

No. 877,776.

PATENTED JAN. 28, 1908.

J. HUTCHINGS.
AUXILIARY ENGINE.
APPLICATION FILED MAR. 18, 1907.

2 SHEETS—SHEET 1.

FIG. 1.

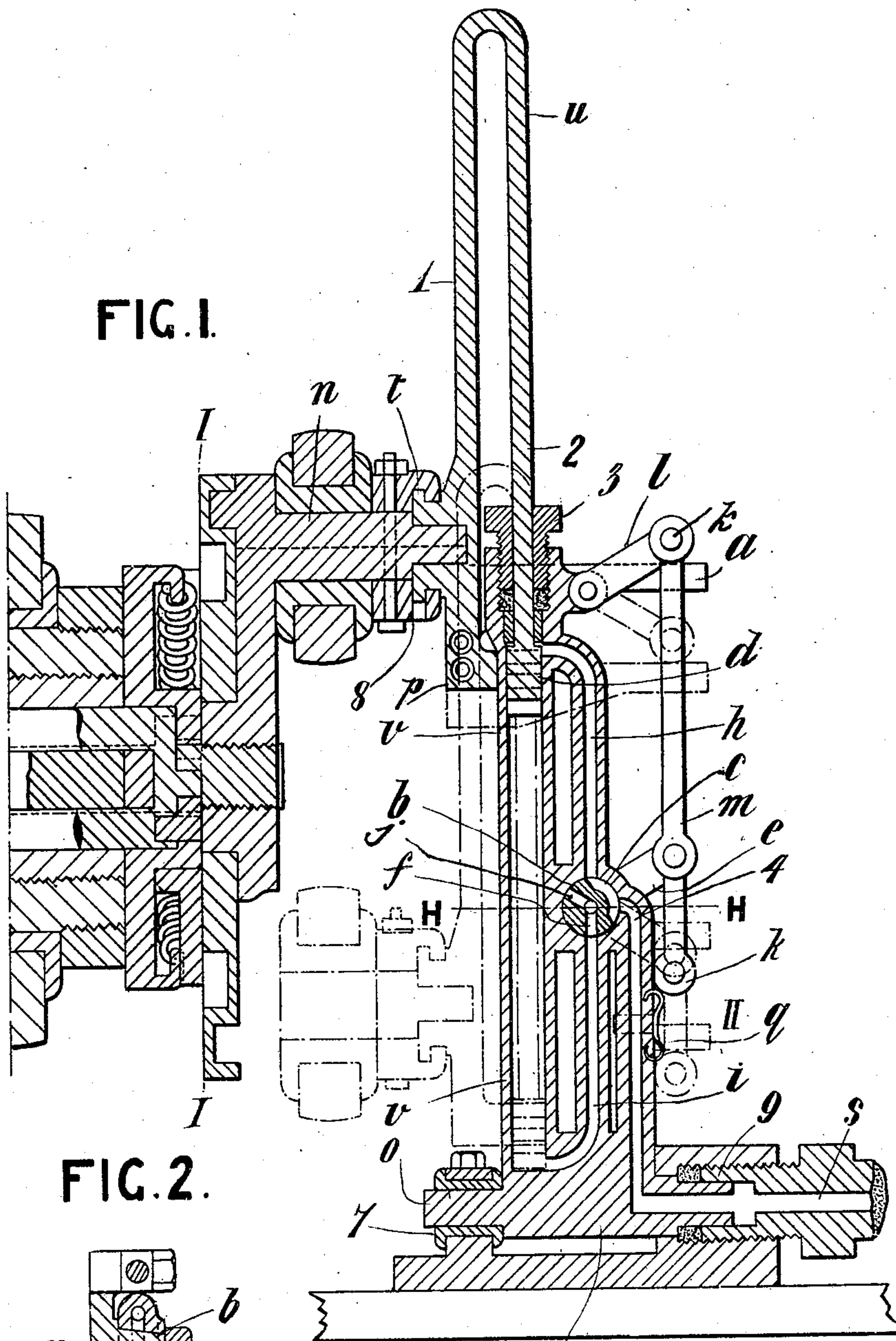
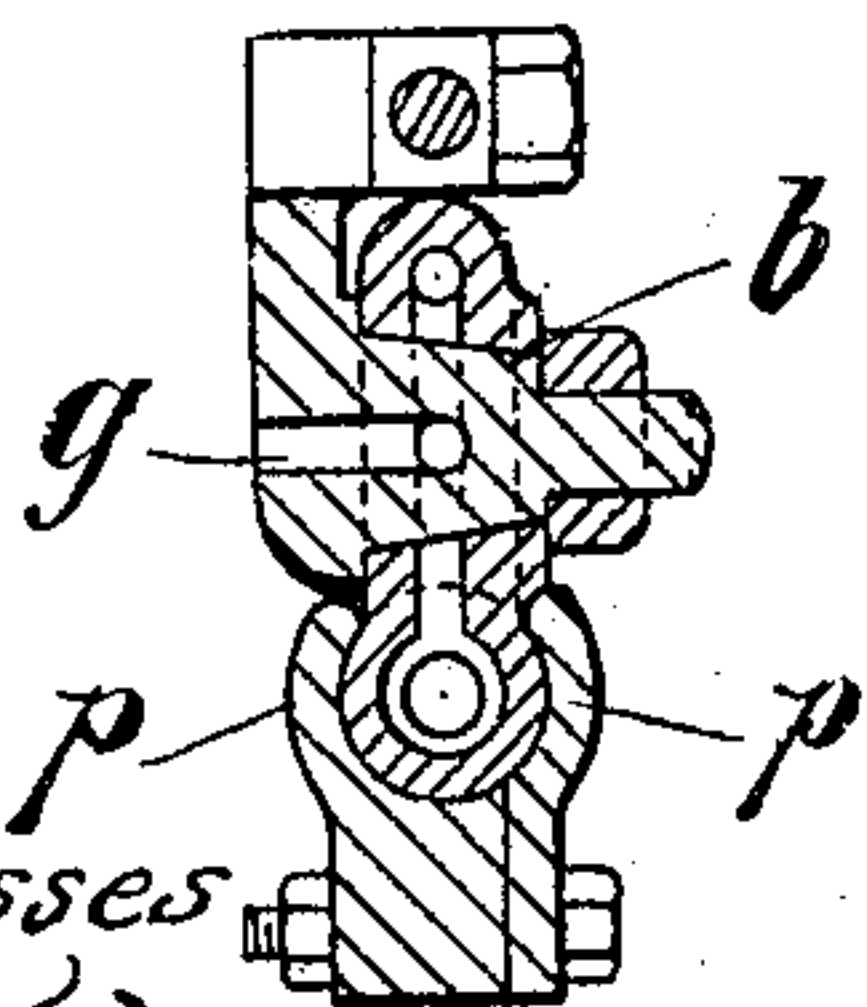


