

1,220,530.

FIG. 1

FIG. 2

FIG. 3

Inventor

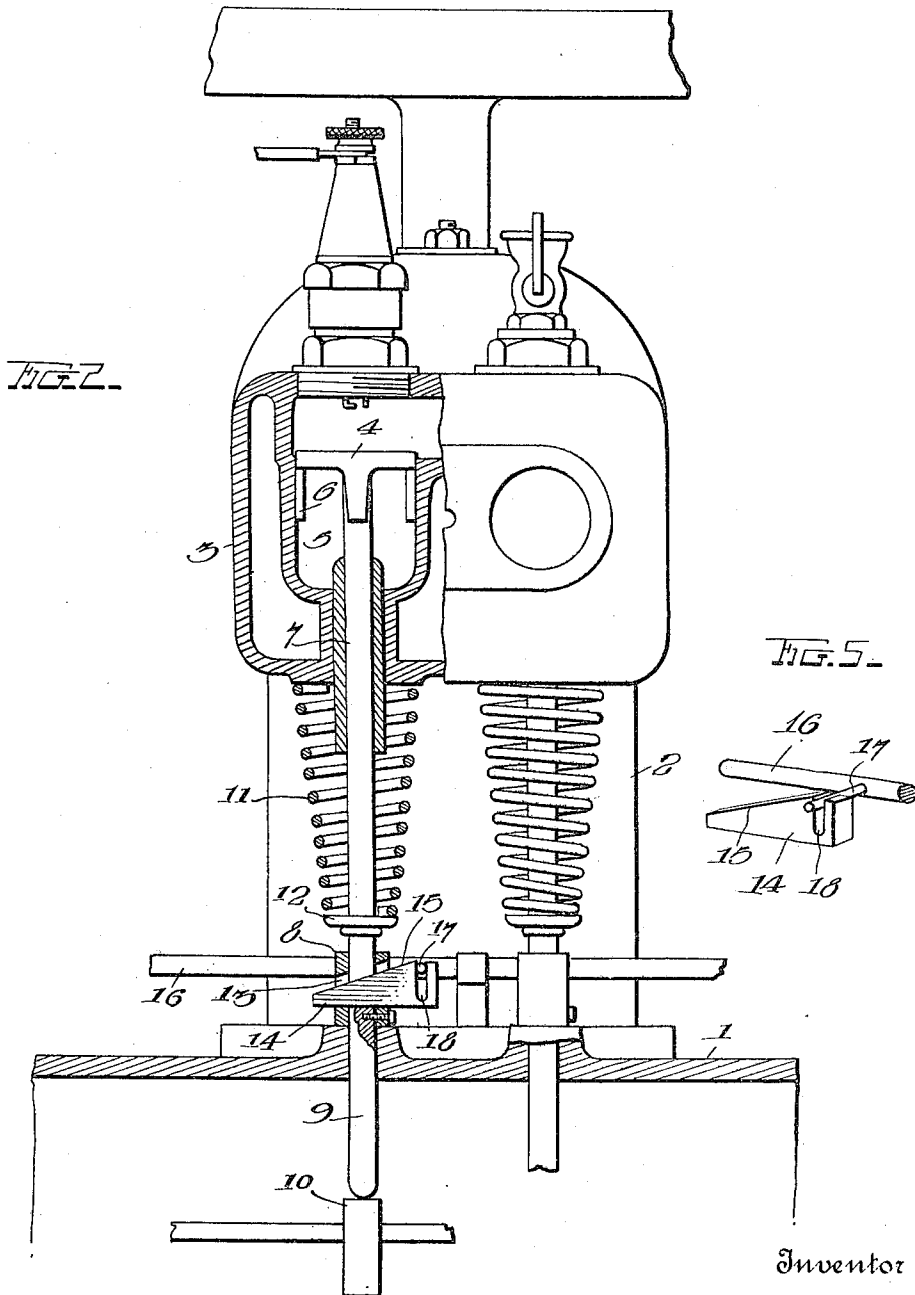
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INTAKE VALVE CONTROL.
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1,220,530.

Patented Mar. 27, 1917.
2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN WILLIAM NEAL, OF MONROE, LOUISIANA, ASSIGNOR OF ONE-HALF TO AUGUSTUS A. SWAYZE, OF MONROE, LOUISIANA.

INTAKE-VALVE CONTROL.

1,220,530.

Specification of Letters Patent.

