A. SMITH.

HOISTING ENGINE.

APPLICATION FILED MAR. 7, 1916.

1,248,186. Patented Nov. 27, 1917

Fig. 1.

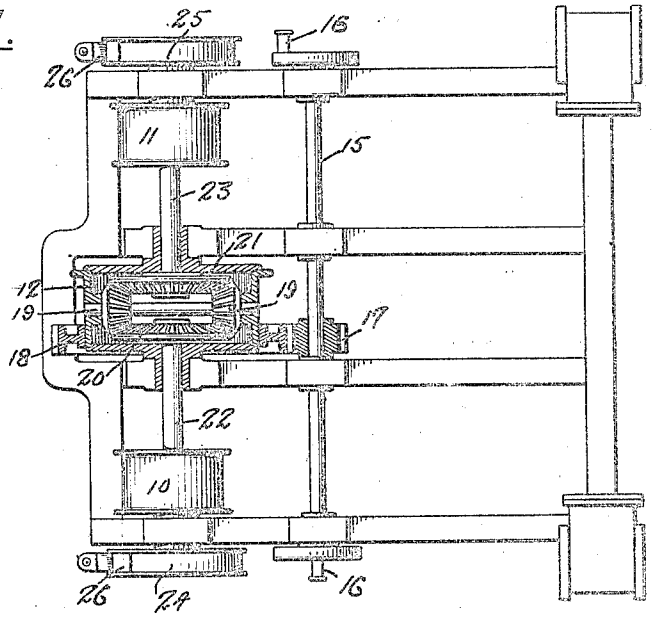


Fig. 2.

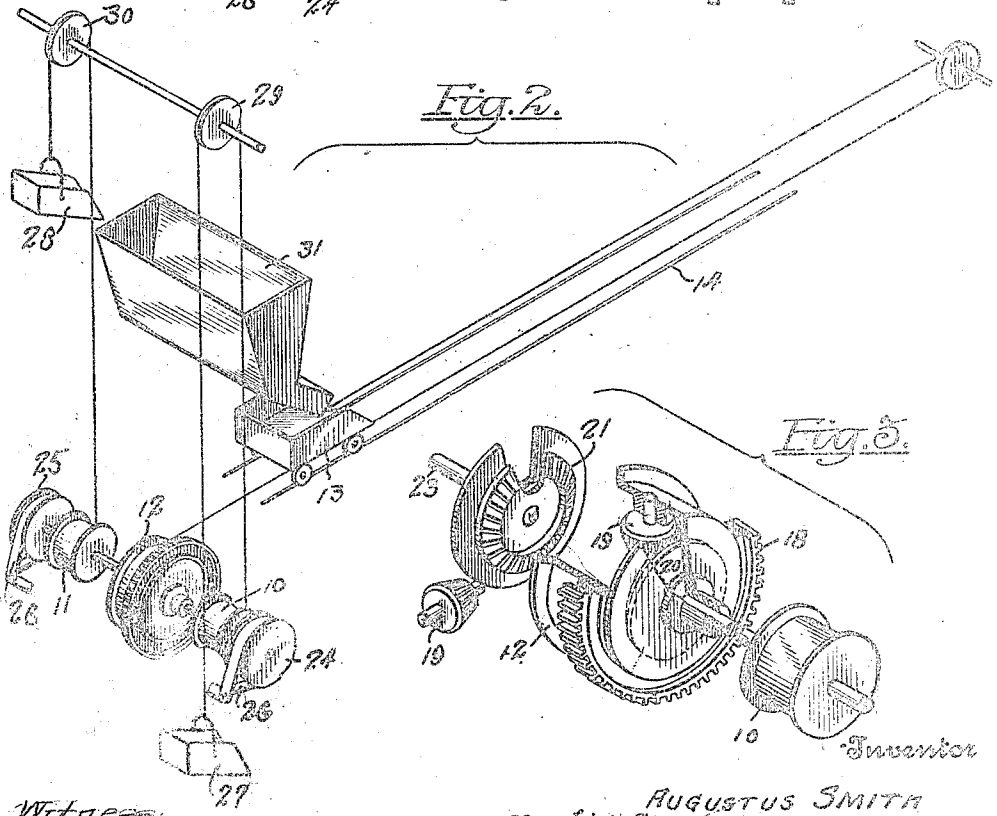


Fig. 3.