FIG. 2.



Witnesses
W. B. Kester
C. H. Kester

Inventor
John Hutchings
James L. Norris

Att'y

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2 SHEETS—SHEET 2.

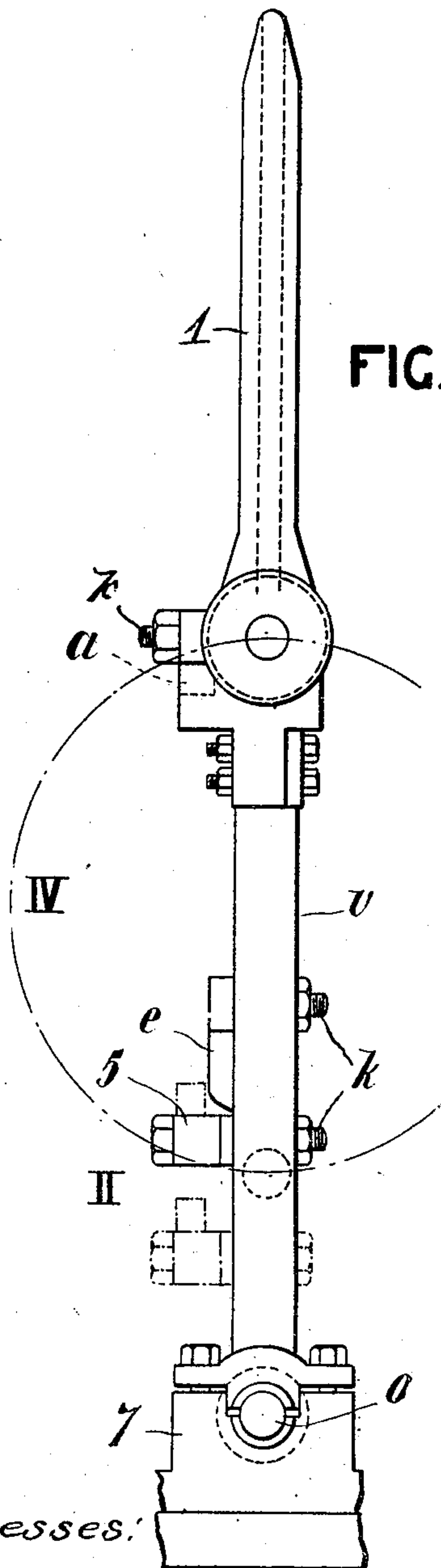


FIG. 3.

