

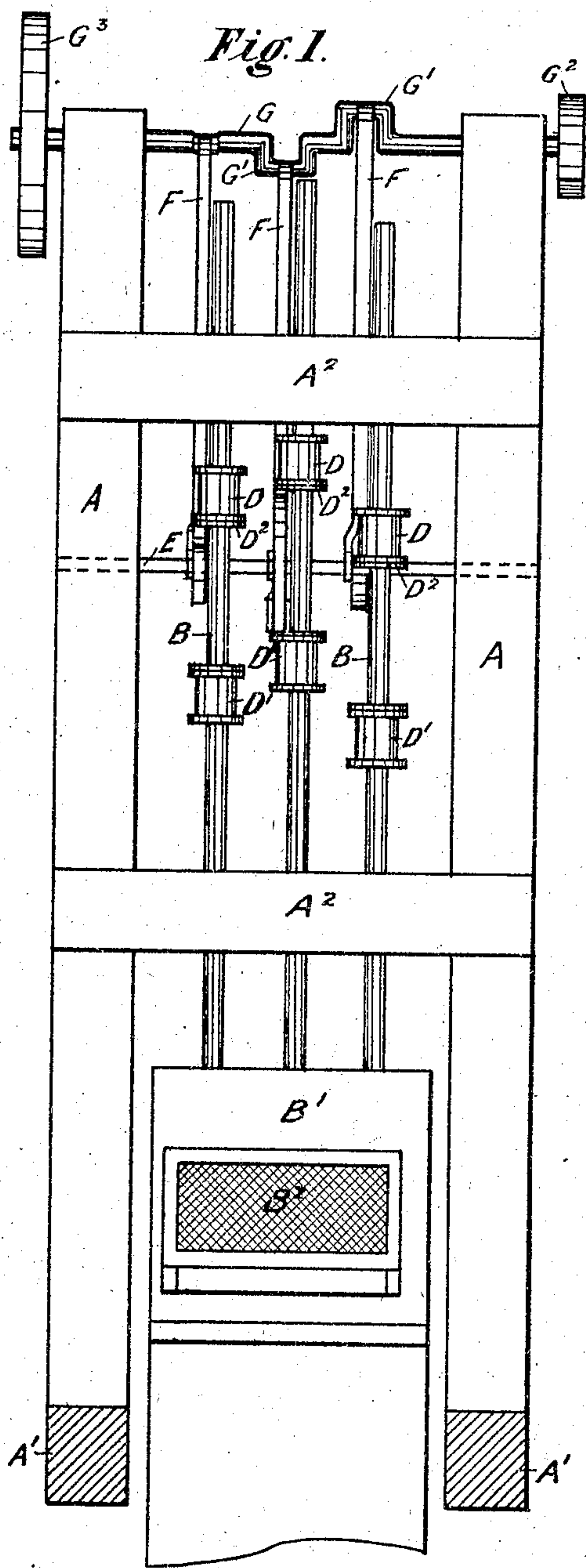
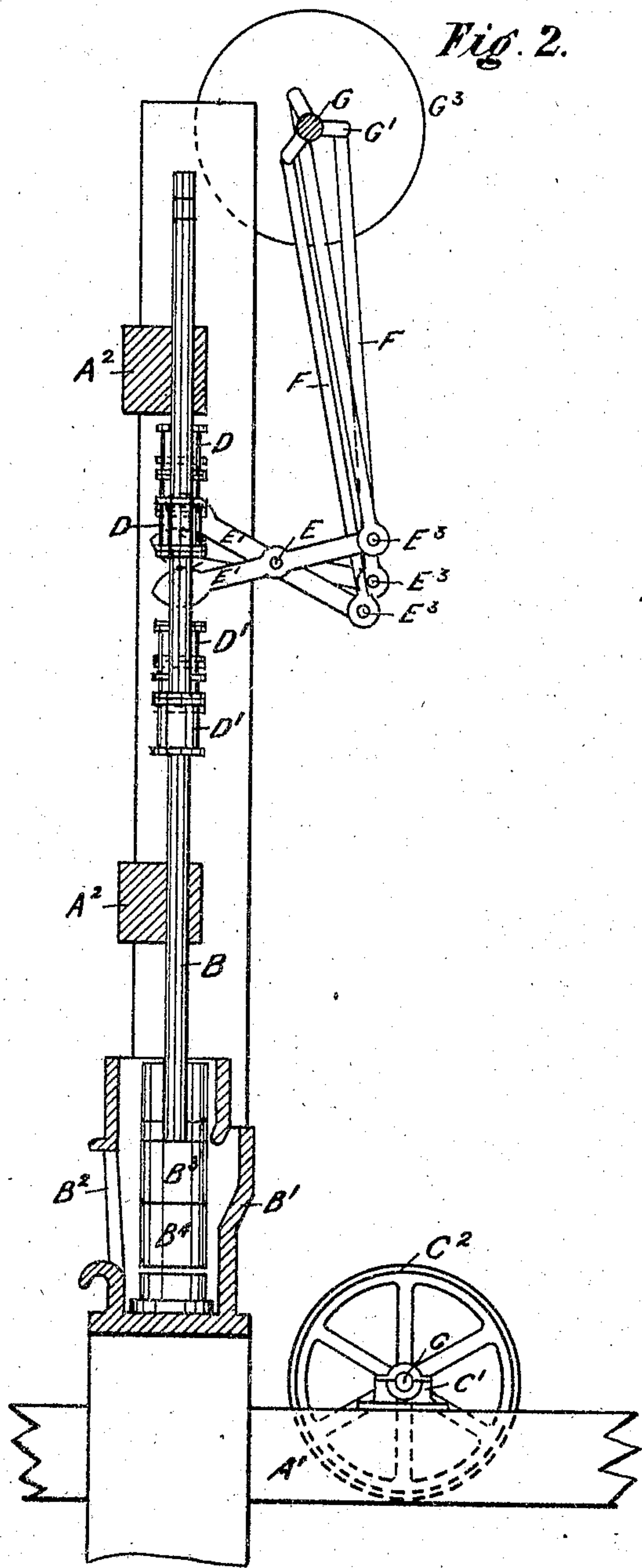
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R. TAYLOR.

