

No. 607,446.

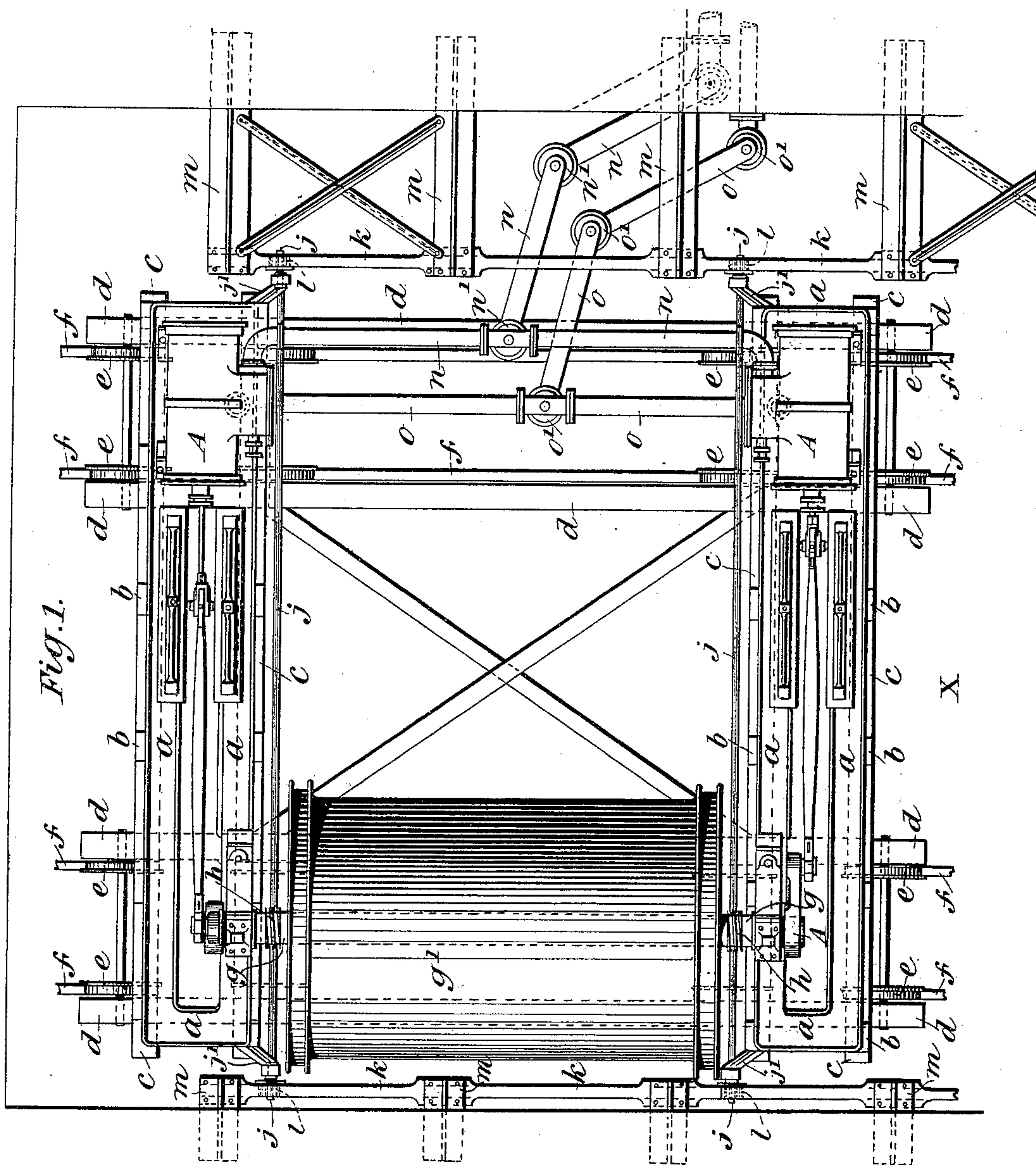
Patented July 19, 1898.

W. MORGANS.
WINDING AND HAULING ENGINE.

(Application filed Dec. 6, 1897.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES.

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INVENTOR.

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Fig. 2.