Patented Mar. 27, 1917.

Application filed April 10, 1916. Serial No. 90,191.

To all whom it may concern:

Be it known that I, JOHN WILLIAM NEAL, a citizen of the United States, residing at Monroe, in the parish of Ouachita and State of Louisiana, have invented certain new and useful Improvements in Intake-Valve Controls; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is a mechanism for controlling the amount of opening movement of the intake valves of internal combustion engines, the object being to provide a simple and inexpensive mechanism of this class by the use of which the amount of explosive mixture fed to the cylinder or cylinders may be accurately controlled, thus effecting a great saving of fuel since when light work is being done less of such fuel will be used than when the engine is on heavy duty.

With the foregoing general object in view, the invention resides in certain novel features of construction and in unique combinations of parts to be hereinafter fully described and claimed, the descriptive matter being supplemented by the accompanying drawings which constitute a part of this application and in which:

Figure 1 is a side elevation of an engine cylinder showing the application of the invention thereto;

Fig. 2 is a view similar to Fig. 1 but showing parts in section to more clearly illustrate the details of the invention;

Fig. 3 is a horizontal sectional view taken on the plane of the line 3—3 of Fig. 1;

Fig. 4 is a vertical transverse section as viewed on the plane indicated by the line 4—4 of Fig. 1; and

Fig. 5 is a perspective view of the wedge-shaped insert to be described and a portion of its operating rod.

In specifically describing the construction shown in the drawings above briefly described, similar characters will be placed on corresponding parts throughout the several views and reference will be herein made to the numerous elements by their respective indices. To this end, the numeral 1 designates the crank case of an internal combustion engine, while 2 has reference to a cylinder rising therefrom, said cylinder having a valve casing 3 in which intake and ex-

haust valves are mounted. The exhaust valve may be of any preferred construction and is therefore not illustrated, but for allowing proper operation of the details to be described, it is essential that the intake valve 4 be allowed a considerable amount of idle movement between its normal and opening positions. To permit this, the valve 4 is preferably in the form of a flat circular plate slidable in a cylindrical guideway 5 and having depending fingers 6 which remain in said guideway when the valve is opened and thus guide said valve on its return movement.

A valve stem 7 depends from the valve 4 and is received in a socket 8 on the upper end of a push rod 9 which is raised at predetermined intervals by a cam 10 in the crank case 1, said stem being normally held in lowered position by a coiled spring 11 whose upper end bears against the valve casing 3, while its lower end rests on a collar 12 secured to the stem. The opposed sides of the socket 8 are formed with vertical slots 13 through which a horizontally moving insert 14 may pass, either the upper or the lower edge of said insert being inclined at 15 whereby to accomplish the action of a wedge. In the present embodiment of the invention, the upper edge of the insert 14 is inclined, and the lower end of the stem 7 is suitably shaped for contact therewith, being held in such contact by a spring 11.

By the construction and arrangement so far described, it will be obvious that if the insert 14 be forced inwardly, the stem 7 will be raised to advance the valve 4 any desired amount toward its opening position, whereupon when the usual amount of movement is imparted to the push rod 9 by the cam 10, said rod will move the insert and the valve stem a corresponding amount and will thus open the valve 4 a greater distance than when the insert is retracted to allow the spring 11 to cause the valve to recede from its opening position. By thus varying the opening of the intake valve, the supply of explosive mixture fed into the cylinder may be accurately controlled and thus when light work is being done, a great saving of fuel may be accomplished. When heavy work is to be performed by the engine, however, the valve may be caused to open to such an extent as to allow the admission of an abundant quantity of mixture.

For the purpose of controlling the insert 14, any preferred means may be employed, but a horizontally movable rod 16 is preferably employed, said rod having a laterally extending pin 17 received in a vertical slot 18 shown as opening through the upper edge of the insert 14. By this connection, sliding of the rod 16 will advance or retract the insert as occasion may demand, and will allow said insert to move vertically with the socket 8 and cooperating parts.

Although in the drawings I have shown but one cylinder, and in the preceding have described the same, it will be obvious that the invention could well be applied to any number and that one rod 16 may be used for operating all of the inserts simultaneously, said rod having controlling means adjacent the driver's seat if the invention be applied to an automobile engine, and obviously, any desired means may be employed for locking said rod against accidental shifting.

