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J. STUMPF.
STEAM ENGINE.

APPLICATION FILED JULY 26, 1910.

1,028,631.

Patented June 4, 1912.

2 SHEETS—SHEET 1.

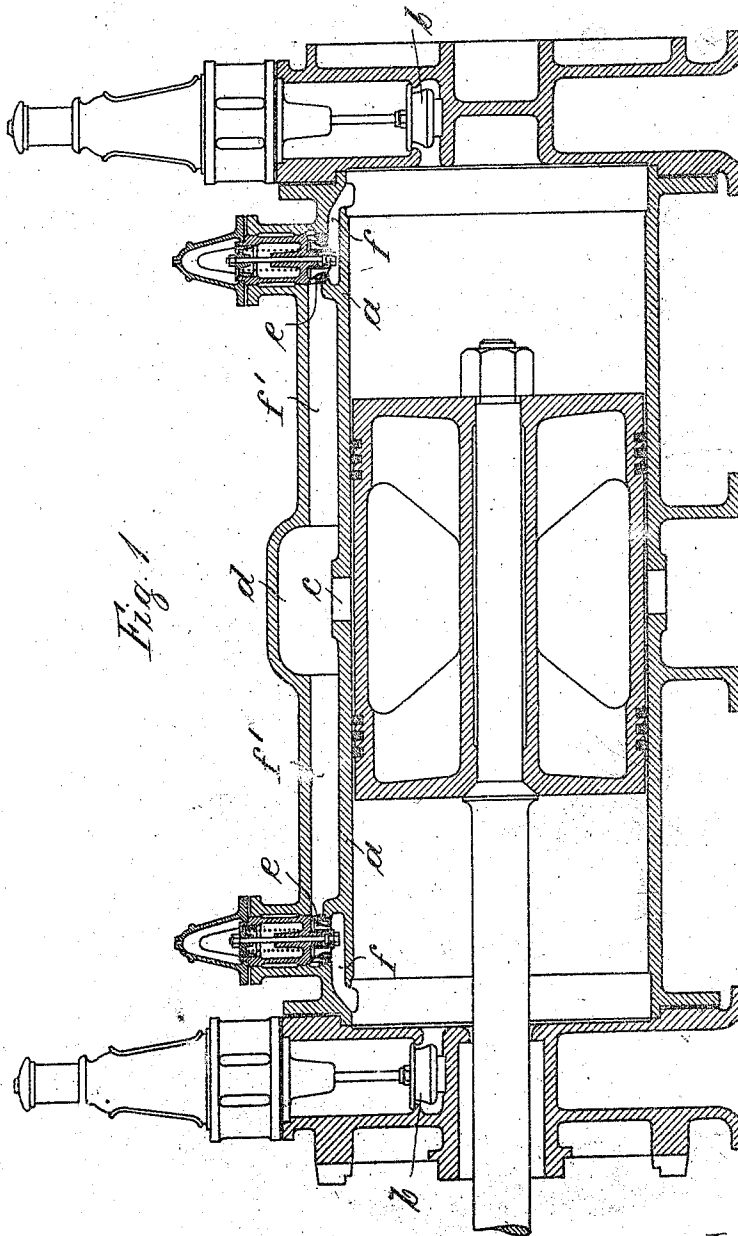


Fig. 1

Witnesses:
Corinne Myers
Thomas Connellan

Inventor:
Johann Stumpf
by L. K. Böhm,
Attorney.

