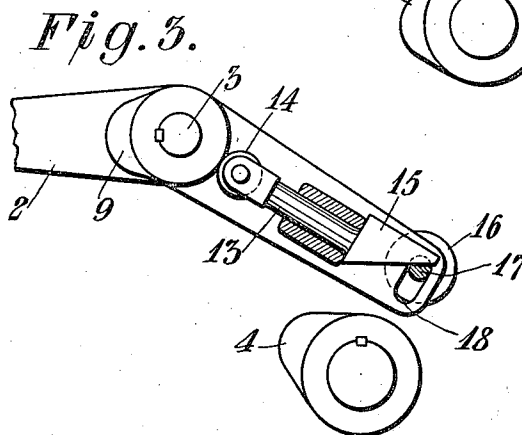
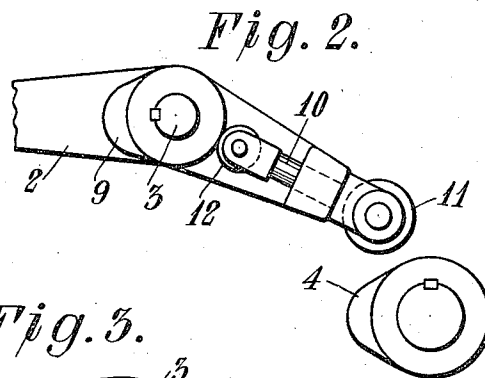
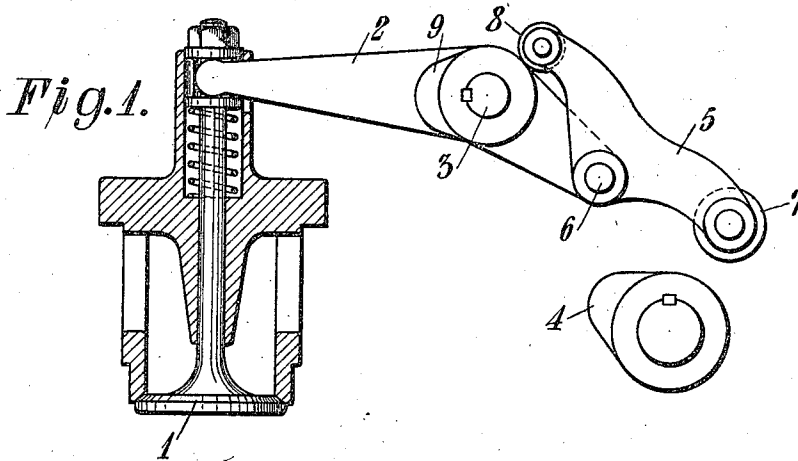


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ADJUSTABLE REGULATING MEANS FOR EXPLOSION AND INTERNAL COMBUSTION ENGINES.
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Patented Feb. 23, 1915.



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ADJUSTABLE REGULATING MEANS FOR EXPLOSION AND INTERNAL-COMBUSTION ENGINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JONAS ALBERT WEYLAND, a subject of the King of Sweden, residing at Djursholm, in the Kingdom of Sweden, have invented new and useful Improvements in Adjustable Regulating Means for Explosion and Internal-Combustion Engines and the like, of which the following is a specification, reference being had to the drawing accompanying and forming a part thereof.

In such regulating means for explosion and internal combustion engines which consist in levers acting on the valves of the engine, which levers in turn are actuated by rotating cams or the like, the motion of the valves is usually regulated by the coupling of regulating cams of different shapes, or by shifting of the fulcrums of the levers, or by shifting of the points of connection of the levers to the spindles of the valves. Since these means thus depend on the exchange of one or several members of the regulating mechanism, or on the shifting of the points of connection of the members to each other and in relation to other parts of the engine, the arrangement generally becomes complicated both in regard to its construction and its manner of operation. Besides that, the regulation frequently can not be performed without more or less interrupting the work of the engine, that is, frequently the regulation cannot take place unhindered during the running of the engine.

My invention, which has for its object to provide a simpler arrangement and above all one which shall be convenient to operate, is on the other hand characterized by this that the lever or levers or the like actuate the engine valves are in themselves capable of adjustment in such manner that they come into contact with the regulating cams earlier or later, so that the valves will be opened more or less, respectively during a longer or shorter time, or else so that the levers come outside of the region of action of the regulating cams in which latter case the valves remain closed.