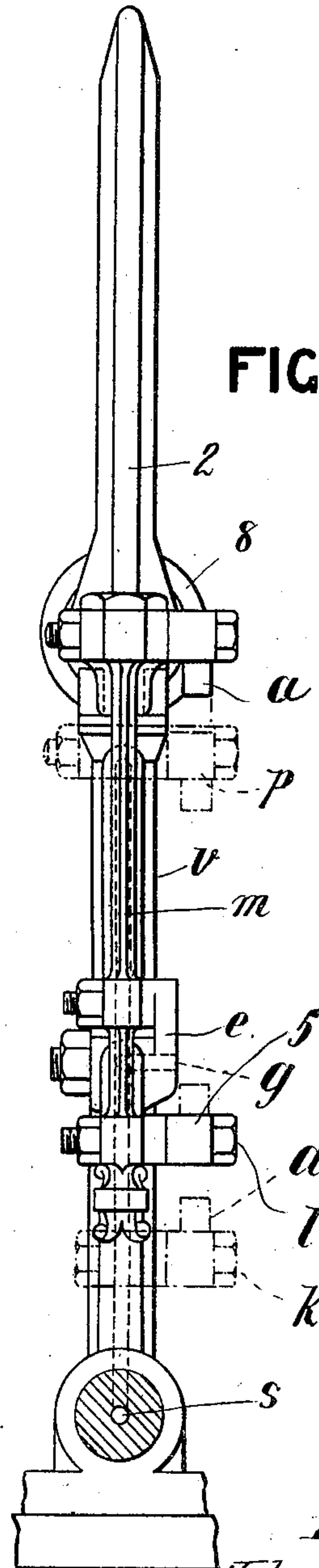


FIG. 4.

Witnesses:

W. B. Keefe
C. D. Kester

Inventor

John Hutchings

James L. Norris

att'y

UNITED STATES PATENT OFFICE.

JOHN HUTCHINGS, OF LONDON, ENGLAND.

AUXILIARY ENGINE.

No. 877,776.

Specification of Letters Patent.

Patented Jan. 28, 1908.

Application filed March 18, 1907. Serial No. 363,063.

To all whom it may concern:

Be it known that I, JOHN HUTCHINGS, subject of the King of Great Britain, residing at 210 Moorgate Station Chambers, Moorfields, in the city of London, England, mechanical and mining engineer, have invented certain new and useful Improvements in Auxiliary Engines, of which the following is a specification.

This invention relates to certain new and useful improvements in apparatus for starting or assisting the cranks of internal combustion or other engines over their dead centers, and the object thereof is to provide an apparatus for the purpose set forth in a manner as hereinafter referred to and which shall be simple in its construction, strong, durable, readily set up with respect to the engine, and comparatively inexpensive to manufacture.

With the foregoing and other objects in view, the invention consists in the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown the preferred embodiment of the invention, but it is understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In describing the invention in detail, reference is had to the accompanying drawings, wherein like reference characters denote corresponding parts throughout the several views, and in which:—

Figure 1 is a vertical sectional elevation of an apparatus for the purpose set forth in accordance with this invention. Fig. 2 is a horizontal sectional view taken on the line H—H, Fig. 1. Fig. 3 is an external side view of the parts to the right hand side of the line I—I, Fig. 1, and Fig. 4 is an external side elevation of the parts shown in Fig. 3 but showing them from the opposite side thereof.

Referring to the drawings by reference characters, *n* denotes the pin of a subsidiary crank carrying a removable slotted and shouldered ferrule 8 for the purpose of connecting the crank to a collar *t* carried by an inverted U-shaped piston rod *u*. The legs of the piston rod *u* are indicated by the reference characters 1 and 2 respectively. The collar *t* connects the pin *n* of the crank with the leg 1. The leg 2 of the rod *u* is connected to a piston *d*, the latter adapted to

have a reciprocatory movement within an oscillatory cylinder *v*. The piston *d* operates at right angles with respect to the stroke of the main engine. The leg 1 of the piston *u* is arranged to travel exteriorly of the cylinder *v* and has the end *p* thereof enlarged so as to extend inwardly and slide upon the cylinder *v* when the piston *d* is reciprocated by fluid pressure. The leg 2 of the rod *u* extends through a packing gland as at 3 to within the cylinder *v* and as before stated carries the piston *d*.