Witness:

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By his Attorneys

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UNITED STATES PATENT OFFICE.

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HOISTING-ENGINE.

1,248,186. Specification of Letters Patent. Patented Nov. 27, 1917.

Application filed March 7, 1916. Serial No. 82,630.

To all whom it may concern:

Be it known that I, AUGUSTUS SMITH, a citizen of the United States of America, and residing at Roselle, in the county of Union and State of New Jersey, have invented a certain new and useful Improvement in Hoisting-Engines, of which the following is a specification.

My invention relates to hoisting engines and particularly to an engine for operating a plurality of skips serving a common hopper and dump car. The special object of my invention is to provide an engine having a group of three operating drums consisting of a primary drum and a pair of secondary drums driven therefrom and having a fixed ratio of rotation with relation thereto, but so flexibly interconnected that either of the secondary drums may be driven while the other is stationary without substantially altering the angular relation of the drums to each other, as would be the case if this freedom were obtained by clutches of any sort in which slip or lost motion could occur.

In the accompanying drawings,

Figure 1 is a plan, partially in section, of an engine typical of the invention;

Fig. 2 is a diagrammatic perspective of an installation in which my improved engine is embodied; and

Fig. 3 is a broken, exploded, perspective of certain of the engine parts.

As here shown, my invention is embodied in an engine having a pair of skip-hoisting drums 10 and 11, which for convenience I will call the secondary drums, and an intermediate hauling drum 12, which I will call the primary drum, for shifting the dump car 13 in one direction on the inclined trackway 14. The drive is taken from the shaft 15 rotated by any suitable motor (not shown), which may be connected for instance to the cranks 16. A pinion 17 keyed on this shaft meshes with a gear 18 on the hauling drum 12. The latter, instead of being keyed or loosely mounted as usual on its shaft, forms the drum portion of an equalizer casing or differential gear box and carries the bevel pinions 19 the axes of which are fixed in bosses on the interior of the drum 12. Meshing with these pinions are bevel gears 20 and 21 on their respective shafts 22 and 23, which pass through the sides of the differential drum casing and carry at their outer ends the skip hoisting drums 10 and 11. Obviously if the bevel gears 20 and 21 are free to revolve they are carried around by the pinions 19 when the drum 12 rotates, while if either bevel gear 20 or 21 is held against rotation then the other bevel gear would be driven at twice the normal speed through the combined effect of the rotation of the drum 12 and of the differential pinions 19.

On the extreme ends of the shafts 22 and 23 are keyed brake wheels 24 and 25, the brake bands 26 for which may be operated from any convenient point of control (preferably adjacent the control for the hoisting engine) so that the operator may hold either drum 10 or 11 stationary while the engine drives the car hauling drum 12 and the other skip-hoisting drum.

Operated by the hoisting drums 10 and 11 are the two skips 27 and 28 the ropes for which pass over sheaves 29 and 30 to the respective drums. Both dump into a common hopper 31 which discharges into the car 13 hauled up the inclined trackway 14 by the drum 12 and returning by gravity to position beneath the discharge chute of the hopper 31. In Fig. 2, the drum 11 and skip 28 are shown operated in conjunction with car 13 so that when skip 28 is over the hopper in discharge position the car 13 is under the hopper ready to receive the material from the skip. So long as drum 10 is held stationary by its band brake, the relative position of the skip 28 and car 13 remains constant on each trip of the car and skip. If it be desired however, that after skip 28 has been lowered to the ground, skip 27 should be raised then drum 11 would be held by its brake and drum 10 released, whereupon skip 27 would be lifted and work in unison with the car 13. Thus the skips may be alternately operated to cooperate with the car 13, by holding one skip hoisting drum 11 (for instance during the filling of the skip) while the other drum is freed and lifts its load to the chute 31.