One form of construction of my invention, which in practice is of especial advantage, is that the lever of the valve has one—or several—parts, movably connected to the lever, which part—or parts—directly or indirectly on one side is in contact with the movable

regulating cam and on the other side in contact with an adjustable member at the lever which member by its adjustment into different positions will move the said part closer to or farther from the regulating cam, eventually so far that it comes outside of the region of action of the cam. The member on the lever, by means of which the shifting of the said part is effected, consists preferably of a cam or the like, which is movable around the axis of the lever. Such an arrangement is especially simple and easy of operation, and the regulation can be effected as easily whether the engine is idle or running. The arrangement can also in a simple manner be combined with the governor of the engine, so that the regulation will be closely and directly corresponding with the variations in the speed of the engine.

In the accompanying drawing are shown three different modifications of the above described form of my invention. The three figures of the drawing show respectively the different modifications.

In Figure 1 of the drawing 1 represents the valve, and 2 the lever operatively connected to the valve and arranged to oscillate around the shaft 3. 4 represents the cam arranged to be rotated by the engine and to oscillate the lever. Upon the end of the lever directed toward the cam is mounted the lever (or link) 5 arranged to turn around the stud 6, said part 5 supporting partly a friction roller 7 which can make contact with the regulating cam 4, and partly another friction roller 8 resting against a cam 9 which is arranged to be turned upon or together with the shaft 3 of the lever 2. When the cam 9 is turned so as to move the roller 8 away from the shaft 3, the roller 7 approaches the cam 4, and the valve 1 will therefore be opened earlier and be kept open a longer time. If, on the other hand, the cam 9 is turned so that the roller 8 will draw closer to the shaft the condition is reversed, and the cam 9 may be turned so far that the roller 7 comes outside of the region of action of the cam 4, in which case the valve 1 remains closed. This will be the case, for instance, during a moment of the reversal of the motion of the engine. In the drawing the cam 9 is shown in the latter said position.

In Fig. 2 the part 10 is shown slidably mounted in the lever 2, which part 10 is provided with two friction rollers 11 and 12, corresponding to the friction rollers 7 and 8 in Fig. 1. When in this case the cam 9 is turned so that the part 10 will slide in the lever and the roller 11 approaches to or recedes from the cam 4, the result of course will be the same as in the arrangement shown in Fig. 1.

In Fig. 3 the part (or rod) 13 is shown slidably mounted in the lever 2, which part through a friction roller 14 abuts against the cam 9. The other end of the part 13 is formed with a wedge 15, against the oblique side of which abuts the stud 17, upon which the friction roller 16 is loosely mounted. The stud 17 is arranged to be moved back and forth in an oblong slot 18 in the lever 2. When in this case the cam 9 is turned so that the part 13 slides outward, the wedge 15 will cause the roller 16 to approach the cam 4, while in the opposite case the roller 16 recedes from the cam. In the three modifications now shown and described, the parts 5, 10 and 13 are preferably retained in their normal positions by springs, not shown in the drawing.

My invention may of course be modified and constructed in many other ways than those shown in the drawing. For instance some other part than the roller 9 may be used upon the lever 2 for the adjustment of the parts 5, 10 or 13. The arrangement of the cam 9, shown in the drawing, is however the preferred construction both in regard to simplicity, convenience of operation and facility of simple and efficient combination with the governor of the engine.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In regulating means for explosion and

internal combustion engines having a valve, the combination of a lever actuating said valve, a member movably connected with said lever, a cam arranged to be rotated and to engage the said member so as to oscillate the lever, a shaft for said lever, and means on said shaft adapted to be turned with the same and to engage and to adjust the position of the member relatively to the lever so as to cause the member to be engaged by the cam earlier or later.

2. In regulating means for explosion and internal combustion engines having a valve, the combination of a lever actuating said valve, a member movably connected with said lever, a cam arranged to be rotated and to engage the said member so as to oscillate the lever, a shaft for said lever, and a cam on said shaft adapted to be turned with the same and to engage and to adjust the position of the member relatively to the lever so as to cause the member to be engaged by the first-named cam earlier or later.

3. In regulating means for explosion and internal combustion engines having a valve, the combination of a lever actuating said valve, a member fulcrumed on the lever, a roller mounted in said member, a cam arranged to be rotated and to engage the said roller so as to oscillate the lever, a shaft for said lever, and a cam on said shaft adapted to be turned with the same and to engage and to adjust the position of the member relatively to the lever so as to cause the roller to be engaged by the first-named cam earlier or later.

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