Jan. 10, 1939. A. J. ISBELL 2,143,318

MULTIPLE THROTTLE CONTROL

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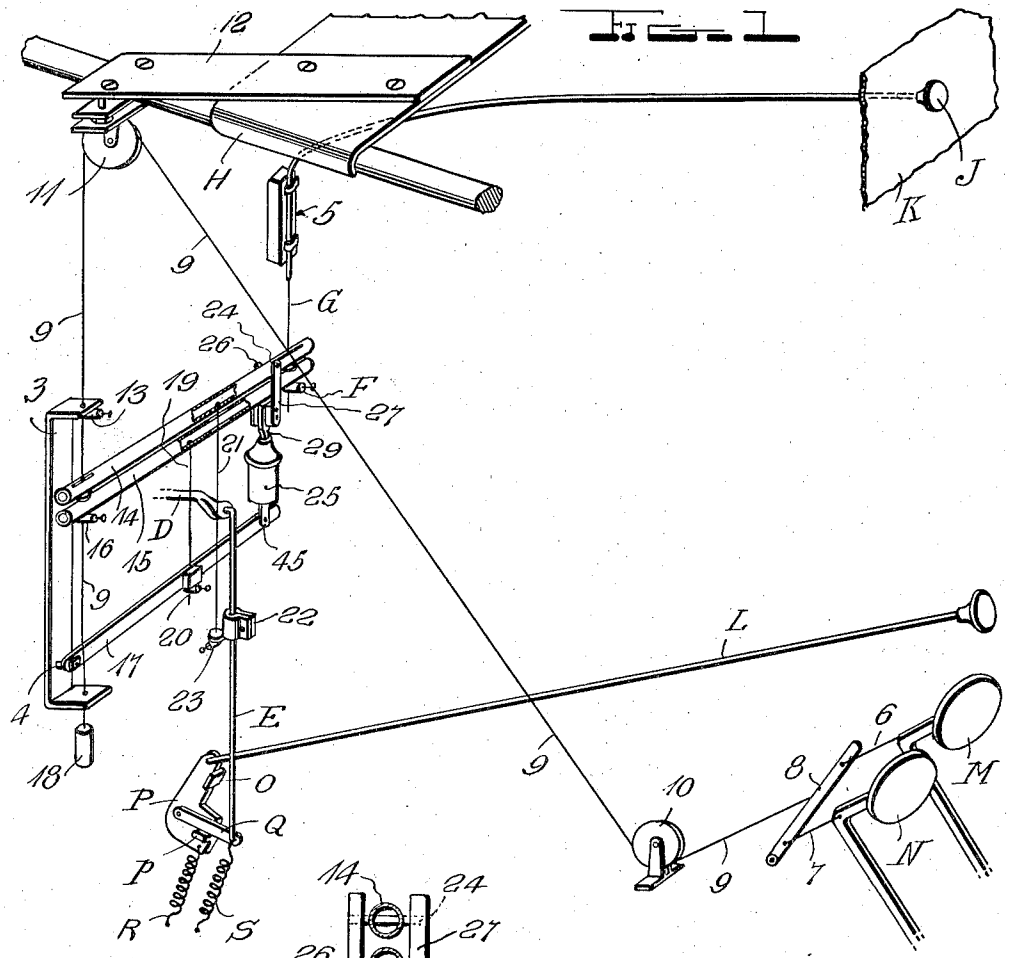


