 will move away from the U-shaped portion 146 and the lug 112 will recede from the lug 130, the accelerator pedal may be operated to operate the throttle independent of the other linkage.

In operating the throttle by the hand lever 60, the lug 130 on the link 72 will strike against the lug 112 and the lever 70 to swing the lever 70 on the shaft 66 which in turn operates the throttle linkage. The hand throttle 60 will allow the lever 72 to be moved a sufficient distance to open the throttle to its full position before the lug 130 strikes the U-shaped portion 146 of the starter lever 74 so that the hand lever may be operated without interfering with the starting mechanism.

The best known art is as follows: 1,106,466, McMurtry, 1,214,048, McMurtry, 1,293,468, Kettering, 1,434,013 Kettering, 1,628,707, Bevan et al. and 1,766,711, Heitger.

We claim:

1. In combination with an internal combustion engine having a starting device, an accelerator pedal and a carburetor, a throttle interrelated with a carburetor, means to operate the starting device, means connected to the accelerator pedal to operate the throttle, means connected with the starter operating means and interconnected with the throttle operating means to move the throttle toward open position simultaneously with the starting of the engine, and means to cause the starter mechanism to return to normal position and the throttle operating mechanism to return the throttle toward closing position, and means operable by the means for operating said starting device for causing said throttle to be left in partly open position sufficient for idling of the engine.

2. In combination with an internal combustion engine having a starting device, an accelerator pedal and a carburetor, a throttle interrelated with a carburetor, means to operate the starting device, a rod connected at one end to the accelerator pedal, a lever pivotally mounted on the engine and connected to the other end of the rod, means connecting the lever to the throttle to operate the same, a second rod connected to the starter operating means, a second lever pivotally mounted on the engine coaxially with the first mentioned lever, means interconnecting said levers whereby the operation of said starter pedal will simultaneously operate said throttle, and means to cause the starter operating means to return to normal position and the throttle mechanism to return the throttle toward closing position, and means operable by the means for operating said starting device for causing said throttle to be left in partly open position sufficient for idling of the engine.

3. In combination with an internal combustion engine having a starting device, an accelerator pedal and a carburetor, a throttle interrelated with the carburetor, means to operate the starting device, hand operated means to operate the throttle, means connected to the accelerator pedal to operate the throttle, said two means being directly connected, means connected to the starter operating means for operation thereby and interconnected with the second-mentioned throttle operating means and operating the hand operated means and the means connected to the accelerator pedal, means to cause the return of the parts operated thereby toward normal position and means for preventing the hand operated throttle operating means from returning completely to said normal position so that it is stopped

in partly open position after the starter operating means has been released.

4. In combination with an internal combustion engine having a starting device, operating means therefor, and accelerator pedal and a carburetor, a throttle interrelated with a carburetor, and a hand operated throttle lever, a rod connected at one end to the pedal, a first lever pivoted to the engine and connected to the other end of the rod, a second lever pivoted to the engine, means interconnecting the second lever with the hand operated lever, means connected to the throttle and interconnected with the said first and second levers whereby the throttle is capable of operation from either the hand operated lever or the pedal, a third lever pivoted to the engine coaxially with the second lever, a rod connecting the said third lever to the starter operating means, said third lever being interconnected with the said first and second levers to cause the operation of the latter when the former is operated whereby the throttle is opened simultaneously with the operation of the starting device, means to return the starting device and the accelerator pedal and other parts operated thereby toward initial or normal positions, and means for preventing the hand operated throttle operating means from making a complete return movement so that said hand operated throttle operating means is stopped in partly open position after the starter operating means has been released.

5. In combination with an internal combustion engine having a starting device, an accelerator pedal and a carburetor, a throttle interrelated with a carburetor, a first lever pivoted to the engine, means interconnecting said lever with the starting device so that said lever and starting device always move together, a second lever pivoted to the engine, means interconnecting said second lever with the accelerator pedal so that said second lever and the accelerator pedal always move together, means interconnecting said second lever with the throttle to operate the same, said second lever being engaged by the first and operated by the same on operation of the starting device simultaneously to open the throttle, the operation of said accelerator pedal moving the throttle without moving the second lever.

6. In combination with an internal combustion engine having a starting device, an accelerator pedal and a carburetor, a throttle interrelated with a carburetor, two levers pivoted to the engine and on the same axis, a connection from one of said levers to the throttle and a connection from the same lever to the accelerator pedal said connection being such that the accelerator pedal, the throttle and said lever always move together, a connection from the other lever to the starting device whereby said other lever and said starting device always move together, said levers being interengaged whereby the operation of the starting device will operate both levers to move the throttle when starting the engine, the interengagement permitting the operation of the accelerator pedal lever independently of the other lever.

7. In combination with an internal combustion engine having a starting device, an accelerator pedal and a carburetor, a throttle interrelated with the carburetor, means to operate the starting device, hand operated means to operate the throttle, means connected to the accelerator pedal to operate the throttle, said two means being directly connected, means connected to the starter operating means for operation thereby and interconnected with the second-mentioned throttle operating means and operating the hand operated means and the means connected to the accelerator pedal, means to cause the return of all of said operating means after operation to enable the return of the parts operated thereby to normal position, and means for returning the hand throttle operating means toward normal position upon release of the starter operating mechanism, and means to maintain the throttle in partly open position after the starter operating mechanism has been released.

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