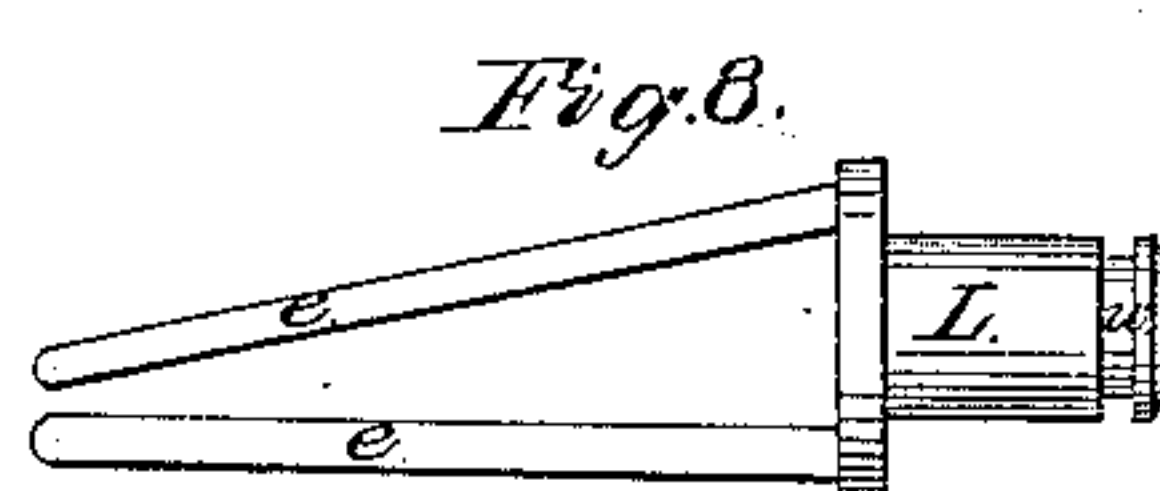
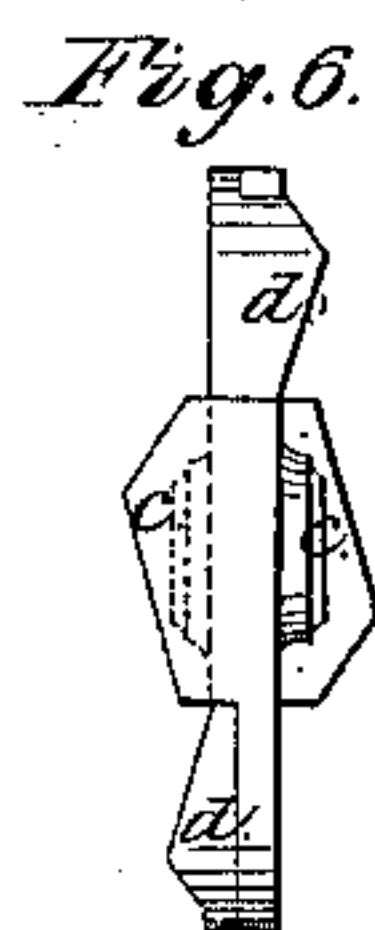
