March 20, 1973 H. K. RANDAU ET AL 3,721,223

DISTRIBUTOR

Original Filed June 25, 1969

FIG. 1

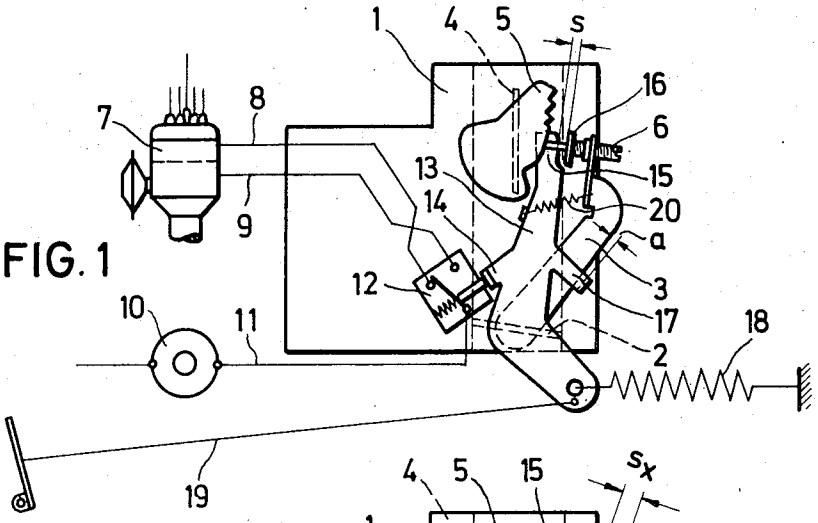


FIG. 2

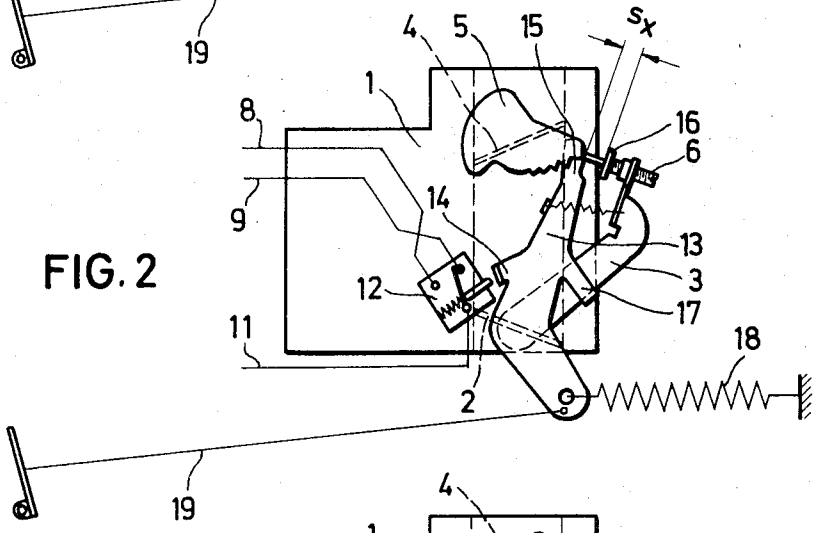
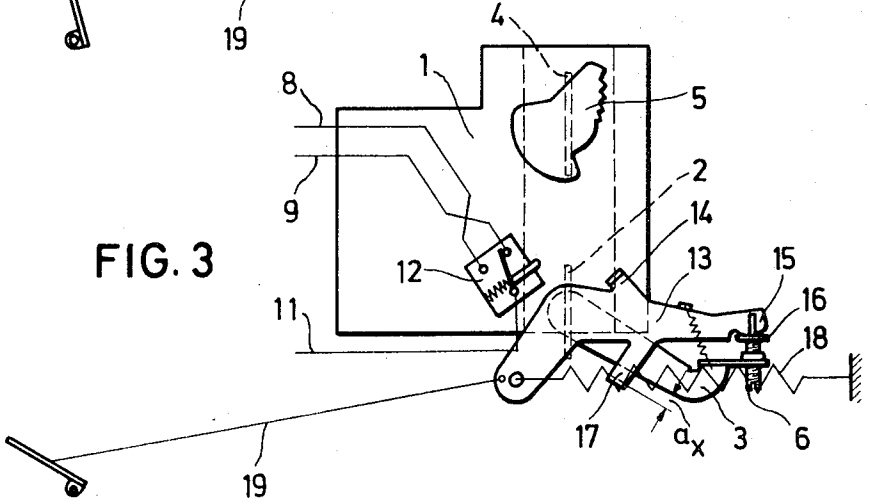


FIG. 3



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DISTRIBUTOR

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Continuation of abandoned application Ser. No. 836,229, June 25, 1969. This application May 18, 1971, Ser. No. 144,626
Claims priority, application Germany, June 28, 1968, P 17 51 612.0
Int. Cl. F02d 11/10
U.S. Cl. 123—102 6 Claims

ABSTRACT OF THE DISCLOSURE

Device to determine the current path in an ignition distributor for motor vehicle engines having a switch operated by a throttle valve linkage and a circuit breaker system controlled by the switch and provided with an intermediate lever to change the switch.