FIG. 1

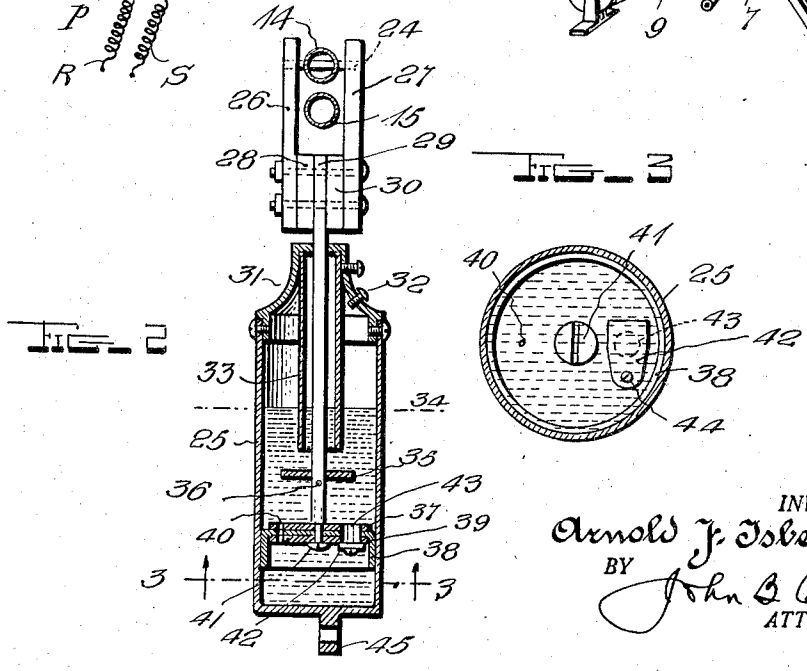


FIG. 2

FIG. 3

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FIG. 4

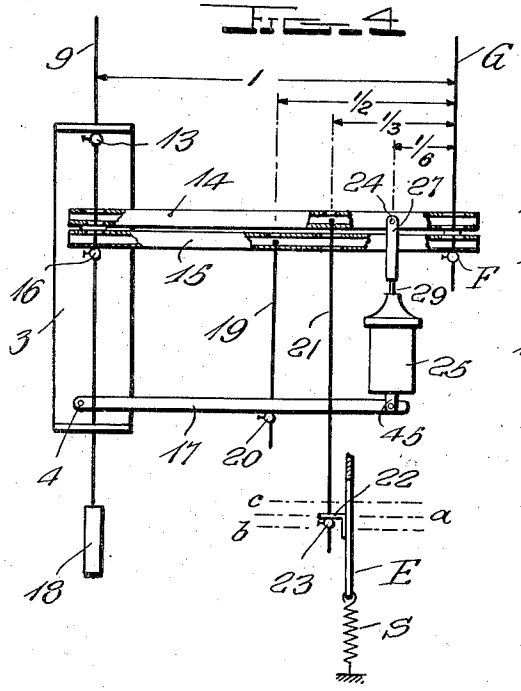
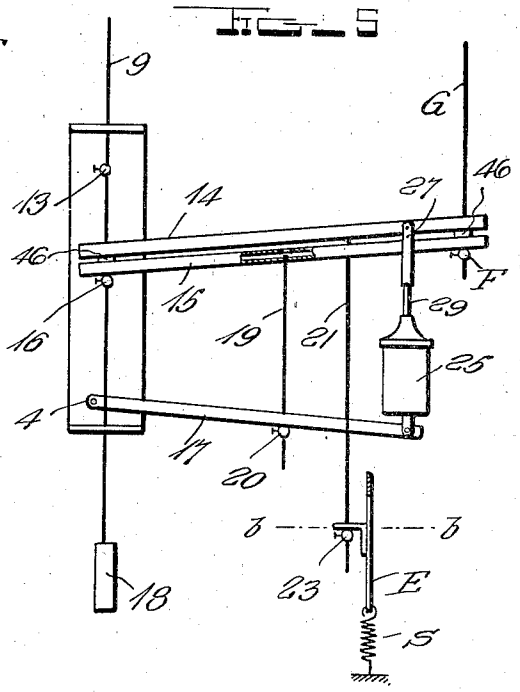