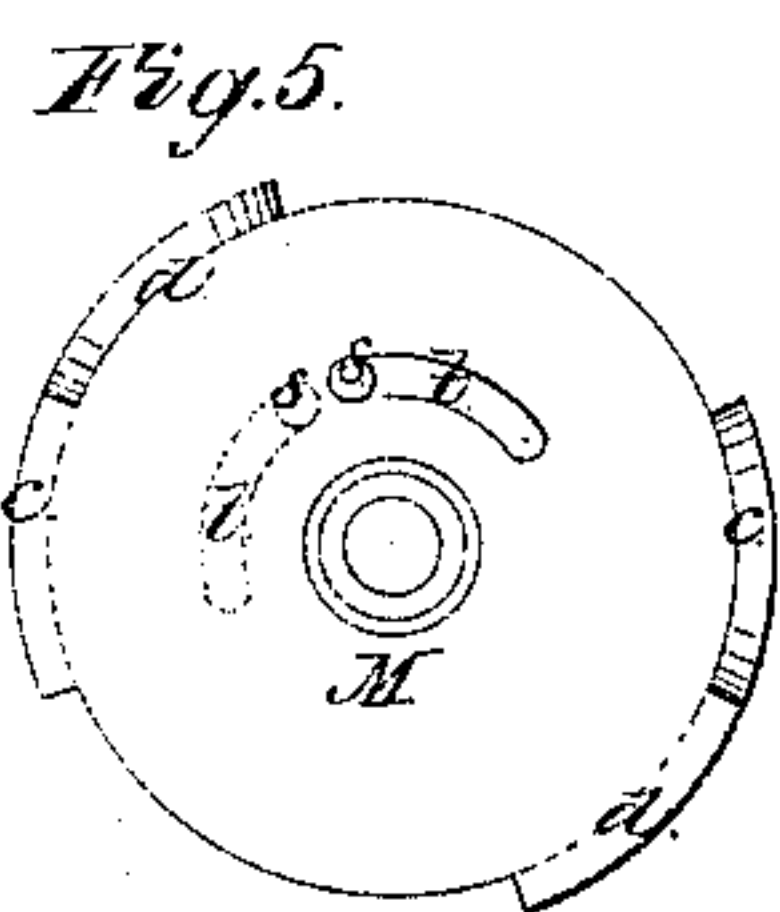
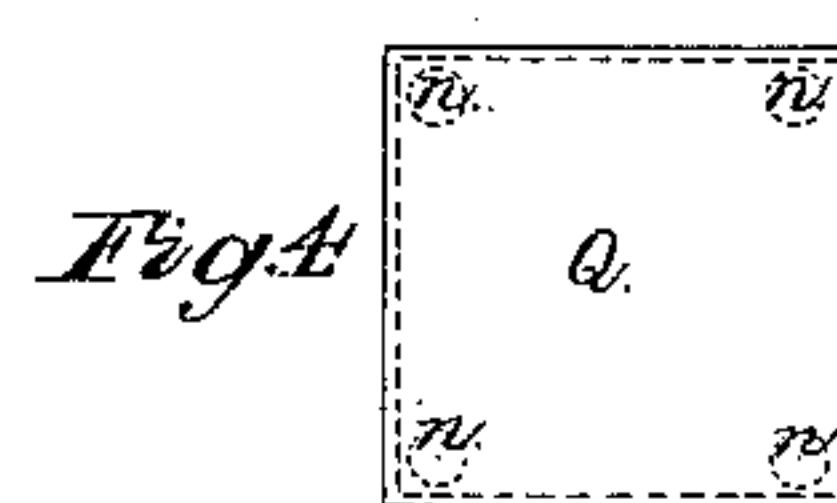
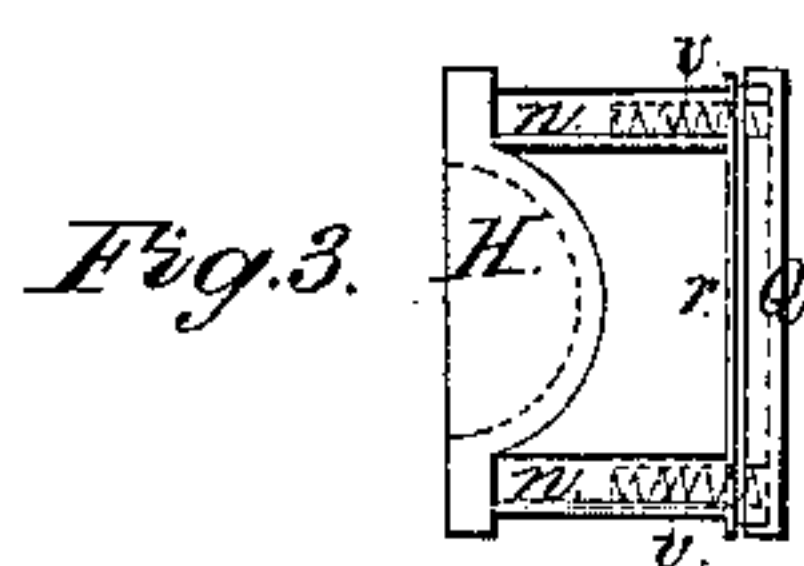
