E. A. RUNDLOF.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED AUG. 14, 1909.

963,071.

Patented July 5, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

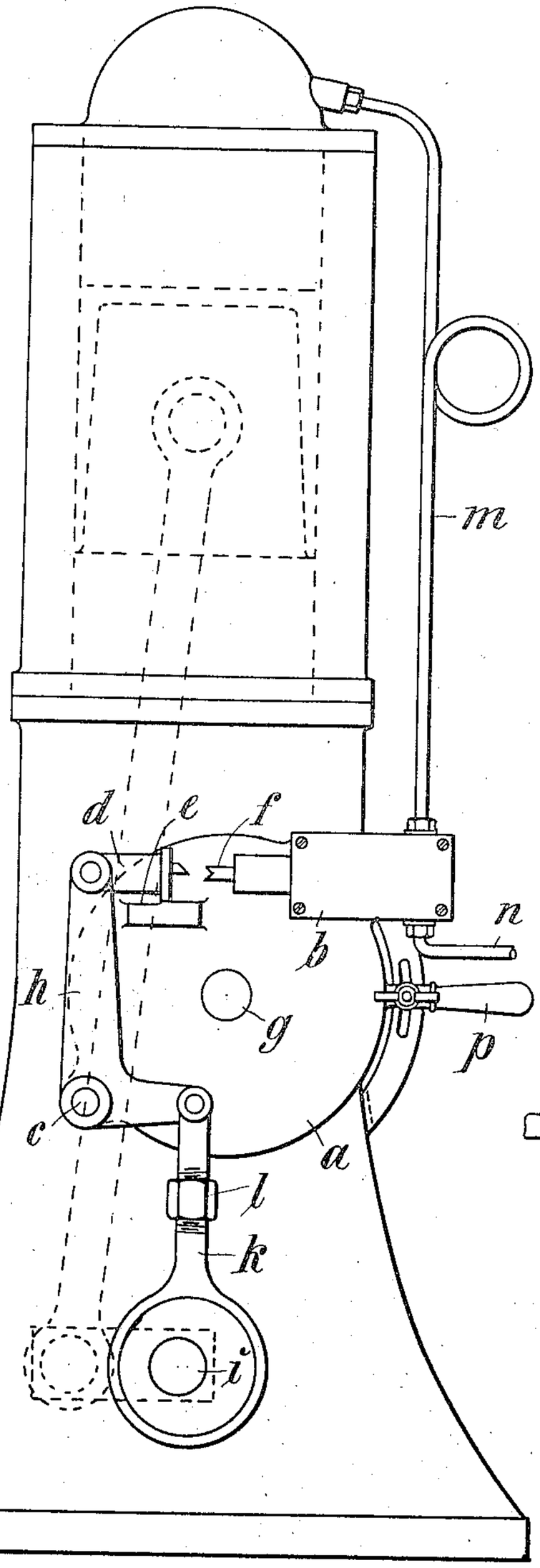
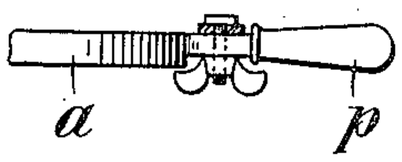


Fig. 1a.