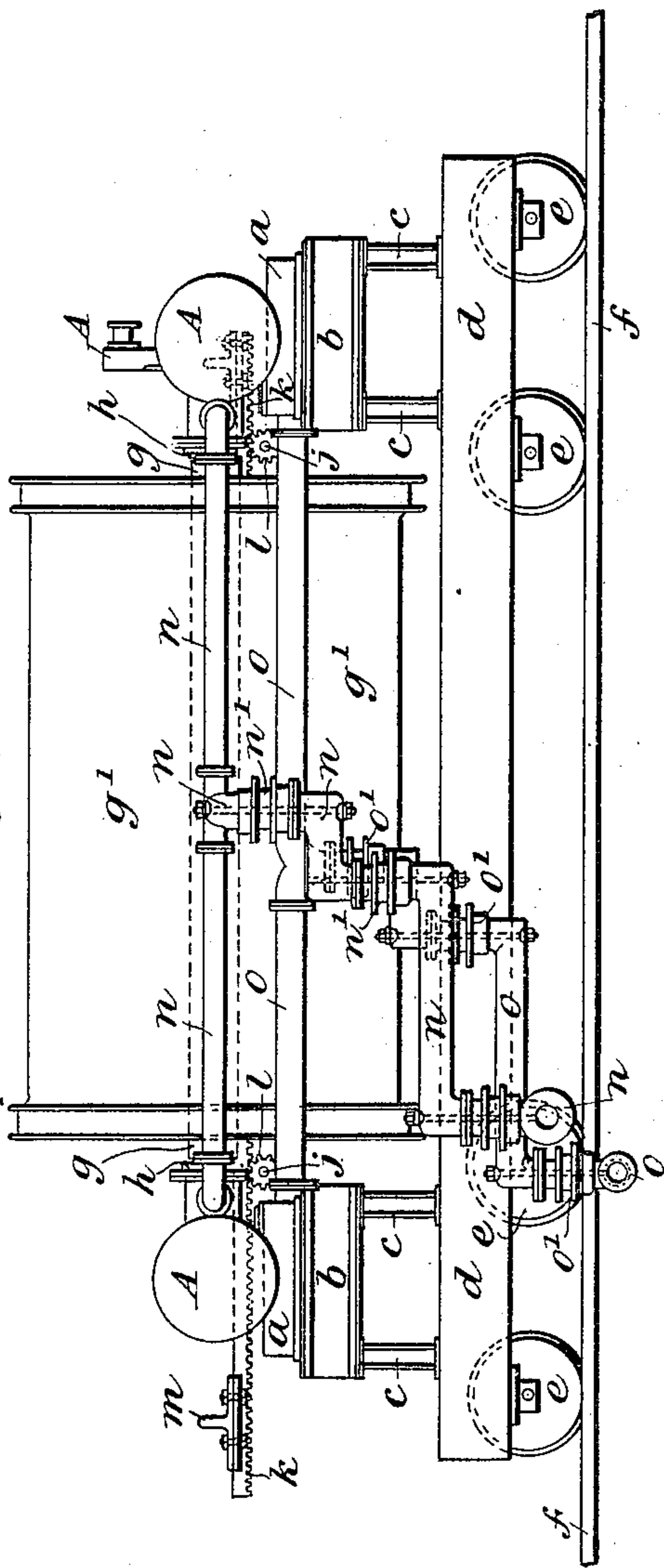
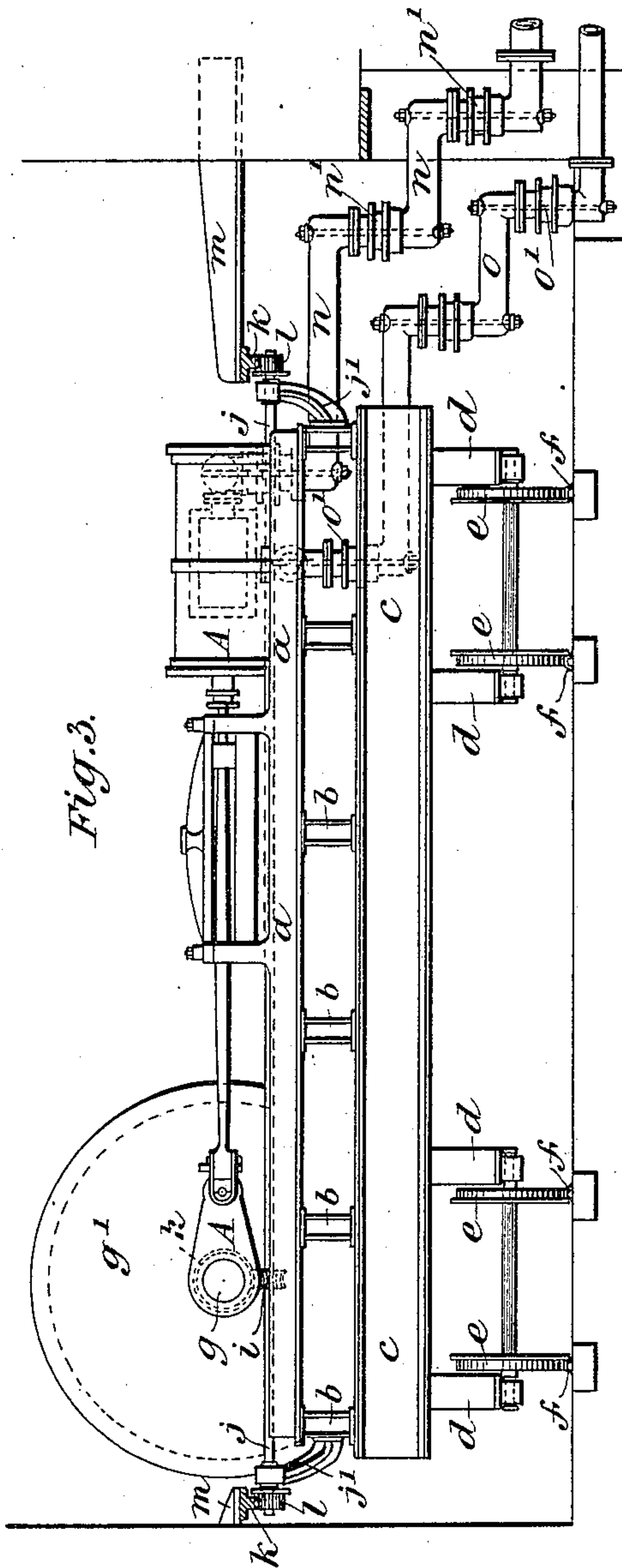


