No. 839,286. PATENTED DEC. 25, 1906.

J. G. GILREATH.

STEAM ENGINE.

APPLICATION FILED JUNE 15, 1905.

2 SHEETS—SHEET 1.

FIG. 1.

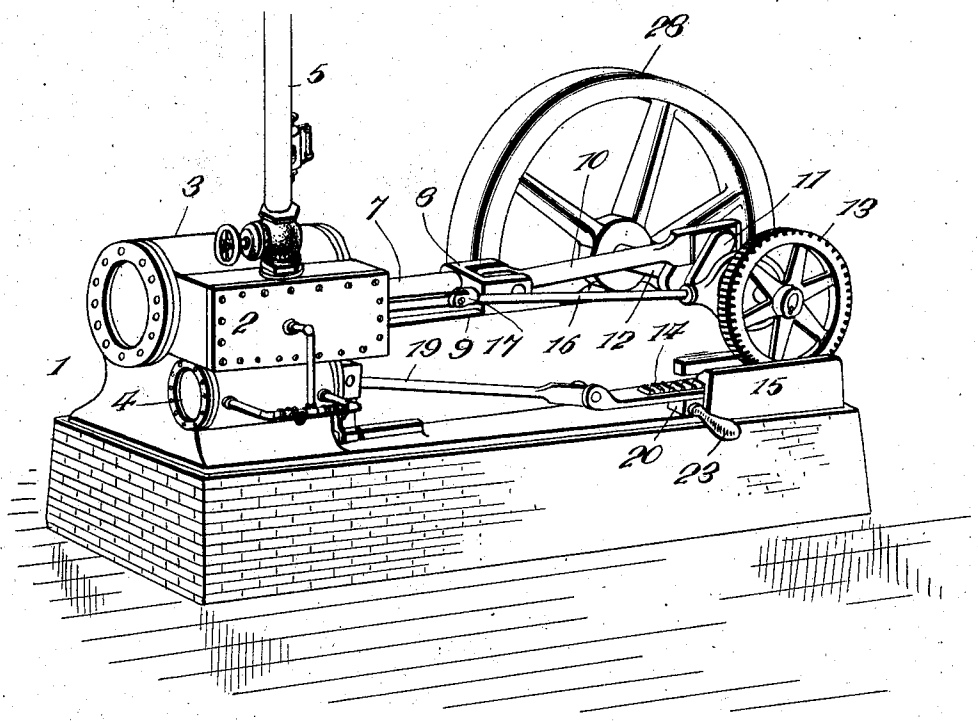
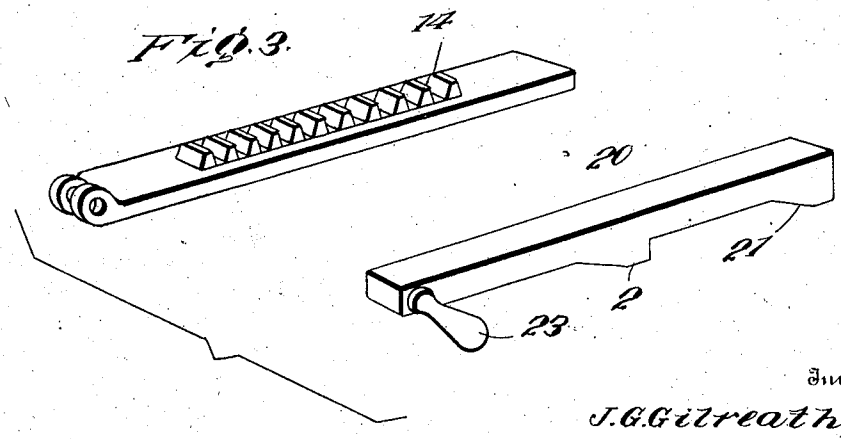


FIG. 3.



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2 SHEETS—SHEET 2.