Witnesses

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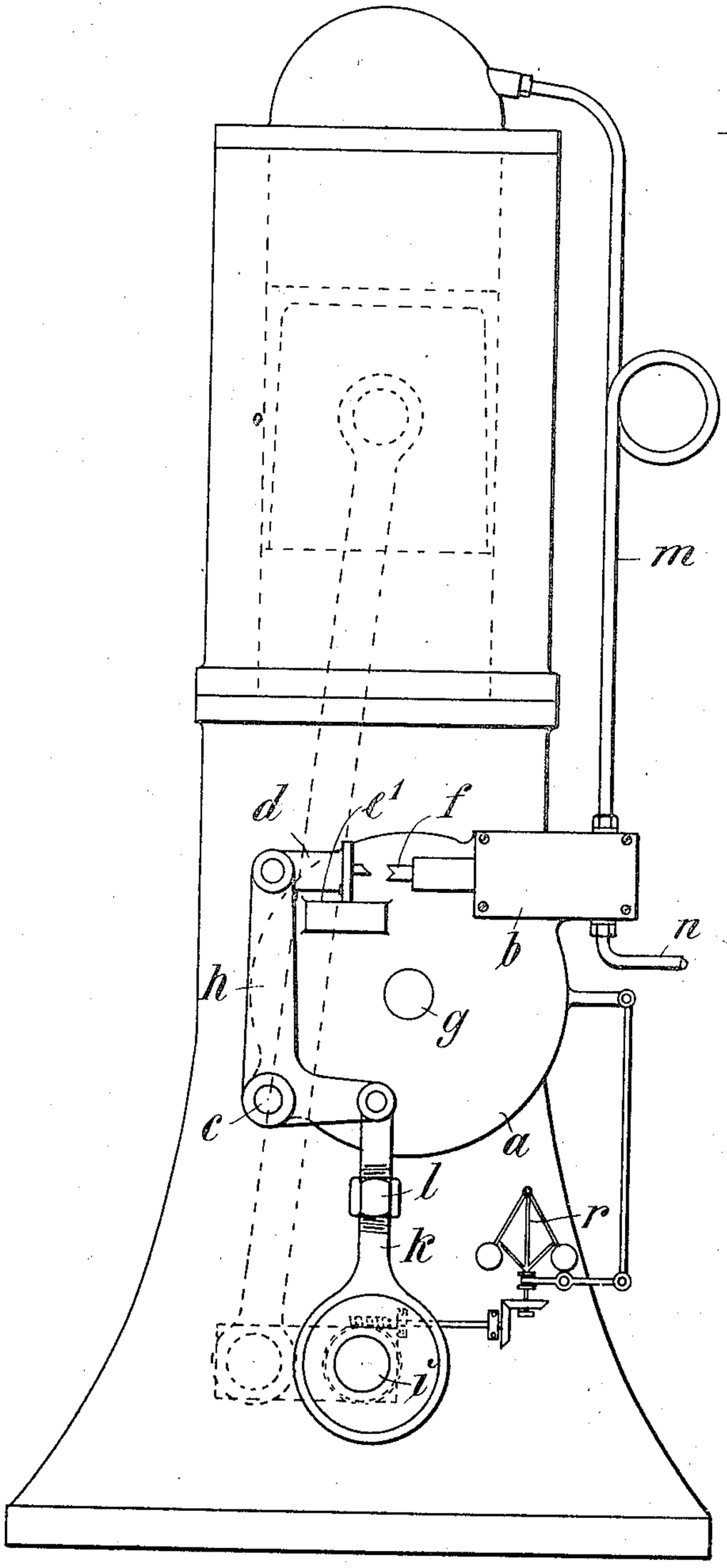
2 SHEETS—SHEET 2.

Fig. 2.



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INTERNAL-COMBUSTION ENGINE.

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To all whom it may concern:

Be it known-that I, ERIK ANTON RUNDLOF, a subject of the King of Sweden, residing at Stocksund, near Stockholm, in the Kingdom of Sweden, have invented new and useful Improvements in Internal-Combustion Engines, of which the following is a specification, reference being had to the drawings accompanying and forming a part hereof.

This invention relates to internal combustion engines.

In order to increase or decrease the supply of fuel in an internal combustion engine it is customary to adjust the distance between the fuel pump and the reciprocating part actuating the said pump. The said adjustment is usually performed by means of a screw or the like situated at the pump. Such a device has however several drawbacks. For one thing it is difficult to obtain a quite accurate adjustment, and for the other the adjustment is liable to be disturbed during the running of the motor.

The object of the invention is to provide an adjusting device which works in all respects quite satisfactorily.

The invention consists, chiefly, in that the pump and the movable member operating the same are both carried by a support adjustable relatively to the part of the engine from which movement is imparted to the member operating the pump. Thus the stroke of the pump and, thereby, the supply of fuel may be varied by changing the relative position of the said support and the movable part connected to the pump-operating member. By this means not only can the adjustment be performed with the greatest accuracy but the parts may also be so reliably secured in position that the supply of fuel cannot unintentionally change during the working of the engine.

The invention is particularly of importance in internal combustion engines in which the reciprocatory pump-operating member coöperates with a broken guiding surface for regulating the speed of the engine, inasmuch as in such case the said guiding surface may be carried by the aforesaid support for the pump and the pump-operating member. By this means the said guiding surface will always have a fixed position relatively to the pump, by which the speed of the engine may at all times be kept constant.

The invention further comprises the constructions and combinations of parts hereinafter more particularly described.

In the drawing I have shown a suitable embodiment of my improved regulating device applied to an internal combustion engine. Figure 1 shows the regulating device adapted to be operated by hand, and Fig. 2 shows the same connected to a governor driven by the engine.

Referring to the drawings, *a* is a disk which may be of circular or other suitable form. Attached to the said disk are the pump *b*, the fulcrum *c* for the reciprocating weight *d* actuating the pump, and, in the case illustrated in Fig. 1, the plane or guide *e* serving to control the speed by causing the weight *d* to swing outwardly so as not to meet the pump piston *f* when the speed is increased above the normal one. The invention is not limited to the use of a speed-controlling plane, but instead of such a plane a straight sliding surface *e'* for the part *d'* may be employed, as shown in Fig. 2, or the said part may be guided or supported otherwise, if preferred. It will thus be seen that the disk *a* may be turned or otherwise adjusted without the relative positions of the parts *b*, *c*, *e* being changed. On the other hand, an adjustment of the disk *a*, for instance a turning of the said disk about the pin *g*, will cause a change of the relative positions of the reciprocating weight *d*, or an angle lever *h*, or the like, connected to the said weight, and the part of the engine, for instance the shaft *i*, from which movement is transmitted to the said weight. By this means the stroke of the pump may be increased or decreased, as may be desired. Thus, if the disk *a* is turned in the counter-clockwise direction, the stroke is decreased, and vice versa. As is easily understood, the angle of turning is in each case very small, and the supply and exhaust conduits *m* and *n* connected to the pump therefore need only be slightly flexible in order not to prevent the turning.