Fig. 3.



WITNESSES.

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UNITED STATES PATENT OFFICE.

WILLIAM MORGANS, OF LONDON, ENGLAND.

WINDING AND HAULING ENGINE.

SPECIFICATION forming part of Letters Patent No. 607,446, dated July 19, 1898.

Application filed December 6, 1897. Serial No. 660,887. (No model.) Patented in England September 10, 1896, No. 20,021.

To all whom it may concern:

Be it known that I, WILLIAM MORGANS, a subject of the Queen of Great Britain, residing at London, England, have invented a certain new and useful Improvement in Winding and Hauling Engines, (for which I have obtained Letters Patent in Great Britain, under date of September 10, 1896, No. 20,021,) of which the following is a specification.

10 This invention relates to winding and hauling engines such as are used at collieries and other mines and in other places for like and analogous purposes.

15 It has for its object to prevent overlapping of ropes when winding in shafts or pits and inclines of great depth or length, to obviate the employment of drums of the large diameter hitherto necessary in deep winding and hauling, and to enable the direction of the 20 rope in coiling and uncoiling to be kept at a right angle, or approximately so, to the axis of the drum or drums.

According to this invention the winding or hauling drum, with engine or pair of engines 25 or engine with two or more cylinders or electric or other motor, which is referred to hereinafter by the general term "engine," is carried on a frame or platform mounted on wheels, for which rails are laid down. Toward each end the drum-shaft carries a worm. 30 The worm, which is situated toward one end of the drum-shaft, gears with a worm-wheel centered on a shaft which extends longitudinally along the engine-carrying frame or platform at one side thereof. Similarly the worm 35 situated toward the opposite end of the drum-shaft gears with a worm-wheel centered on a shaft extending parallel with the other worm-wheel shaft, or only one worm and one worm-wheel may be employed. In front of the engine-carrying frame or platform and fixed 40 apart therefrom is a rack. A similar rack is fixed behind the frame. With these racks gear pinions carried toward the ends of the worm-wheel shafts, or one rack only may be 45 employed. As the drum revolves motion in a direction parallel to the axis of the drum is imparted to the engine-carrying frame or platform. The extent of such transverse travel 50 of the frame depends upon the setting or proportioning of the worm-and-rack gearing, which may be arranged so that the extent of

travel for each revolution of the drum is equal to the diameter of the rope, or the said gearing may be adjusted or set to give a clearance 55 or interval between the coils. By the transverse motion of the engine-carrying frame or platform the rope is always maintained in a direct line with the plane of the groove of the head-gear pulleys or incline pulleys usually 60 provided for carrying the rope, and hence no angular strain is set up with respect to said pulleys.

In order to accommodate the steam-pipes employed for conveying steam to or from the 65 engine to the traversing motion of the engine-carrying frame or platform, the said pipes are made either telescopic or flexible or with ball-and-socket swivel or knee joints, or are adapted for their office in other like or analogous ways. 70

Referring to the accompanying drawings, Figure 1 represents in plan a pair of steam winding or hauling engines mounted upon a 75 frame constructed and arranged for movement laterally in accordance with this invention. Fig. 2 is an end view as seen looking toward the rear ends of the engine-cylinders. Fig. 3 is a side elevation as seen from X, 80 Fig. 1.

The bed-plates *a* of the pair of engines *A* are bolted or otherwise secured to girders *b*, transversely situated below the bed-plates and fixed to the longitudinal girders *c*. The 85 girders *c* are supported upon transverse beams *d*, carrying bearings for the journals of the axles of the wheels *e*, which rest upon rails *f*, extending transversely under the whole frame. The drum-shaft *g*, on which is keyed or otherwise secured the winding or hauling 90 drum *g'*, carries toward each end a worm *h*. The worms *h* gear with the worm-wheels *i*, secured on shafts *j*, supported and free to rotate in brackets *j'*, fixed to the outside transverse girders of the engine-carrying frame or 95 in some other suitable position on the same.