FIG. 5



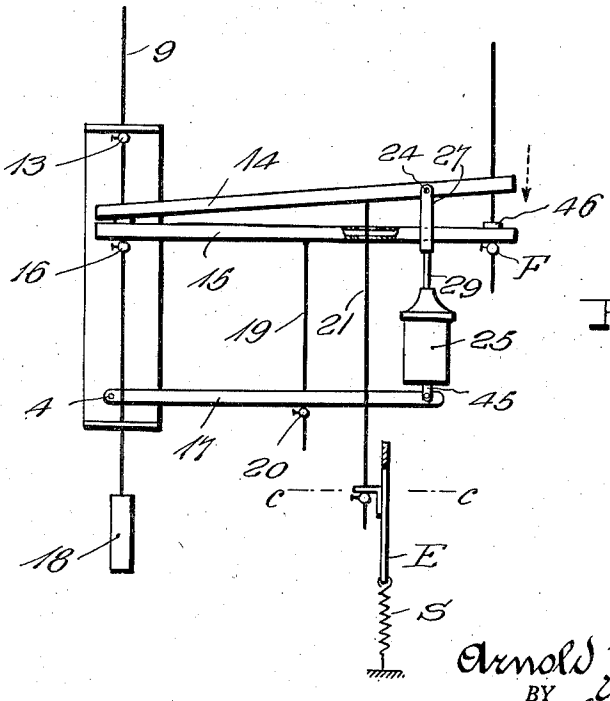


FIG. 6

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FIG. 7

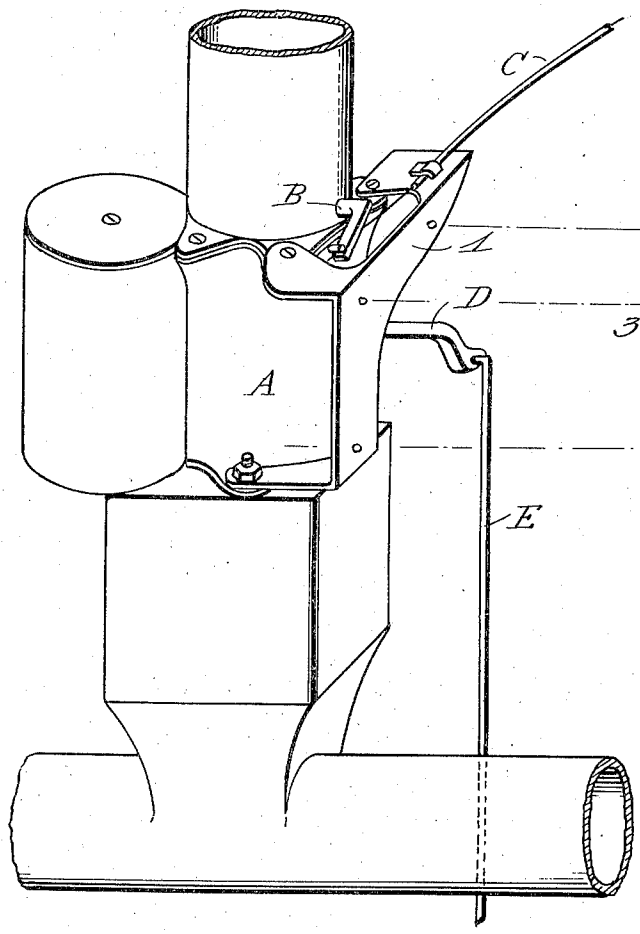


FIG. 8

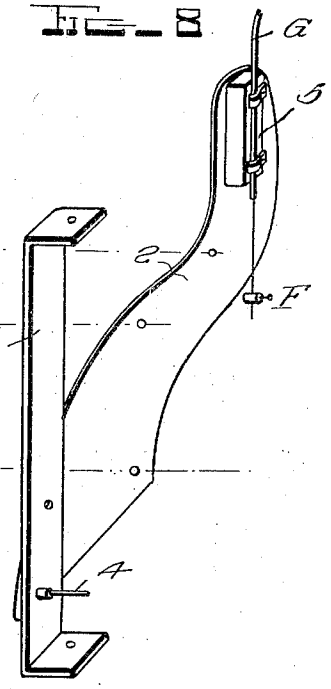
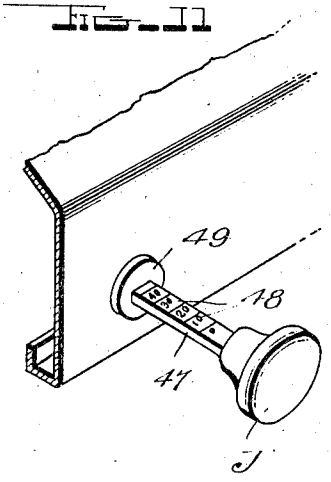


FIG. 11



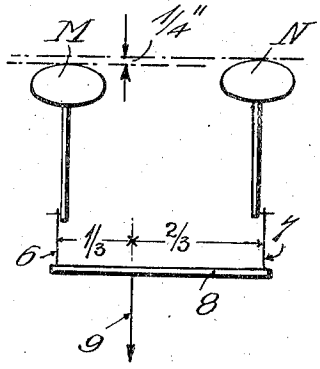
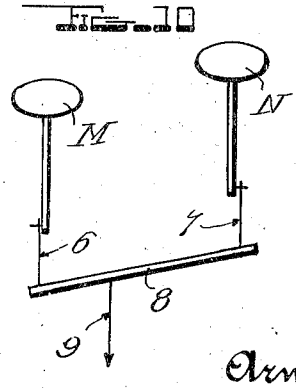