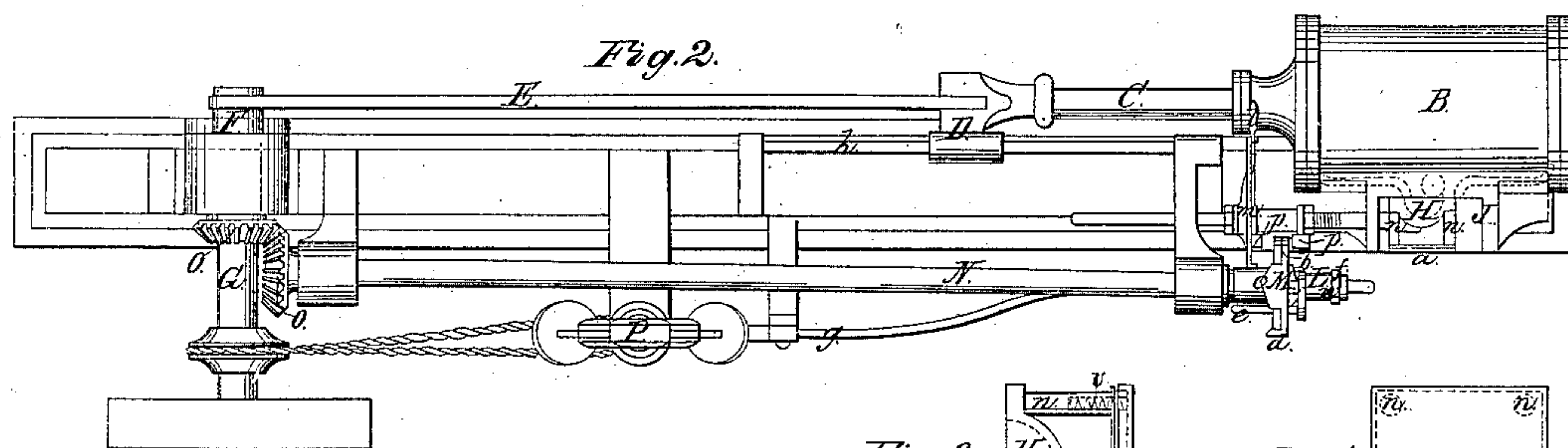
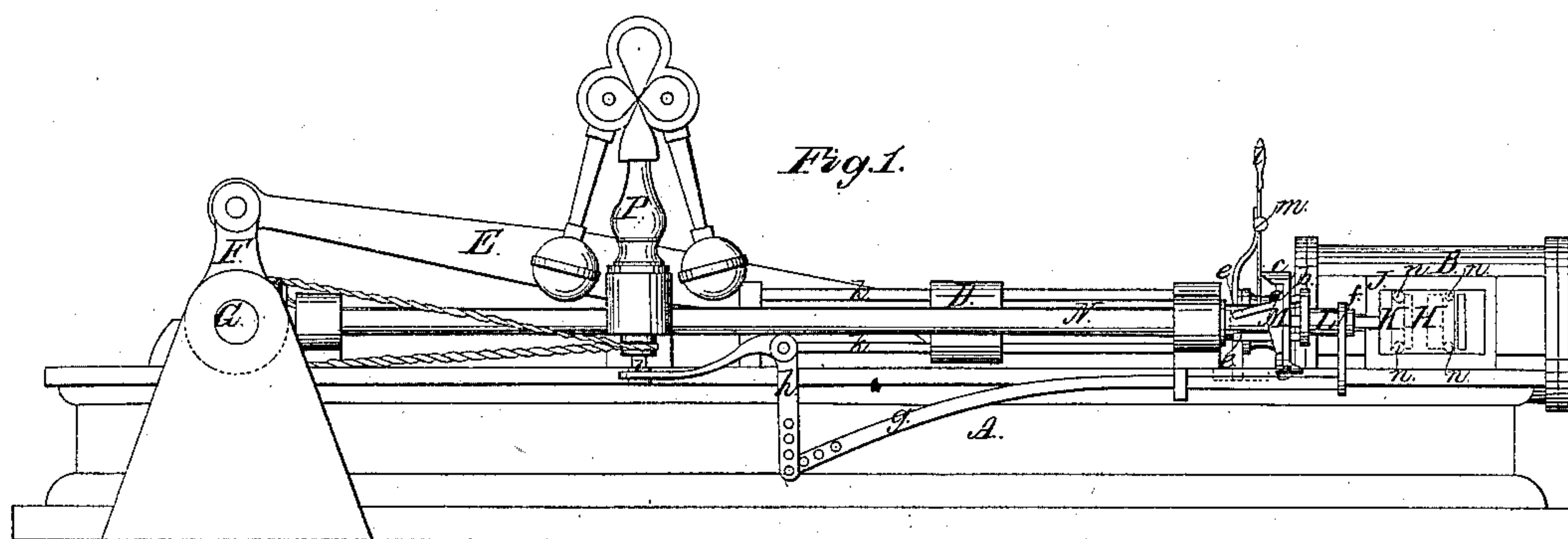