An arm *a* extends horizontally and outwardly in the same direction as the said crank pin and is so connected to the end *p* which slides on cylinder *v* that it moves in unison with the crank pin *n*. This arm *a* while moving within its path or cycle indicated by dotted lines IV Fig. 3 is made to come into contact with projecting pins *k*, *k* which form pivots and are linked by means of the levers *e* and *l* and connecting rod *m* to the (multiple-way) cock or valve *b*.

The oscillating part of this valve *b* is formed as a tapered plug and opposite to the motive supply inlet pipe bore 4, leading from pipe *s* it is segmentally and peripherally channeled at *c* so as to communicate alternately when moved upward, or downward, or otherwise reciprocated relatively to the opposite sections *h*—*i* of the pipe *s* (or oppositely disposed branching pipes) which pipes respectively form the inlet and also exhaust passages alternately communicating with the cylinder *v* above and below the said piston *d*.

When the lever *e* of the valve *b* is moved upwards, the said segmental and peripheral channel *c* in the valve *b* is brought into communication with the upper channel *h* and directs the incoming motive fluid into the cylinder *v* above the piston *d* and thus causes the piston *d* to move downward while the lower exhaust passage *f* of the valve *b* which is in communication with a further exhaust passage *g* of said valve *b* is simultaneously brought into communication with the bottom passage *i* and while the said piston *d* is descending the motive fluid now below the piston *d* which has been forced into the cylinder *v* during the preceding upward movement is exhausted respectively through the lower passages *i*, *f*, and the central exhaust port *g* of the valve *b* while the lower end of the said segmental and peripheral channel or port *c* of the valve *b* is cut off from said lower

channel *i* and the upper exhaust passage *j* is cut off from the said upper channel passage *h*.

When the horizontal arm *a* actuating valve *b* is descending it comes into contact with a roller 5 on the pin *k* mounted on the connecting rod *m* attached to the valve lever *e* and moves this valve lever *e* to its lowest position II and the said pin *k* to the like position contacting with a spring stop as at *g* which tends to retain it in raised position. By so moving the valve lever *e* communication between the top end of the segmental inlet passage *c* and the upper passage or channel *h* is cut off, the same movement also cutting off the lower exhaust passage *f* from the lower channel *i*, as well as cutting off the said lower channel *i* from the central exhaust port *g* and at the same time opening communication between the said inlet passage *c* and the lower channel *i* and also opening communication between the upper channel *h* and the valve upper and central exhaust ports or passages *j*—*g* respectively and by these means motive pressure is obtained to lift or lower the piston *d* and thus exert power in moving the said crank pin *n* past its respective dead points during its motion around its center. The body 6 of this lifting and lowering device is fixed at its lower end by means of a center pin *o* mounted pivotally in the bearing 7 so that it may oscillate while the piston *d* and the U-shaped legs of the piston rod *u* may reciprocate in unison with the movements of the crank pin *n*.

The motive fluid admission pipe *s* receives air from an air reservoir, not shown, and this pipe *s* is removably connected as at 9 or by equivalent means of connection.

The apparatus is not only applicable for internal combustion engines, but other forms of motive power engines for effecting the movement of the engine shafts and aiding in the turning of the cranks past their dead centers, say for instance a steam engine in

which case the pipe *s* would be suitably connected up so as to take its motive force from the steam supply on the one hand and the part *t* or its equivalent would be connected to a crank or eccentric on the main shaft.

What I claim is:—

1. An attachment for assisting crank pins over their dead centers comprising a cylinder, a motive fluid actuated piston arranged within the cylinder, a U-shaped piston rod having one leg attached to the piston and its other leg arranged exteriorly of the cylinder and attached to the cylinder pin to be assisted, means for alternately supplying and exhausting a motive fluid to each end of the cylinder, causing thereby the reciprocation of the piston, and means to permit of the oscillation of the cylinder during the reciprocation of the piston.

2. An attachment for assisting crank pins over their dead centers comprising an oscillatory cylinder, a piston operating therein, a U-shaped rod having one leg attached to the piston and its other leg arranged exteriorly of the cylinder, sliding thereon and attached to the crank pin to be assisted, combined supply and discharge channels communicating with the opposite ends of the cylinder and with a motive fluid supply, a valve for alternately establishing communication between said channels and the atmosphere and with a motive fluid supply, a link and lever mechanism for shifting said valve, and means carried by one of the legs of the piston rod and adapted to actuate said mechanism alternately in opposite directions during the reciprocation of the piston.

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

JOHN HUTCHINGS.

Witnesses:

JOHN COODA HARE,
ERNEST JOHN HILL.