FIG. 9

FIG. 10



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UNITED STATES PATENT OFFICE

2,143,318

MULTIPLE THROTTLE CONTROL

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Application February 5, 1938, Serial No. 188,980

10 Claims. (Cl. 192—.01)

My invention relates broadly to automotive engine control apparatus and more particularly to a multiple throttle control arrangement.

One of the objects of my invention is to provide a multiple control for the carburetor throttle of an automotive engine, adapted to be actuated from a hand throttle, accelerator, foot brake lever or clutch lever of the automobile, for improving the control facilities of the engine and the efficiency and performance thereof.

Another object of my invention is to provide a multiple throttle control, adapted to supplement the direct controls usually provided, whereby a driver may adjust the hand throttle for any setting of the carburetor intake desired and may close such intake by operation of foot brake or clutch pedal, or both, without altering the adjustment of the hand throttle, so that the adjusted position of the throttle may be resumed upon release of the brake and clutch pedals.

Still another object of my invention is to provide a multiple throttle control as above stated wherein, also, operation of the accelerator to open the carburetor intake further may be effected without altering the adjustment of the hand throttle which may be resumed upon release of the accelerator.

A further object of my invention is to provide a multiple throttle control as above stated with means for opening the carburetor intake beyond the setting of the hand throttle upon release of the brake and clutch pedals for momentary acceleration of the engine, the intake being gradually reduced to the adjusted position of the throttle, automatically, during a short period following the acceleration.

A still further object of my invention is to provide a multiple control for the carburetor throttle of an automotive engine, adapted to supplement the direct controls usually provided and to be actuated from a hand throttle, accelerator, foot brake or clutch lever, without imposing additional load on any of the conventional controls, particularly the clutch, brake and accelerator controls, and wherein lost motion is eliminated to a substantial degree so that uniform operation of the engine through the multiple control apparatus is accomplished.

Still another object of my invention is to provide calibrated indicator scale means in conjunction with the hand throttle for indicating the normal running speed for any set position of the carburetor throttle.

A still further object of my invention is to provide a throttle control arrangement actuated from either the foot brake or clutch control pedal and having means for proportioning the applied force, which is in a sense tending to depress the pedals, so that the brake pedal bears substantially more of the load than does the clutch pedal, slippage of the clutch being thus avoided.

Other and further objects of my invention reside in the structure and arrangement of the various elements of the apparatus hereinafter described with reference to the accompanying drawings, in which:

Figure 1 diagrammatically illustrates the apparatus of my invention in perspective arrangement, indicating the connection thereof with the various control members used by the driver; Fig. 2 is a vertical sectional view, and Fig. 3 a cross-sectional view on line 3—3 in Fig. 2, of a hydraulic device employed in the arrangement of my invention; Figs. 4, 5 and 6 are elevational diagrammatic views, with parts broken away, of the main portion of my invention showing the elements in various progressive stages of operation; Fig. 7 is a perspective view of the carburetor and a special bracket mounted thereon to support the apparatus of my invention; Fig. 8 is a perspective view of a coacting supporting bracket forming a part of the apparatus of my invention; Figs. 9 and 10 illustrate diagrammatically in plan the normal and one actuated position respectively of the foot brake and clutch control pedals in the throttle control arrangement of my invention; and Fig. 11 is a detail view in perspective of the hand throttle provided with a calibrated scale.

The multiple throttle control hereinafter described has many advantages and constitutes an improvement over similar devices in many respects. Among the advantages to be found in my improved arrangement are greater safety due to the driver's instantaneous control of the foot brake, his right foot being rested thereon and not required for movement of the accelerator; economy and quicker acceleration due to the momentary over-advance of the throttle; and quicker starting of the engine by simultaneously releasing the clutch pedal and actuating the starter, also due to the momentary over-advance of the throttle. Furthermore, in the operation of the car, gears may be shifted without touching the accelerator, the engine being automatically accelerated as the clutch is engaged; the car may be driven at various speeds on a level or at constant speed over rises

and depressions in the roadway, without altering the hand throttle setting, by using the brake pedal in the range short of effective application of the brakes for closing the throttle, or the accelerator pedal for opening the throttle wider; and the car may be started on hills more safely because release of the brake with the clutch automatically accelerates the engine, momentarily beyond the desired setting for smoother operation.