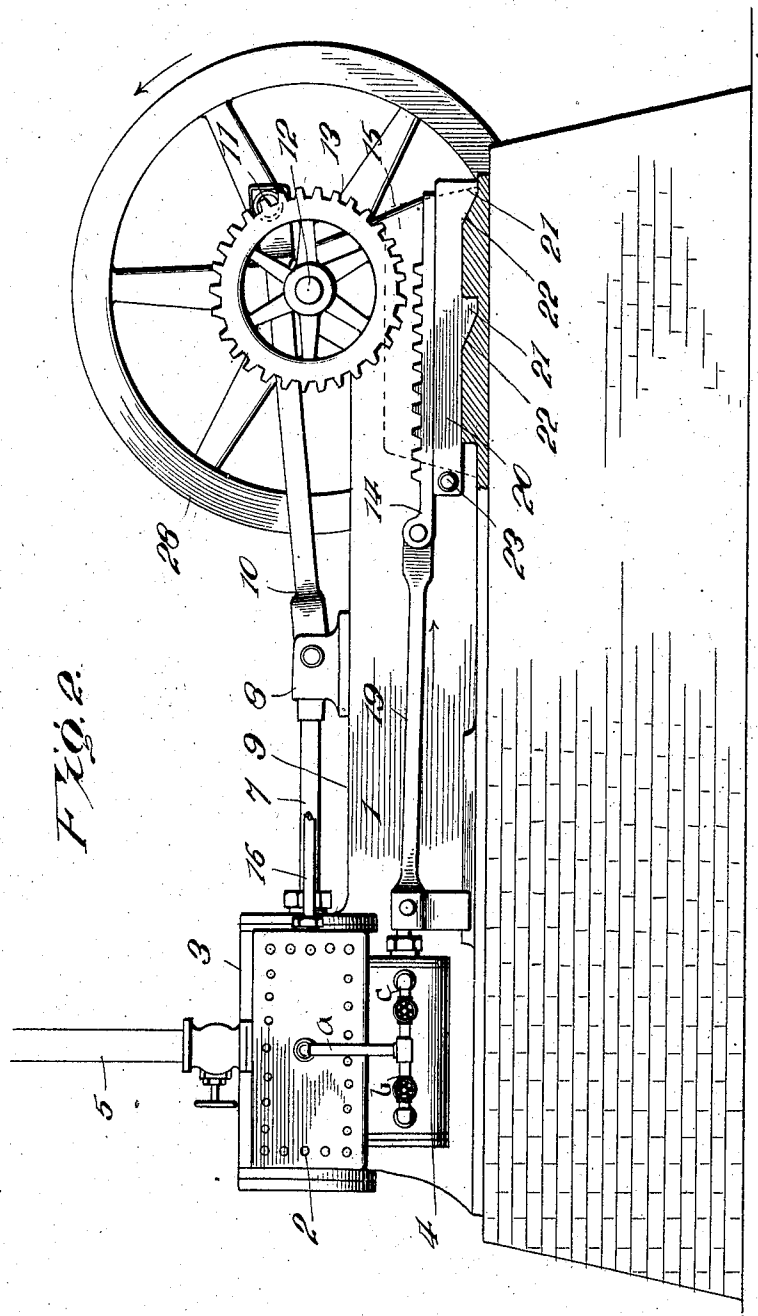

Fig. 2.

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UNITED STATES PATENT OFFICE.

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STEAM-ENGINE.

No. 839,286. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed June 15, 1905. Serial No. 265,368.

To all whom it may concern:

Be it known that I, JAMES G. GILREATH, a citizen of the United States, residing at Wilkesboro, in the county of Wilkes and State of North Carolina, have invented a new and useful Steam-Engine; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to engines, and especially to that class known as "steam-engines;" and the main object of the invention is to provide means to overcome the dead-center of the driving crank-shaft—that is to say, when the crank of the driving-shaft has reached a point where it is in a direct horizontal line with the pitman and the cross-head, which has reciprocating movement in guides and which is also connected directly with the piston-rod.

More especially the means for obtaining this purpose comprises a sliding ratchet-bar, which is connected to a pitman, a cross-head, and a piston-rod, which is driven by the auxiliary cylinder, and also means for raising the ratchet-bar at the requisite moment for starting the engine, comprising a reciprocating element having cam-teeth on the bottom thereof which are adapted to engage recesses upon the base of the engine.

The invention comprises other and further objects and advantages and combinations of elements and arrangements of parts, which will be hereinafter more fully described and then defined in the appended claim.

My invention is illustrated in the accompanying drawings, which, with the characters of reference marked thereon, form a part of this application, and in which—

Figure 1 is a perspective view of a stationary engine, showing my improved means for overcoming the dead-center of the operating power crank-shaft. Fig. 2 is a side elevation, partly broken away, to show more clearly the improved means for obtaining the purpose set forth; and Fig. 3 is a detail view of the ratchet-bar and the reciprocating element for raising said ratchet-bar.