On the shafts *j* are keyed or otherwise fixed pinions *l*, which gear with inverted racks *k*—that is to say, racks having downwardly-projecting teeth. The racks *k* are bolted to cantalivers *m*, fixed in the walls of the engine-house. 100

As the drum *g'* when driven in either direction by the engines *A* rotates, lateral mo-

tion—that is to say, motion in a direction parallel to the longitudinal axis of the drum—is imparted to the engine-carrying frame through the worms *h*, worm-wheels *i*, pinions *j*, and racks *k*.

The travel of the frame on the wheels *e* over the rails *f* is governed by the setting or the proportioning of the worm-and-rack gearing, which may be so arranged that in one complete revolution of the drum the extent of transverse travel or lateral motion of the engine-carrying frame is equal to the diameter of the rope, or the said gearing may be adjusted or set to give a clearance or space between the coils of rope. By the transverse motion of the engine-carrying frame the rope is always maintained in a direct line with the plane of the groove of the head-gear pulleys or incline pulleys in coiling and uncoiling. This obviates angular or side strain with respect to the said pulleys and corresponding friction and wear of ropes.

In order to adapt the pipes *n* for conveying steam or fluid to the engine-cylinders and the pipes *o* for exhaust to fulfil their functions notwithstanding the transverse movements of the engine-carrying frame, the former are fitted at required places with steam-tight swivel-joints *n'* and the latter with similar joints *o'*. Such joints are of a well-known kind.

Among other advantages appertaining to this invention it admits, when steam-engines are used, of the employment in winding and hauling engines of cylinders and drums of smaller diameter than hitherto practicable for winding from great depths without overlapping of the coils of rope and without unduly increasing the length of the engine-stroke to raise the load required to be lifted. A more advantageous relation is obtainable between the piston speed of the engine and the speed of the rope, whereby greater economy and safety in winding and unwinding and hauling are obtained and the durability of the rope is increased.

It is not necessary in all cases to employ two racks or two worms and two worm-wheels in order to traverse the engine-carrying frame. It may be done with one rack only and with one worm and one worm-wheel. Further, the rack or racks employed need not be inverted. The teeth may project upward, and the pinion or pinions may be situated above.

One or more winding-ropes may be worked from the same drum. When two ropes are used, so that one rope is being wound while the other rope is being unwound, the distance measured in a line parallel with the axis of the drum between the coil being wound and the coil being unwound is made to correspond with the distance, similarly measured, between the centers of the pit-cages or trains of wagons to be wound or hauled or between the grooves of the head-gear or other pulleys over which the ropes are to be guided or car-

ried, and as one rope will coil on the drum while the other rope uncoils both ropes may coil alternately on the same portion of the drum.

Although the drum shown in the appended drawings is cylindrical in form, it may be made conical or fusiform or a combination of any such forms.

The drum-surface may be provided with a spiral groove for the rope to bed in. In such case the amount of traverse or lateral motion of the engine-carrying frame should be coincident with pitch of the said spiral groove.

Instead of employing one drum only it is obvious that more may be employed. When two or more drums are used, they may be arranged for clutching and unclutching on the shaft, or they may be placed on separate shafts coupled by connecting-rods or suitable gearing.

Instead of traversing the engine-carrying frame by means of a rack and pinion the lateral motion may be communicated by means of a screw having a pitch corresponding with the coils of the rope, or a screw or screws of different pitch may be used in connection with toothed wheels suitably geared to give the required lateral motion.

Other arrangements than those herein described suitable for constructing a frame or platform for carrying the winding machinery may be adopted, and it is obvious that other motive agents than steam may be employed for operating such machinery.

What I claim is—

1. In winding and hauling engines and in combination a platform, an engine and rope-drum carried thereby, means for supporting the platform so that it is capable of movement in a line at right angles to the travel of the rope or chain, and means operated by the motion of the drum during the winding and unwinding of the same for giving a proportioned and regulated motion to the same and to the platform and engine while the rope coils and uncoils, substantially as described.

2. In winding and hauling engines and in combination, a platform supported so as to be capable of movement in a line at right angles to the travel of the rope or chain, an engine and rope-drum carried thereby, a worm carried by the drum, a worm-wheel engaging therewith, a shaft in the platform on which such wheel is mounted, a pinion on such shaft, and a fixed rack outside of the platform with which such pinion engages, the winding and unwinding of the drum thus rotating the shaft and moving the platform through the medium of the pinion and rack, substantially as described.

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

WILLIAM MORGANS.

Witnesses:

PHILIP M. JUSTICE,
ALLEN PARRY JONES.