In the drawings letters indicate the more or less conventional parts of the automotive engine and controls whereas figures indicate more particularly the structure of my invention adapted for cooperation therewith. It will be understood that the arrangement of my invention may be built into the vehicle during its manufacture, or may be applied as an accessory through adaptation and in supplement to the direct controls usually provided.

Referring to the drawings in more detail, in Fig. 1 I have shown the throttle arm D which connects with the carburetor throttle for controlling the operation of the engine in the conventional manner; Fig. 7 indicates the relation of the arm D to the carburetor A which also is provided with an air valve or choke B manually controlled by means C. In Fig. 1 the usual accelerator linkage is shown to include rod E, drag link Q cooperating with stop *p* on link P which in turn cooperates with a fixed stop O, and the accelerator rod L terminating in an accelerator pedal. Springs R and S are provided to urge links P and Q against their respective stops. The arm D is also usually provided with idling speed adjustment means, not shown, and hand throttle control means comprising wire G provided with a knob J on the instrument panel K, the wire G normally being connected with the arm D by a wire stop F and operable to control the carburetor throttle against the action of spring S. The usually independent brake and clutch pedals are indicated at M and N respectively. Structural bracing members are usually found as at H, Fig. 1, and may serve to mount a portion of the apparatus of my invention.

The multiple throttle control apparatus comprises, more particularly, flexible wires 6 and 7 suitably secured to the brake and clutch pedals M and N, respectively, preferably at a bolted connection in the pedal structure, where such connections are provided. A tube, or rod, 8 holds the wires 6 and 7 in spaced relation, and wire stops or other suitable means are provided to fix the wires to tube 8. A control wire 9 is likewise secured to tube 8, and is passed through suitable guide means, as sheaves or pulleys 10 and 11 mounted on the dust pan and the bracket 12 attached to bracing members H, respectively, so that wire 9 runs parallel to rod E connected with the carburetor throttle arm D. A mass 18 or a suitable equivalent is provided to tension the wire 9, but is not of sufficient weight to offset the forces maintaining the pedals M and N in raised position. Moreover, wire 9 is secured to tube 8 at a point approximately one-third the distance from wire 6 to wire 7, nearer the wire 6, as indicated in Fig. 9, so that the foot brake sustains the greater portion of the tension in wire 9, preventing any depression of the clutch pedal and consequent slipping in the engine clutch. Also, as movement of the clutch pedal is normally greater than that of the brake pedal, the off-middle arrangement of wire 9 results in a more constant range of movement of wire 9 upon actuation of either pedal, as may be understood with reference to Fig. 10.

Mounted adjacent the carburetor by means shown more clearly in Figs. 7 and 8, is a bracket 3 having horizontally extending end portions apertured to pass wire 9 and acting as guide or restraining means for the wire to prevent displacement thereof by inertia or centrifugal forces acting on the mass 18. A wire stop 13 engages the under side of the upper end portion of the bracket 3 and may be adjusted longitudinally on wire 9 preferably so that the brake pedal M is slightly depressed, about ¼", to lend further stability to the wire 9.

An additional wire stop 16 is provided on wire 9 as a support for tubes 14 and 15 through which wire 9 passes, as indicated. The opposite ends of the tubes 14 and 15 are supported by wire stop F on wire G which passes through the tubes similarly to wire 9. The upper tube 14 and the upper side of tube 15 are slotted to permit angular movement of the tubes in the plane of the wires (Fig. 6), while the lower side of tube 15 is simply apertured for the wires in order to provide a stable, pivotal type of support for the tubes. At a point approximately one-third the distance from wire G to wire 9, as shown more clearly in Fig. 4, a beaded head wire 21 is mounted in the tube 14, passed through aligned slots in tube 15 and an apertured bracket 22 fixed to the rod E. A wire stop 23 is provided beneath the bracket 22.