Reference now being had to the details of the drawings by characters, 1 designates the base of the entire stationary engine, having the usual steam-chest 2, the steam-cylinder 3, and the auxiliary cylinder 4. To allow steam to enter the steam-chest, the steam-cylinder, and the auxiliary cylinder, a pipe 5 is provided, as is clearly shown in the accompanying drawings. Adapted to be driven by the steam-cylinder is a piston-rod 7, which is connected direct with the usual reciprocating cross-head 8, which has horizontal reciprocating motion in the usual guideways 9, said cross-head being connected to the pitman 10, which in turn is pivotally mounted, as at 11, to the crank portion of the operating driving-shaft 12. As will be understood, steam enters the auxiliary cylinder through the pipes *a*, *b*, and *c*, after which the steam circulates therethrough and operates the piston, (not shown,) which is carried by the piston-rod 19, thereby causing the said rod to reciprocate. The construction of the steam-chest and auxiliary cylinder may be any conventional form to obtain the proper circulation of steam to operate the coöperating parts of the device, which construction forms no part of the present invention. Mounted upon said driving-shaft is a spur-gear 13, which is adapted to be engaged at the requisite moment by the rack-bar 14, which has a horizontal sliding movement in suitable guides 15, said rack-bar being connected to the pitman 16, which is connected to another cross-head 17, which also has a horizontal movement in suitable guides 18, said cross-head being also connected to the reciprocating piston-rod 19, which is driven by the auxiliary cylinder. Thus from the set forth description and the accompanying drawings the connections of the rack-bar, the spur-gear, the operating driving crank-shaft, and the coöperating pitmen and pistons will be clearly understood.

To raise the reciprocating rack-bar at the requisite moment for starting the engine to engage the spur-gear 13 for the purpose of rotating said gear in the same direction to overcome the dead-center, a suitable device 20 is provided, which is also provided with cam-teeth 21 for engagement with the recesses 22 upon the base of the engine, which will raise the rack-bar sufficiently to engage the spur-gear 13 for starting the engine. Said device is provided with suitable handle 23 for operating said device. This device 20 is adapted to raise the reciprocating rack-bar

just as said rack-bar is driven outward for the purpose of driving the spur-gear 13 in the same direction for the purpose of overcoming the dead-center of the the driving crank-shaft. The driving crank-shaft is provided with the usual fly-wheel 28.

The operation of the device is as follows: The driving crank-shaft is operated through the combination of connections of the pitman 10, the cross-head 8, and the reciprocating piston-rod 7, which is driven by the steam-cylinder 3, and if the pivotal connection 11 of the pitman 10 and the crank-shaft 12 stops in a direct horizontal plane with the piston-rod 7 the reciprocating rack-bar will be raised by the device 20 for starting the engine again, after which the reciprocating rack-bar is ready to be driven outward by the auxiliary cylinder, thereby rotating the spur-gear in the same direction, and by such rotation the pivotal connection 11 will be carried past the dead-center. The device 20 is operated by the handle 23 at the requisite moment to raise the rack-bar 14.

The construction of the steam-cylinder, the steam-chest, and the auxiliary cylinder is well understood, and therefore it is not necessary to describe the operation of the same.

Of course it is distinctly understood that various changes can be made in the details of construction and combinations of parts other than those illustrated in the accompanying drawings, if desired, without in any way departing from the spirit and scope of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

An engine comprising a base having bearings, a crank-shaft mounted in said bearing, said engine having a steam-cylinder, steam-chest and auxiliary cylinder, said crank-shaft having pitman and piston-rod connections with the steam-cylinder, said crank-shaft having pitman and piston-rod connections with said steam-chest, a spur-gear carried by said crank-shaft, said base having guides, a rack-bar to reciprocate in said guides, said rack-bar having pitman and piston-rod connections with the said auxiliary cylinder, a sliding element to reciprocate between said guides for raising the rack-bar to cause said spur-gear to rotate in a forward direction for the purpose of overcoming the dead-center, said sliding element having cam-teeth upon the lower surface thereof, the base of said guides having recesses to coöperate with said cam-teeth.

In testimony whereof I have hereto affixed my signature in the presence of two witnesses.

JAMES G. GILREATH.

Witnesses:
O. F. BLEVINS,
I. S. GAMBILL.