J. STUMPF.

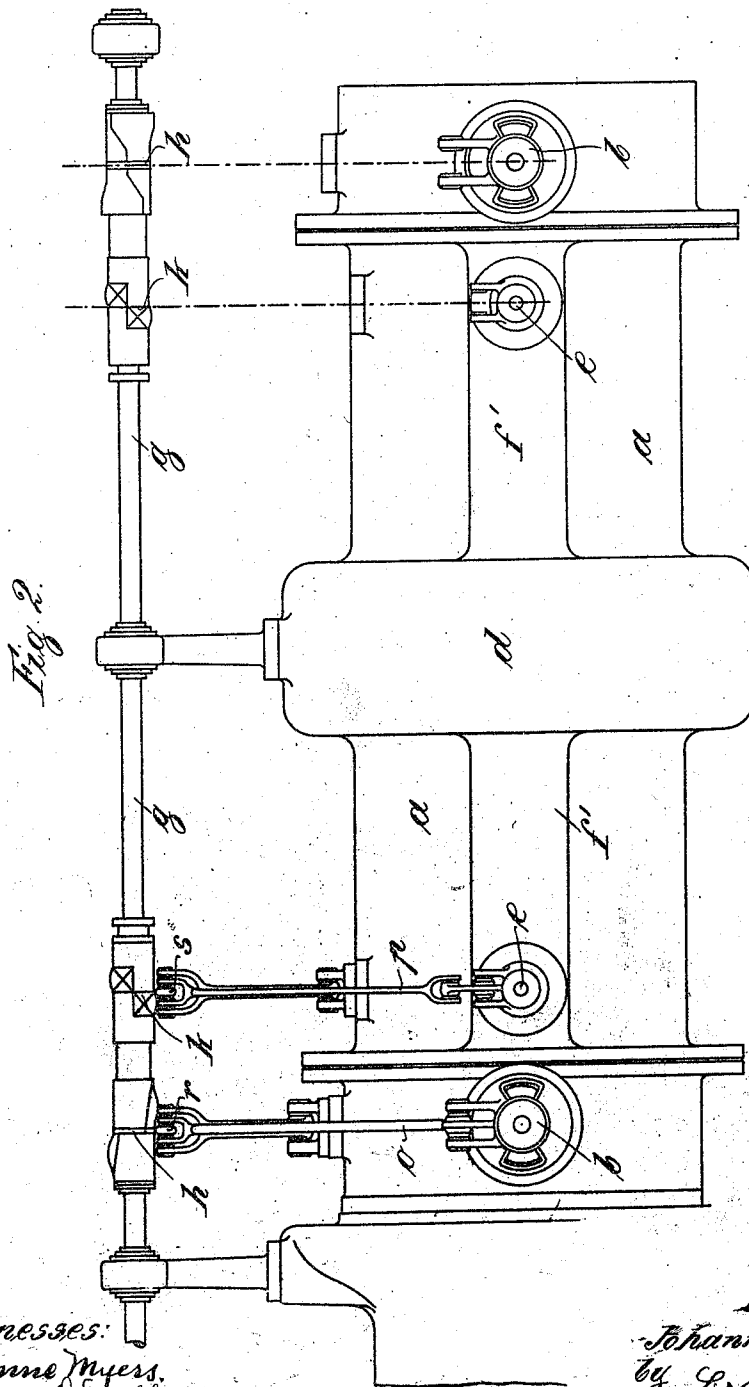
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Johann Stumpf,
by L. K. Böhm,
Attorney

UNITED STATES PATENT OFFICE.

JOHANN STUMPF, OF BERLIN, GERMANY.

STEAM-ENGINE.

1,028,631.

Specification of Letters Patent.

Patented June 4, 1912.

Application filed July 26, 1910. Serial No. 573,933.

To all whom it may concern:

Be it known that I, JOHANN STUMPF, a subject of the King of Prussia, and resident of 33 Kurfürstendamm, Berlin, Germany, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification.

This invention relates to uni-directional flow steam engines, that is engines of the type in which the exhaust takes place through ports in the cylinder walls controlled by the piston in its motion. The invention is specially directed to engines of this type which are required for maneuvering purposes, such as winding engines which require to be stopped dead and accurately in some required position. In uni-directional flow steam engines with compression extending over 90% of the return stroke, such accurate and dead-stopping is difficult. The admission steam on one side of the piston and the highly compressed residual steam on the other side cause an oscillating movement of the piston which, in a winding engine, would in turn cause an oscillating movement of the winding drum and probably lead to accidents.

The object of the present invention is to provide maneuvering gear for uni-directional flow steam engines which will enable them to be stopped dead and accurately in any required position.

The invention consists in a uni-directional flow steam engine having in addition to the usual piston-controlled exhaust ports further exhaust ports controlled by members which are only operated when the cut off is late and which retain the additional exhaust ports closed during normal or early cut off.