With the apparatus thus far described, it will be seen that the accelerator linkage is free to control the carburetor throttle, as normally; and that a dual lever arrangement is provided for further control. Considering the stop 16 fixed, with the pedals M and N raised, the throttle can be set by adjusting stop F by knob J; whereupon, considering stop F fixed, the throttle would be closed by depression of either the brake or clutch pedal. To this extent merely, therefore, the arrangement of my invention is operable and advantageous in many ways. It will be noted that no additional load is borne by brake or clutch pedals, that the bracket 22 which is the only load added to the accelerator linkage may be compensated for by removing the apertured flange originally provided on the throttle arm D for wire G, and that actually the pressure required to operate brake and clutch is decreased, by the weight of the mass 18 in particular.

In combination with the foregoing arrangement I have provided further control means operative to advance the throttle momentarily beyond the setting of stop F, and permitting the fixed setting to be resumed after a desired time interval of about five seconds. The additional structure includes a lever 17 pivoted on a bolt 4 in the lower end of fixed bracket 3, and extending in the general direction of the tubes 14, 15. A wire 19 is fixed to the tube 15 about the middle thereof and depends to lever 17, passing through a portion of the lever and being provided with a wire stop 20 which supports the lever. Between the extremity of lever 17 and a point 24 about one-sixth the distance from wire G to wire 9 (Fig. 4), I provide a hydraulic device at 25 pivotally connected to the respective members.

The hydraulic device is shown in sectional detail in Figs. 2 and 3 and comprises a cylinder 25 having a closed end provided with a connecting lug 45 for pivoting on the lever 17, and an open end provided with a closure 31 which is centrally

apertured to pass a piston rod 29 which extends into the cylinder. The rod 29 supports a pair of washers 37 and 39 and a leather sealing washer 38 of greater diameter disposed therebetween, all held by screw 41, the washers comprising a piston movable in the cylinder 25. A stop washer 35 supported by pin 36 is mounted on the rod 29 and cooperates with the lower end of a spacer tube 33 fixed to the closure 31, the spacer tube being of predetermined length proportioned with respect to the maximum amount of over-advance desirable in the carburetor throttle. The piston has a small aperture 40 drilled through washers 37, 38 and 39 and left uncovered; and a relatively large aperture 43, likewise drilled through all the washers, but provided with a valve closure comprising a leather flap 42 held by a screw 44. The cylinder is filled with oil or other hydraulic fluid through opening 32 in the closure 31 to a level approximately at line 34, and the structure is such that the piston may rise with respect to the cylinder with relatively small impedance, valve 42 opening downwardly, but may descend only as the fluid passes through the small aperture 40.

The upper end of rod 29 is provided with a yoke comprising arms 26 and 27 bolted to the rod 29 with spacer blocks 28 and 30 interposed. The yoke portion embraces tube 15 and is connected with tube 14 at 24 as indicated in Fig. 1, the yoke being deep enough to permit relative displacement of tube 14 in the operation of the device, as in Fig. 6.

The apparatus is adjusted as follows. Wire stops F and 16 are set to support tubes 14 and 15 substantially horizontal with the hand throttle J in about mid-position of its range. Wire stop 13, as noted, is adjusted to remove slack in wire 9 by holding the brake pedal M slightly depressed. Wire stop 23 is set to produce the fastest desired idling speed of the engine, when the hand throttle J is in, at its lowest effective position, and the pedals M and N are unoperated. And wire stop 20 is set for any degree of movement desired in the hydraulic device 25, within the limit set by the spacer tube 33 therein. Stop 20 is adjusted, and pivot 4 correspondingly located with respect to the extended length of the hydraulic device, so that lever 17 and tubes 14, 15, are substantially parallel or divergent at the hydraulic device in order that the raising of the stop F may maintain or reduce the extended condition of the device to assure operation thereof from the brake and clutch pedals. Preferably the stop 20 is adjusted to provide an extension of approximately one-fourth inch in the hydraulic device upon the actuation of wire 9 as in Fig. 5.

It might be here noted that by setting stop 23 so that the engine idles with the hand throttle pushed in and tube 14 raised by hand to extend the hydraulic device to its limit there results an excellent operating condition which is similar to the usual condition in every way, except that the loads on the pedals M and N are decreased, whenever the hand throttle is pushed fully in.