Obviously, if the travel of skip 28 must be longer than the travel of skip 27 this is readily accomplished by simply making the drum 11 correspondingly larger than drum 10; or, if the relative travel of skips 27 and 28 were so unequal that the proper diameter drums could not conveniently be used on the same axis, it would be perfectly feasible to substitute gears for the drums on the spin-

dles 22 and 23 and drive the drums at any desired ratio.

The underlying thought of the invention is to provide a mechanism such that if one of the secondary drums (*e. g.* 10) be held against rotation (as by band brake 24—26) the free secondary drum (*e. g.* 11) will revolve through its operative connection with the primary or hauling drum 12 in its definite ratio, thereby controlling in definite fixed paths the bodies hoisted or hauled by the drums. At the same time, the option is afforded of using either of the two secondary drums by simply releasing one and holding the other without upsetting the fixed ratio between the chosen drum on the driven shaft and the primary driving drum which moves when either of the secondary drums turns.

An obvious use of the device would be to release both brakes and pull simultaneously on both secondary drums 10 and 11, in which case, if the drums were of the same diameter, the pull on both ropes would be the same, or by making the secondary drums of different diameters any selected ratio could be established between the pull exerted by the drums respectively.

Other possible modifications will readily occur to those skilled in the art which do not depart from what I claim as my invention.

I claim as my invention:—

1. In a hoisting engine, a primary drum, a pair of secondary drums, and means associated with each of said secondary drums for hauling a load independent of the other secondary drum, a driving connection between the primary and secondary drums, means for halting one of said secondary drums on the drive of the other secondary and the primary drum, the sum of the revolutions of the secondary drums when both are driven simultaneously being equal to the revolutions of one secondary drum when that is driven alone, and bearing a predetermined fixed ratio to the revolutions of the primary drum, for the purpose described.

2. In a hoisting engine, a primary drum, a pair of secondary drums, and means associated with each of said secondary drums for hauling a load independent of the other secondary drum, a driving connection between the primary and secondary drums, means for halting either of said secondary drums on the drive of the primary drum and the other secondary, the sum of the revolutions of the secondary drums when both are driven simultaneously being equal to the revolutions of one secondary drum when that is driven alone, and bearing a predetermined fixed ratio to the revolutions of the primary drum, for the purpose described.

3. In a hoisting engine, a primary drum, a pair of secondary drums, and means associated with each of said secondary drums for hauling a load independent of the other secondary drum, a differential drive gearing operatively connecting the primary and secondary drums, and means for halting one of the secondary drums to permit the drive of the other secondary drum at accelerated speed, the revolutions of the secondary drums combined or of either alone being equal and having a predetermined fixed ratio to the revolutions of the primary drum.

4. In a hoisting engine, a primary drum, a pair of secondary drums, and means associated with each of said secondary drums for hauling a load independent of the other secondary drum, a differential drive gearing operatively connecting the primary and secondary drums, and means for halting either of the secondary drums to permit the drive of the other secondary drum at accelerated speed, the revolutions of the secondary drums combined or of either alone being equal and having a predetermined fixed ratio to the revolutions of the primary, drum.

5. In a hoisting mechanism, a dump car and a pair of skips for filling the same, a primary drum for hauling the dump car and a pair of secondary drums for lifting the filling skips, means for driving the primary drum, a differential driving connection between the primary drum and the secondary drums, and means for holding either of the secondary drums to permit the other secondary drum to run at accelerated speed, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

AUGUSTUS SMITH.

Witnesses:

M. V. MOSALBE,

W. G. KICHER.