APPARATUS FOR OPERATING STAMP MILL DRIVES.

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APPARATUS FOR OPERATING STAMP-MILL DRIVES.

SPECIFICATION forming part of Letters Patent No. 791,732, dated June 6, 1905.

Application filed March 7, 1904. Serial No. 196,996.

To all whom it may concern:

Be it known that I, ROBERT TAYLOR, a subject of His Majesty King Edward VII, residing at Subiaco, in the State of Western Australia, Australia, have invented certain new and useful Improvements in Apparatus for Operating Stamp-Mill Drives, of which the following is a specification.

This invention relates as aforesaid to apparatus for the purpose of operating stamper-batteries, drop-hammers, pile-drivers, and other similar machines in which it is required to obtain the action of raising a battery-shank, hammer, or other weight and dropping it on the object to be crushed, hammered, or driven with a rapid succession of drops or blows, also to facilitate or impart an impetus to the drop or blow. The mechanism is devised as a substitute for the same and other devices at present in use for a similar purpose and with the special object of obtaining a greatly increased speed in the succession of drops or blows over existing methods and appliances.

In order that my invention may be better understood both as regards construction and the method of operation, I shall now proceed to describe the same by the aid of the accompanying illustration, in which the mechanism comprising my invention is attached and adapted to an ordinary stamper-battery as at present in use for quartz-crushing and the like.

Figure 1 is a vertical side section of the stamper-battery with the double-faced lever-cams and coöperating mechanism attached, and Fig. 2 is a front elevation of a stamper-battery with the double-faced lever-cams and coöperating mechanism attached.

Throughout the drawings similar letters of reference are used to denote corresponding parts wherever they occur. In this respect A A are the stamper-battery columns or standards, fitted to the sill-logs A' A' and carrying the guide-blocks A², in which the shanks B are fitted and guided to work freely with a vertical action. These parts, with the mortar-box B', screens B², stamp-heads B³, shoes B⁴, driving-shaft C, and bearings C', may all be similar and be constructed of like materials to those respective parts at present in use in

stamper-batteries or may be of any other design or arrangement as is now or may be adopted by various makers, such materials, design, or arrangement constituting no part or claim in this invention. I also make use of a tappet D, as in use in ordinary cam-batteries, which tappets may be attached to the shank B by means of a screw, clamp, and key or by cogs and wedges, as at present in use, and shall have a removable liner D² attached to their wearing-faces, so that the main body of the tappet may be worn out; but when the liner is worn the latter may be replaced by a new one. In addition to this tappet B, I place a second tappet D' on each shank at a certain distance below the other, the distance being in direct relation to the throw of the cam-levers E'. This tappet D' may be similar in design and construction and in means of attachments to the shank as the former D, above referred to.

At the back of the standards or columns A and at the head thereof I attach a shaft E, which does not revolve as the ordinary cam-shaft, but is fixed to the standards by means of bearings, brackets, clamps, or the like, and on this shaft E are fitted the double-faced lever-cams E'. These lever-cams fit loosely on the shaft E, which latter forms a fulcrum for the said lever-cams. The levers are prevented from making any lateral motion on the shaft by means of collars and set-screws or some similar device. The cam-faces E² of the lever E' are made to the form of a cycloidal curve, so that whatever position the lever may be in within its arc of action the face D² of the tappet shall be tangential to the curve of the cam-face at its highest point with which it is in contact and shall be so adjusted that when lifting the shank B the cam shall cause it to revolve in one direction, and when a certain speed of action is reached the tappet shall be thrown above the reach of the lever-cam, which returning more quickly than the shank the lower cam-face strikes the lower tappet D', accelerating the speed of the drop and tending to revolve the shank in the same direction as the original motion. These lever-cams are made alike at the top and bottom, so that they may be reversible when worn out on

one face, likewise so that the lower face shall bear the same relation to the face of the lower tappet D as already specified for the upper tappet D. The back or connecting-rod end of the lever at E^3 is made with an eye to which the connecting-rod F may be coupled or attached by means of a pin or bolt. A crank-shaft G is fitted to the standards or columns A or to cross-bearers, as many as may be found most convenient. This crank-shaft G will have as many double cranks G' as there are lever-cams to operate. They shall also be set at varying angles to each other in order to equalize the work and attain on the crank-shaft as well as to obtain the correct succession in the dropping of the stampers.