It is obvious that, if preferred, the disk or part *a* may be stationary in which case the part *i* may be adjustable. In either case the intermediate motion transmitting part or parts may be adjustable in length if desired. Thus, for instance, the eccentric rod *k* interposed between the shaft *i* and the angle lever *h* may be made in two parts adjustable relatively to each other by means of a right- and lefthand threaded nut *l*.

The disk or part *a* may be adjustable otherwise than by turning about an axis, for instance movable vertically or horizontally or in both directions, or it may have a combined swinging and parallel motion. The disk or part *a* may be adjusted manually by means of a handspike *p* (Fig. 1) or any other easily manageable device, or the adjustment may be performed automatically by means of a governor *r* (Fig. 2) driven by the engine particularly if the engine has no hit and miss regulation, such as the broken plane *e* shown in Fig. 1. In such case the parts mentioned form a speed governor varying the supply of fuel by adjusting the disk *a*.

Obviously the regulating device described may be used whether the pump be employed for pumping liquid fuel or other liquid, such as water.

Having now described my invention what I claim and desire to secure by Letters Patent is:

1. In an internal combustion engine, the combination of an adjustably mounted disk, a pump attached to the said disk, means carried by the said disk for operating the said pump, a movable part driven from the engine, and connections between the said movable part and the pump-operating means, substantially as and for the purpose set forth.

2. In an internal combustion engine, the combination of an adjustably mounted disk, a pump attached to the said disk, means carried by the said disk for operating the said pump, a movable part driven from the engine, and adjustable connections between the said movable part and the pump-operating means, substantially as and for the purpose set forth.

3. In an internal combustion engine, the combination of a disk adapted to be adjusted in different positions about an axis, a pump attached to the said disk, means carried by the said disk for operating the said pump, a movable part driven from the engine, and connections between the said movable part and the pump-operating means, substantially as and for the purpose set forth.

4. In an internal combustion engine, the combination of a disk adapted to be adjusted in different positions about an axis, a pump attached to the said disk, means carried by the said disk for operating the said pump, a movable part driven from the engine, and adjustable connections between the said movable part and the pump-operating means, substantially as and for the purpose set forth.

5. In an internal combustion engine, the combination of a disk adapted to be adjusted in different turning positions, a pump carried by the said disk, pump-operating means comprising an angle-lever pivotally supported by the said disk, a rotary shaft driven from the engine, and connections between the said rotary shaft and the pump-operating means, substantially as and for the purpose set forth.

6. In an internal combustion engine, the combination of a disk adapted to be adjusted in different turning positions, a pump carried by the said disk, pump-operating means comprising an angle-lever pivotally supported by the said disk, a rotary shaft driven from the engine, and adjustable connections between the said rotary shaft and the pump-operating means, substantially as and for the purpose set forth.

7. In an internal combustion engine, the combination of an adjustably mounted disk, a pump attached to the said disk, means carried by the said disk for operating the said pump, a guide for the said pump-operating means carried by the said disk, a movable part driven from the engine, and connections between the said movable part and the pump-operating means, substantially as and for the purpose set forth.

8. In an internal combustion engine, the combination of an adjustably mounted disk, a pump attached to the said disk, means carried by the said disk for operating the said pump, a guide for the said pump-operating means carried by the said disk, a movable part driven from the engine, and adjustable connections between the said movable part and the pump-operating means, substantially as and for the purpose set forth.

9. In an internal combustion engine, the combination of a disk adapted to be adjusted in different positions about an axis, a pump attached to the said disk, means carried by the said disk for operating the said pump, a guide for the said pump-operating means carried by the said disk, a movable part driven from the engine, and connections between the said movable part and the pump-operating means, substantially as and for the purpose set forth.

10. In an internal combustion engine, the combination of a disk adapted to be adjusted in different positions about an axis, a pump attached to the said disk, means carried by the said disk for operating the said pump, a guide for the said pump-operating means carried by the said disk, a movable part driven from the engine, and adjustable connections between the said movable part and the pump-operating means, substantially as and for the purpose set forth.

11. In an internal combustion engine, the combination of a disk adapted to be adjusted in different turning positions, a pump carried by the said disk, pump-operating means comprising an angle-lever pivotally supported by the said disk, a guide for the said pump-operating means carried by the said

disk, a rotary shaft driven from the engine, and connections between the said rotary shaft and the pump-operating means, substantially as and for the purpose set forth.

12. In an internal combustion engine, the combination of a disk adapted to be adjusted in different turning positions, a pump carried by the said disk, pump-operating means comprising an angle-lever pivotally supported by the said disk, a guide for the said pump-operating means carried by the said disk, a rotary shaft driven from the engine, and adjustable connections between the said rotary shaft and the pump-operating means, substantially as and for the purpose set forth.

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