This is a streamlined continuation application filed copending with U.S. patent application Ser. No. 836,229, now abandoned. Also, the distributor referred to herein is described in commonly owned U.S. patent application Ser. No. 730,053, filed May 17, 1968, and now U.S. Pat. No. 3,577,963.

This invention relates to a distributor for the engines of motor vehicles having a switch operated by the throttle valve linkage; with the throttle valve closed, a circuit breaker system is influenced by a centrifugal governor (conventional centrifugal advance mechanism) and another circuit breaker system is influenced in each open position of the throttle valve, influenced by a vacuum governor. The basic setting for the time of ignition of the centrifugal governor has been at the same time selected relatively late as compared to that of the vacuum governor, in order to achieve the purpose of purification of exhaust gas during idling and to achieve a good combustion and to achieve good riding characteristics during acceleration and travel. If the switch were operated directly by the lever of the throttle valve, then, if the position of the throttle valve or of the throttle valve lever is regulated by the idle limiting screw as an adjustment screw, the distance of the throttle valve lever in relation to the switch would also need to be newly set each time, so that it would be necessary to make additionally either the switch itself shiftable or to provide a shiftable stop at the throttle valve lever.

It is an object of the invention to develop the operating linkage in such a manner that only a single adjustment will be necessary. At the same time one must make certain that upon opening the throttle from the idling position, the switch in any case will have been switched over to the vacuum governor before the throttle valve begins to open. Even in the case of a cold start, which at present almost generally takes place while closing a special starter valve, mostly operated automatically, as well as by simultaneous slight opening of the throttle valve, an early ignition is of advantage. A further object of the invention comprises the further demand that the linkage, whenever the starter valve closes, brings about each time an immediate switching over to the vacuum governor for an early ignition.

A further object of the invention resides in the fact that an intermediate lever with an additional path arranged between the switch and the throttle valve lever is provided for the purpose of switching over the switch and of operating the throttle valve lever, with which intermediate lever on the one hand the gas linkage and on the other hand the throttle valve return spring, will engage. Thus, said

intermediate lever has an arm to switch over the switch and a second arm is provided for the operation of the throttle valve lever. The additional adjusting screw seated in the throttle valve lever has been provided with a concentric stop plate for the second arm of the intermediate lever.

Furthermore, in the case of the arrangement of an automatic starter valve (automatically operated choke) with a speed pulley or fast idle cam, known per se, the intermediate lever is provided with a third arm reaching behind the throttle valve lever.

In a further development of the invention, the switch has been firmly attached to the carburetor and the intermediate lever has been arranged swivelably on the shaft of the throttle valve. A compensating spring, which is weaker than the return spring, connects the intermediate lever and the throttle valve lever.

Further objects of the invention will be apparent from the following description when considered in connection with the accompanying drawing in which:

FIG. 1 is a diagrammatic view showing a carburetor with the arrangement according to the invention in the position for idling and thrust with a warm engine,

FIG. 2 is a similar view showing the carburetor in the position of the parts in the case of a cold start, and

FIG. 3 is a similar view showing the carburetor in the position of full gas consumption.

On the carburetor **1** with the throttle valve **2** and the throttle valve lever **3**, the member **4** designates the customary automatic starter valve (described in more detail for example in the journal, "Gute Fahrt": 1965, Issue 1, pages 24 to 27; Issue 4, pages 64 to 67 and Issue 5, pages 18 and 19) and numeral **5** designates the speed pulley or segment of the starter valve **4**. An additional adjusting screw **6** seated at the end of the throttle valve lever **3** contacts the speed pulley **5** each time against one of the notches which depends on the temperature of the motor, for example FIG. 2 against the uppermost notch in the case of a cold motor (cold start with closed starter valve **4**) or FIG. 1 in the case of a warm engine at the lowest notch of the speed pulley (warm idling and thrust closed throttle operation, starter valve **4** fully opened).

A distributor **7**, has two circuit breaker systems independent of one another and arranged one above the other, namely (not shown in detail) in superposed relation, the one influenced by the centrifugal governor adjusted in its basic position for delayed ignition, the circuit breaker cable **8** leading to its circuit breaker, and the lower one influenced by a vacuum governor, adjusted to early ignition with the circuit breaker cable **9**. The primary cable **11** coming from the ignition coil **10** leads to a switch **12** which is press-button operated and firmly disposed on the carburetor **1**, said switch **12** guides the primary current in the case of a closed throttle valve **2** to the circuit breaker cable **8** of the centrifugal governor system, and in the case of an opened throttle valve **2**, on the other hand, to the circuit breaker cable **9** of the vacuum governor system.