*C.A. Schultz,*  
*Reciprocating Steam Engine,*  
*No. 21,907,* *Patented Oct. 26, 1858.*



# UNITED STATES PATENT OFFICE.

C. A. SCHULTZ, OF NEW YORK, N. Y.

## IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 21,907, dated October 26, 1858.

*To all whom it may concern:*

Be it known that I, C. A. SCHULTZ, of New York, in the county of New York and State of New York, have invented a new and useful Improvement in Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a longitudinal elevation; Fig. 2, a plan; Fig. 3, a side view of the slide-valve; Fig. 4, a top view of the same; Fig. 5, a front view of the revolving cam-wheel; Fig. 6, a side view of the same. Fig. 7 is an end view of the socket and guide-rods; Fig. 8, a side view of the same.

The construction of the engine is as follows:

A is the frame.

B is the cylinder.

C is the piston-rod.

D is the cross-head, which works on slides *k k*.

E is the connecting-rod.

F is the crank.

G is the crank-shaft.

J is the steam-chest.

H represents a balance slide-valve, of which the lower part is a common slide-valve, with four columns, *n n n n*, Figs. 3 and 4, one (standing upright) on each corner, on the top of said valve. On the top of columns *n n n n* is a plate, *r*, Fig. 3, of the same area as the valve H. The valve H, columns *n n n n*, and top plate, *r*, are cast solid. Four holes are cast or drilled in the upper plate, *r*, which run about half-way into the columns *n n n n*, to be used for spiral springs *v v v v*, Fig. 3, which will be used to press against cap Q, Fig. 3. This cap Q is fitted on the upper plate, *r*, on valve H, as shown in Fig. 3, and serves as a packing, in combination with spiral springs *v v v v*. As this cap will bear against the top or cover of the steam-chest J and at the same time press the valve H against the face of the cylinder D, no steam can enter the top of the cap Q. There will be no pressure on the valve H, and not more power is required to operate the valve H, but just to move the weight of the same.

K is the valve-stem, with friction-rollers *p p* attached to it, Fig. 2.

*l* is a lever, for which *m* is the guide. The

lever *l* is intended to serve in place of the well-known unhooking-gear. This is done by moving the lever *l* toward revolving shaft N. This movement will bring the friction-rollers *p p* underneath the valve-stem K, so that the same cannot come in contact with the revolving cam-wheel M. The revolving cam-wheel M, Figs. 1, 2, 5, and 6, gets the motion from the crank-shaft G by means of bevel-wheels O O and revolving shaft N, Figs. 1 and 2.

The revolving cam-wheel M is constructed in two parts, *a* and *b*, of which *b* is the part which opens the valve H, by means of cams *c c*, operating against friction-rollers *p p* on valve-stem K. This part *b* of revolving cam-wheel M is fastened to revolving shaft N. The part *a* of revolving cam-wheel M is movable and not fastened to revolving shaft N. The part *a* of revolving cam-wheel has two cut-off cams, *d d*. The part *a* of revolving cam-wheel is operated by guide-rods *e e* in socket L, Figs. 7 and 8. The guide-rods *e e* form a taper—that is, they are far apart where fastened to socket L and near together on the outer end. These two guide rods *e e* fit the two holes *s s*, Fig. 5. One of these holes is in part *a* and the other hole is in part *b*, and will bring the opening-cams *c c* and the cut-off cams *d d* close together, Figs. 5 and 6, when the same are entered with their outer ends, and will bring said cams far apart when pushed in all the way up to socket L. The slots *t t*, Fig. 5, allow the guide-rods *e e* to move freely in and out.

P is the governor, Figs. 1 and 2.

*i* is a small rod inside of the governor-column. This rod is connected with socket L by means of bell-crank *h* and rod *g*. Rod *g* is attached to fork *f*, which is fitted into slot *w* in socket L. The socket L is fitted onto revolving shaft N, so as to move freely back and forward.

The operation of the engine is as follows: As there is no difference in the steam-ports of the cylinder from the common slide-valve, it needs but little explanation. The engine will start when the steam enters the steam-chest J. The revolving cam-wheel M will make the same revolutions as the crank-shaft G by means of bevel-wheels O O and revolving shaft N, and the same will open and shut the valve H by means of opening-cams *c c* and cut-off cams



*d d*. These cams *c c* and *d d* operate the valve H by coming in contact with friction-rollers *p p* on valve-stem K. The part *a* of revolving cam-wheel M, with cut-off cams *d d*, is movable, and therefore can be regulated to cut off steam at any desired length of stroke, which is done by moving socket L back and forward, so that the guide-rods *e e* will pass in and out the holes *s s* in revolving cam-wheel M. This can be done at any time when the engine is in full motion. The governor P is attached to socket L to regulate the speed of the engine. Whenever the engine runs faster than a certain speed, the governor-balls will fly out and lower the rod *i*, which will move the socket L back by means of bell-crank *h* and rod *g*, in

connection with fork *f*. This movement will bring the cut-off cams *d d* close to the opening-cams *c c*, and so it will cut off steam at a shorter length of stroke until the engine runs at the right speed again.

What I claim as new and my own invention, and desire to secure by Letters Patent, is—

1. The revolving cam-wheel M, with the opening-cams *c c* and adjustable cut-off cams *d d*, constructed as described.

2. The socket L, with guide-rods *e e*.

C. A. SCHULTZ.

Witnesses:

JOHN HAUCK,

F. DIEFFENBACH.