From the foregoing, taken in connection with the drawings, the construction, operation and numerous advantages of the invention will be readily understood without requiring a more extended explanation, but in conclusion I will state that although I have described and shown certain specific details, numerous changes may be made within the scope of the invention as claimed.

I claim:

1. The combination with the intake valve of an engine, and valve operating means for moving said valve to open position at predetermined intervals, said valve having idle movement between its normal and opening positions, of means for advancing said valve toward its opening position and for imparting the thrust of the valve operating means to said valve.

2. The combination with the intake valve of an engine, and valve operating means for moving said valve to open position at predetermined intervals, said valve having idle movement between its normal and opening positions, of an insert for reception between the valve and its operating means to advance said valve toward its opening position and to impart the thrust of said valve operating means to said valve.

3. The combination with the intake valve of an engine, and valve operating means for moving said valve to open position at predetermined intervals, said valve having idle movement between its normal and opening positions, of a wedge-shaped insert for reception between the valve and its operating means to advance said valve any required amount toward its opening position and to impart the thrust of said valve operating means to said valve.

4. The combination with the intake valve of an engine, and valve operating means for moving said valve to open position at pre-

termined intervals, said valve having idle movement between its normal and opening positions, of an insert for reception between the valve and its operating means to advance said valve toward its opening position and to impart the thrust of said valve operating means to said valve, and an insert control member having a loose connection with said insert for allowing it to be moved by the valve operating means.

5. The combination with the intake valve of an engine, and valve operating means for moving said valve to open position at predetermined intervals, said valve having idle movement between its normal and opening positions, of a wedge-shaped insert for reception between the valve and its operating means to advance said valve any required amount toward its opening position and to impart the thrust of said valve operating means to said valve, said insert being movable transversely of the line of movement of the valve when advancing the latter, but moving on said line of movement when shifted by the valve operating means, an insert control member movable transversely of said line of movement, and a sliding connection between said control member and the insert for allowing the latter to move on the aforesaid line.

6. The combination with the intake valve of an engine, and valve operating means for moving said valve to open position at predetermined intervals, said valve having idle movement between its normal and opening positions, of a wedge shaped insert for reception between the valve and its operating means to advance said valve any required amount toward its opening position and to impart the thrust of said valve operating means to said valve, said insert being movable transversely of the line of movement of the valve when advancing the latter, but moving on said line of movement when shifted by the valve operating means, and an insert control member movable transversely of said line of movement and having a lateral projection, said insert having an aperture elongated longitudinally of said line of movement and receiving said projection loosely therein.

7. The combination with the intake valve of an engine, the stem of said valve, and a longitudinally shifting operating rod alined with said stem, said valve having idle movement between its normal and opening positions, of a wedge interposed between said operating rod and the valve stem for shifting the latter to advance the valve toward its opening position.

8. The combination with the intake valve of an engine, the stem of said valve, and a longitudinally shifting operating rod alined with said stem, said valve having idle movement between its normal and opening posi-

tions, of a socket carried by the operating rod and receiving the free end of the stem slidably therein, said socket having slots in opposed sides, and a wedge slidable through said slots and engaging said free end of the stem to shift the latter for the purpose of advancing the valve toward its opening position.

9. The combination with the intake valve of an engine, the stem of said valve, and a longitudinally shifting operating rod alined with said stem, said valve having idle movement between its normal and opening positions, of a socket carried by the operating rod and receiving the free end of the valve stem slidably therein, said socket having slots in opposed sides, a wedge slidable in said slots and engaging said free end of the stem to shift the latter for the purpose of advancing the valve toward its opening position, an operating rod shiftable transversely of the stem, and a sliding connection between said rod and the wedge for allowing the latter to move with the operating rod and the valve stem.

10. An internal combustion engine hav-

ing a tubular guideway in which its intake valve is slidably mounted for idle movement between its normal and opening positions, a stem for said valve parallel with the engine cylinder, an operating rod movable longitudinally and having a socket receiving the free end of said stem, a cam for shifting said operating rod to open the valve, a spring for closing said valve, a wedge slidable through the aforesaid socket and contacting with said free end of the valve stem, and an operating rod for said valve mounted for movement in a direction at right angles to the valve stem, this operating rod having a laterally extending pin and the wedge being formed with a transverse slot receiving said pin to permit said wedge to move with the valve stem and the operating rod of the latter.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN WILLIAM NEAL.

Witnesses:

MOSES CURTIS FLEWELLEN,
LUTHER V. TURNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."