Referring to Figs. 4–6, the operation of the complete system of my invention is shown in three stages; Fig. 4 shows the middle set position of the hand throttle J, which would correspond to a speed on level road of, say, about fifty miles per hour. Upon depression of clutch or brake pedal, wire 9 moves downwardly with stops 13 and 16, as shown in Fig. 5, lowering the left ends of tubes 14 and 15 and letting bracket 22 drop from position *a* to position *b*, closing the carburetor throttle. At the same time, wire 19 permits lever 17 to drop and the hydraulic device at 25 to extend, due to passage of fluid readily through the larger aperture 43, to a maximum determined by the meeting of washer 35 and tube 33, Fig. 2—wire 19 becoming slack if the maximum extension of the hydraulic device is attained.

Upon release of the clutch and brake pedals, wire 9 is restored to position with stop 13 limiting its movement, as illustrated in Fig. 6. Stop 16 raises tubes 14 and 15, and wire 19 draws lever 17 upward parallel again with tube 15 (in the condition noted). The hydraulic device at 25 does not immediately contract because of the closure of the larger aperture 43 by valve 42, leaving open only the smaller aperture 40 in the piston, and as a result the right end of tube 14 is raised approximately one-fourth inch above tube 15, pulling wire 21 and lifting bracket 22 to position *c* and opening the carburetor throttle beyond the set position at *a*. In a period of about five seconds, the hydraulic device contracts to the position shown in Fig. 4, tube 14 resting on tube 15, and bracket 22 again resumes the set position at *a*.

The mounting brackets illustrated in Figs. 7 and 8 have been devised for adaptation of my invention to a 1937 model of a standard make of automobile, and it is to be understood that various types of brackets may be devised for mounting the apparatus of my invention. More particularly, Fig. 7 shows the form of carburetor structure A to which I have affixed a bracket 1 in substantially the form illustrated; provision is made for securing thereto a guide and clamp for the choke control means C. The bracket 1 is provided with three holes which are of a predetermined arrangement, regardless of the form of bracket 1, so as to coact with holes in a standardized bracket arrangement such as shown at 2, 3, provision being made on bracket 2 at 5 to clamp and support the hand throttle control device which includes wire G. Brackets 2, 3, therefore, and more especially bracket 3 as hereinbefore described, may be considered a part of the standard elements of my invention, bracket 2 being cooperable with various special adaptor brackets, one of which is illustrated in Fig. 7, for mounting the apparatus in operable relation to various designs of carburetors.

Because of the uniform control effected through operation of the system of my invention I provide calibrated scale means in connection with the hand throttle control J as illustrated in Fig. 11. The knob J has a shank portion 47 flattened on the top side and inscribed with scale indicia as at 48. The bushing 49 serves to mount the shank and the knob in the instrument panel and the edge of such bushing constitutes an indicator for the scale at 48. It might be here noted that this hand throttle should preferably be set from an advanced to a more closed position although subsequent operation of either the engine clutch, foot brake or accelerator pedal will quickly establish the required relation in each instance.

In automotive engines it is a known fact that throttle control varies as the throttle is closed or opened to a set position, resulting in a higher speed where the throttle is closed from an advanced position. Such is the control effected in all of the apparatus of my invention and is one of the major factors differentiating from prior are devices. Moreover, such control is more uni-

form and accurate in its results, and by reason thereof the indicator means, Fig. 11, is highly dependable in operation and of particular efficacy in the arrangement of my invention.

The various wires may be conveniently mounted in the tube elements by providing headed portions at one end thereof, small holes in the exit side of the tube, and a larger hole opposite thereto, so that the wire may be simply drawn into position. This refers particularly to wires 6, 7 and 9 at tube 8, and wires 19 and 21 at tubes 15 and 14 respectively; and the structure is illustrated in Figs. 4 and 9, as well as in Fig. 1.

Between tubes 14 and 15, on wires 9 and G, I have shown washers 46 which may be of felt, rubber, leather, or other suitable cushioning and silencing material; and additional guides, dampers, washers, and the like may be employed in the apparatus as may be necessary to eliminate noise and vibration.

The apparatus of my invention has proven highly practical in service and requires no adjustments or attention subsequent to installation. I have found the arrangement particularly advantageous during lengthy trips in relieving fatigue and increasing the safety and ease of operation of the car.