The method of carrying out this invention conveniently adopted consists in employing variable cam gear for operating the inlet and supplementary exhaust valves, the gear being such that the supplementary exhaust valves remain closed and unoperated during normal or early cut off and are only affected when the cut off is late. The cams for operating the supplementary exhaust valves are preferably articulated to the inlet valve cams so as to be adjusted simultaneously and interdependently therewith.

With this invention, the engine operates with maximum efficiency as an ordinary uni-directional flow steam engine during the

greater part of its working time and the supplementary exhaust valve gear is only called into action when maneuvering, that is when the inlet valves are raised a short distance and for a longer time than in ordinary running. The necessary throttling for maneuvering can thus be effected by altering the cam gear without affecting the engine throttle valve. Also the adjustment of the inlet valve gear for starting also affects the supplementary exhaust so that it comes into operation to assist starting.

The variable cam gear employed consists conveniently of suitable conical cams mounted on a sliding sleeve and all the valves both inlet and supplementary exhaust are preferably operated from a single cam shaft.

The invention is illustrated by way of example in the accompanying drawings which illustrate part of a double acting uni-directional flow steam engine.

In these drawings: Figure 1 is a vertical sectional elevation of a horizontal engine cylinder. Fig. 2 is a plan of the cylinder shown in Fig. 1.

In carrying the invention into effect according to the form shown the cylinder *a* is supplied with working steam through valves *b* at the admission ends of the cylinders. The ordinary exhaust takes place through ports *c* controlled by the piston in its motion, which ports open into an annular chamber *d*. The supplementary exhaust valves *e* according to this invention control the ports *f* which communicate with the cylinders at or near the admission ends. The ports or passages *f* are continued behind the valve *e* in the passages *f'* which communicate with the annular chamber *d*. The inlet valves *b* and the supplementary or maneuvering exhaust valves *e* are operated from a common cam shaft *g*, which in the form shown is rotatable. On the shaft *g* there are arranged the cams *h* and *k* for the inlet and supplementary exhaust valves respectively. These cams are suitably articulated. In the form shown they are both formed or mounted on one sleeve so that their adjustment is simultaneous and interdependent. The arrangement and shape of the cams will be evident from the above description.

Any suitable gear may be used for sliding or otherwise adjusting the cams. On the cams there bear rollers *r* and *s* which operate

the valves *b* and *e* through any well known form of intermediate links and levers *o* and *p* respectively.

If the cams *h* which are shown as double cones, are set to give the inlet valves a small lift of long duration for either direction of rotation of the engine, the cones *h* are also set to open the valves *e* for a convenient time to allow the residual steam to escape in the desired amount through the passages *f'*. When the cut off is made sooner the opening or period of opening of the valves *e* is reduced till when the cut off is normal or early the valves *e* are unaffected by the conical cams *h* and remain closed.

I claim:—

1. In combination with a cylinder having a steam inlet port at its end and a main exhaust, an admission valve controlling the admission of steam to said cylinder through said inlet port, means for operating said inlet valve, said means being adjustable to give an earlier or later cut off of the valve as required, a supplementary exhaust passage communicating with the inlet end of said cylinder, a valve normally at rest and closing said supplementary exhaust passage and means for moving said valve from its normal position of rest to relieve compression when the cut off is late comprising a member movable and adjustable with the operating means for the admission valve and an oper-

ating member for the supplementary exhaust valve arranged to co-act with said movable member to operate said supplementary exhaust valve when the operating means for the admission valve gives late cut off.

2. In combination with a cylinder having a steam inlet port at its end and a main exhaust port, an admission valve controlling the admission of steam to said cylinder through said inlet port, a slidable and rotatable cam for operating said valve to give a variable cut off as desired, a supplementary exhaust passage communicating with the inlet end of the cylinder, a valve normally at rest and closing said supplementary exhaust passage and means for moving said valve from its normal position of rest to relieve compression when the cut off is late comprising a cam slidable and rotatable with the operating cam for the admission valve and an operating arm for said supplementary exhaust valve, said operating arm being arranged to co-act effectively with said rotatable and slidable cam when the operating means for the admission valve is located to give a late cut off.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOHANN STUMPF

Witnesses:

JOHANNES HEYNEMANN,
FRANZ MÜLLER.