On the shaft of the throttle valve **2** and throttle valve lever **3**, an intermediate lever **13** is seated swivelably, which has an arm **14** for operation of the switch **12**, a second arm **15** for operation of the throttle valve lever **3** provided with a concentric stop plate **16** on the idling adjusting screw **6**, as well as a third arm **17** which reaches hook-like behind the throttle valve lever **3**. There is always a play $s \ldots s_x$ (idling play) between arm **15** and stop plate **16** or correspondingly between arm **14** and the pressure button of switch **12**, the size of said play depending on which notch of the speed pulley the idling adjusting screw **6** stands in the throttle valve lever **3**. Furthermore, between the hook of arm **17** and the throttle valve lever **3**, there is furthermore a distance $a \ldots a_x$ which, however, will disappear in the cold starting position whenever the

idling adjusting screw **6** stands on one of the upper notches, so that the intermediate lever **13** is driven and arm **14** is lifted off switch **12**, said distance depending on the notch which comes to bear (the load) in each instance, but besides that also on the position of the idling adjusting screw **6** in the throttle valve lever **3**. The customary return spring **18**, closing the throttle valve **2**, engages with the intermediate lever **13** and the gas linkage **19** engages in an opposite direction. In order to avoid rattling noises subject to idling path *a*, a compensating spring **20** has been provided which is weaker than the return spring **18** and connects the throttle valve lever **3** and the intermediate lever **13**.

In the case of a warm motor or of an open starter valve **4** (FIG. 1), the idling adjusting screw **6** abuts on one of the lower notches of speed pulley **5**, the return spring **18** pulling arm **14** on the intermediate lever **13** against switch **12**, since the hook-shaped arm **17** of the intermediate lever **13** does not fit against the throttle valve lever **2** (distance *a*), as a result of which the circuit breaker system with the basic adjustment "delay" is switched on, which system is operated by means of a cable **8** on the distributor **7** by the centrifugal governor.

In the case of a cold start (FIG. 2), the idling adjusting screw **6** is positioned at S_x, while increasing the idling path on the uppermost notch of the speed pulley **5**, the throttling lever **3** has driven intermediate lever **13** with its hook-shaped arm **17** to such a point that switch **12** will have reversed by means of the cable **9** to the circuit breaker system adjusted for early firing.

Likewise by means of the cable **9** "early ignition" (firing) has been switched on in the case of all open positions of the throttle valve **2** (acceleration and even speed) up to full gas position (FIG. 3), but arm **15** will then fit against stop plate **16** and will have operated throttle valve lever **3**, whereas now the distance between the hook-shaped arm **17** and throttle valve lever **3** has increased to a_x.

By the use of the intermediate lever **13** according to the invention and by the changeable idling path *s*, an adjustment will be required only at a single position, namely at the idling adjusting screw for low speed adjustment of the idling and the reversing point of switch **12**, and it will be assured simultaneously that upon opening the throttle from the idling position, in order to avoid under certain circumstances a jerky jump in the R.P.M. of the motor, the switch will always first reverse to the vacuum governor and the throttle valve will be opened only subsequently.

What is claimed is:

1. A device to determine the current path in an ignition distributor for the engine of a motor vehicle which has a vacuum governor and a centrifugal governor and a carburetor having a throttle valve, comprising; a switch mounted on said carburetor, throttle valve linkage mounted on said carburetor, said linkage including a pivotally mounted intermediate lever having a limited idling path

with respect to a lever provided on said throttle valve, said intermediate lever having a first arm for operating said switch, a first circuit breaker system for the centrifugal governor controlled by said switch so that when said throttle valve is in a closed position said carburetor is influenced by said centrifugal governor, a second circuit breaker system for the vacuum governor controlled by said switch so that when said throttle valve is in an opend position said carburetor is influenced by said vacuum governor, said intermediate lever being disposed between said switch and said throttle valve lever, said intermediate lever being connected at one end to a gas linkage means opposed by a return spring and intermediate its ends being hooked to said throttle valve lever for movement thereby in one direction during the opened position of said throttle valve.

2. Device according to claim **1** wherein said intermediate lever is provided at its opposite end with a second arm for operating said throttle valve lever.

3. Device according to claim **2** wherein an idling adjustment screw means is mounted on said throttle valve lever, said screw means including a stop plate against which said second arm of said intermediate lever rests for operation of said throttle valve lever.

4. Device according to claim **3** wherein said carburetor includes an automatic starter valve, a speed pulley member connected to said starter valve, said intermediate lever being provided with a third arm for hooking on to said throttle valve lever, said speed pulley member having a plurality of notches at its free end facing said adjustment screw means with the uppermost one of said notches being in contact with said screw means during a cold start of said motor, said intermediate lever being moved as a result thereof away from said switch by means of said third arm.

5. Device according to claim **4** wherein said intermediate lever is pivotally disposed on a shaft of said throttle valve.

6. Device according to claim **5** wherein a compensating spring is provided which is weaker than said return spring, said compensating spring connecting said intermediate lever and said throttle valve lever.

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U.S. Cl. X.R.

123—117, 117 A