Each crank G' shall be coupled to the lever-cams E' at the point E^3 by means of a connecting-rod F, so that when the cranks are revolved the levers shall receive an alternating motion and bring the cam-faces E^2 into contact with the tappet-faces D^2 , lift the shanks, and on returning allow them to fall.

In the event of the speed at which the lever-cams are driven being so great that the motion of the cams shall exceed the gravitation of the stampers the lower cam-faces E^2 will strike the top of the tappet D' and accelerate its falling motion, thus increasing the impetus of the blow and avoiding the possibility of the upper tappet D dropping on the upper cam-face E^2 before it has completed the drop or blow.

The crank-shaft may receive its motion from a driving-shaft C with a pulley C^2 , having a belt driving on the crank-shaft pulley G^2 , or may be driven direct by an engine or motor or by gear or by any other convenient means of power transmission. A fly-wheel G^3 may be attached to the crank-shaft G, which by its centrifugal momentum will overcome the inertia of the stampers and equalize the strain on the driving power.

For convenience of illustrating my invention it is shown attached to a three-head battery; but I desire it to be distinctly understood that my invention may be attached to a unit battery or one of any number of stamps or heads arranged in a line, as shown in the illustrations, or the lever-cams may be constructed with a double-faced cam on each end of the connecting-rod F, coupled to a point between one end of the shaft or fulcrum E, so that one lever may be arranged and employed to operate two stamps. With this object the stamps may be arranged in a system of even numbers back to back, or the lever-cams may be fitted in a position at right angles to that shown on the drawings and made to operate two stamps in the one mortar-box, the lever-cams being actuated by one crank and one connecting-rod. In a similar manner the lever-cams and mechanism may be attached to and employed for the purpose of operating drop-hammers, pile-drivers, or

such other machines in which it is required to obtain a rapid succession of drops or blows. In all cases the cam-faces E^2 being down will be some distance below the upper tappet-faces D^2 , and clearance shall be allowed between the tappets D and D' and the guide-blocks A^2 , so that the action of the cam-levers E' may throw the shank B some distance higher than the highest point reached by the top of the cam-face E^2 , also to allow for wear in the shoes and dies.

The method of operating my invention is as follows: The crank-shaft G being revolved by means adapted for the purpose the cranks G' , through the connecting-rods F, will operate the lever-cams E' , which will throw the shanks B upward and in the case of a high speed being attained will strike the lower tappet p' on the return stroke and accelerate the falling motion of the stamper or hammer or the like, thus enabling a very rapid succession of blows to be delivered on the material to be crushed, hammered, or driven, as the case may be.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. In apparatus for operating stamper-batteries, drop-hammers and the like, the combination of a lever fulcrumed upon a fixed pivot and having one end formed as a double-faced cam, each of the faces being described upon a cylindrical curve, a stamper or hammer shank to one side of which the cam end of the lever passes, an upper tappet upon said shank with which the upper cam-face engages, to lift the shank and concurrently turn it, a lever-tappet at an appreciable distance from the upper, out of engagement with the cam, against which the lower cam-face may strike a blow when the lever is rapidly driven, and means for vibrating said lever.

2. In apparatus for operating stamper-batteries, drop-hammers and the like, the combination of a lever fulcrumed upon a fixed pivot and having one end formed as a double-faced cam, each of the faces being described upon a cylindrical curve, a stamper or hammer shank to one side of which the cam end of the lever passes, an upper tappet upon said shank with which the upper cam-face engages, to lift the shank and concurrently turn it, a lower tappet at an appreciable distance from the upper, out of engagement with the cam, against which the lower cam-face may strike a blow when the lever is rapidly driven, means for vibrating said lever, and renewable linings for said tappets.

3. In apparatus for operating stamper-batteries, drop-hammers and the like, the combination of a lever fulcrumed upon a fixed pivot and having one end formed as a double-faced cam, each of the faces being described upon a cylindrical curve, a stamper or hammer shank to one side of which the cam end of the lever

passes, an upper tappet upon said shank with which the upper cam-face engages, to lift the shank and concurrently turn it, a lever-tappet at an appreciable distance from the upper, out
5 of engagement with the cam, against which the lower cam-face may strike a blow when the lever is rapidly driven, a link attached to the heel end of the lever, a crank-shaft for op-

erating said link, and means for driving said shaft.

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

ROBERT TAYLOR.

Witnesses:

SYDNEY WILLIAM CURTIS,
ARTHUR JAMES KENNEDY.