Various modifications in the apparatus disclosed are contemplated and it is desired that it be understood that such modifications are within the scope of my invention. For example, the form and arrangement of the elements may be varied to meet certain eccentric conditions of space adjacent the carburetor throttle.

Thus while I have shown my invention in its preferred embodiment, modifications may be made therein, and no limitations upon my invention are intended except as are imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. In combination with the throttle arm of a carburetor, means controlled by a hand throttle control for setting said arm at any position of adjustment for running, and means controlled jointly and severally by the clutch and the brake pedals for closing the carburetor throttle when both the clutch and the brake pedal are depressed and when either of them is depressed, and for restoring the throttle arm to the set position of adjustment for running upon the release of both clutch and brake pedals to normal position, the last said means being under tension with respect to said pedals and effective to decrease the pressure required to operate said pedals.

2. In combination with the throttle arm of a carburetor, means controlled by a hand throttle control for setting said arm at any position of adjustment for running, means for closing the carburetor throttle below the set position of adjustment, and means dependent upon each of the aforesaid means and automatically operative for advancing the throttle momentarily beyond the set position of adjustment, the last said means permitting said throttle arm to return immediately to the set position of adjustment.

3. In combination with the throttle arm of a carburetor, means controlled by a hand throttle control for setting said arm at any position of adjustment for running, and means controlled jointly and severally by the clutch and the brake pedals for closing the carburetor throttle below the set position of adjustment; the last said means comprising tensioned wire means fixed to said pedals and connected with the aforesaid means, and movable in advance of said pedals to vary the position of the throttle arm, said tensioned wire means being effective to decrease the pressure required to operate said pedals.

4. The combination set forth in claim 3 and wherein said tensioned wire means includes separate wires of short length fixed to said pedals and to the opposite ends of a spacer member, and an actuating wire fixed to said spacer member substantially closer to the end connected with the brake pedal, whereby the tension in said actuating wire is proportionately greater on said brake pedal than on the clutch pedal.

5. The combination set forth in claim 3 and wherein said tensioned wire means includes means for dividing the tension in said wire means with substantially greater tension on the brake pedal than on the clutch pedal, and stop means connected with said wire means for maintaining said brake pedal partially depressed by the substantially greater tension thereon, whereby depression of the clutch pedal by said tensioned wire means is precluded and lost motion is eliminated.

6. The combination set forth in claim 2 and wherein the first said means is adjustable for effectively disconnecting said hand throttle and the last said means from the carburetor throttle arm, said throttle arm being controllable by an accelerator mechanism independent of all of the aforesaid means.

7. The combination set forth in claim 2 and including calibrated scale means in combination with the hand throttle control for indicating the set position of adjustment of the throttle arm.

8. In an automotive vehicle having engine clutch and brake control pedals and an engine provided with carburetor throttle means, a multiple throttle arm control arrangement comprising manual means for setting the arm in a selected position for running said vehicle, means jointly and severally controlled by said clutch and brake control pedals for releasing the arm from set position upon actuation of both or either of said pedals, and automatic means actuated with the last said means and effective upon release of said pedals for advancing the throttle arm beyond the set position thereof and retarding the return of said arm to the set position.

9. In an automotive vehicle having engine clutch and brake control pedals and an engine provided with carburetor throttle means, a multiple throttle arm control arrangement comprising a pedal controlled accelerator mechanism connected with said arm through a drag link device, a lever member, a pull wire connected with said arm and with said lever member, control and pivot means connected at one end of said member and manually adjusted to a set position, control and pivot means connected at the other end of said member and jointly and severally controlled by said pedals, the first said means constituting a pivot for the last said control means and the last said means constituting a pivot for the first said control means, said means being individually operative with the last said means operable to release the throttle arm from set position upon actuation of both or either of said pedals.

10. A multiple throttle arm control arrangement as set forth in claim 9 and including a second lever member connected with said control

and pivot means similarly to the aforesaid lever member and having a wire connected to the middle thereof, a third lever member pivoted in fixed relation to said throttle arm and connected with said wire, and a hydraulic piston device connected between the opposite end of the third said lever member and the corresponding end of the first said lever member, said hydraulic piston device adapted to be extended upon actuation of the last said control means for advancing said throttle arm beyond the set position through the first said lever member upon release of both said pedals and to retard the return of said arm to set position.

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