M. JACKER.

Hoisting-Machine.

No. 206,734. Patented Aug. 6, 1878.

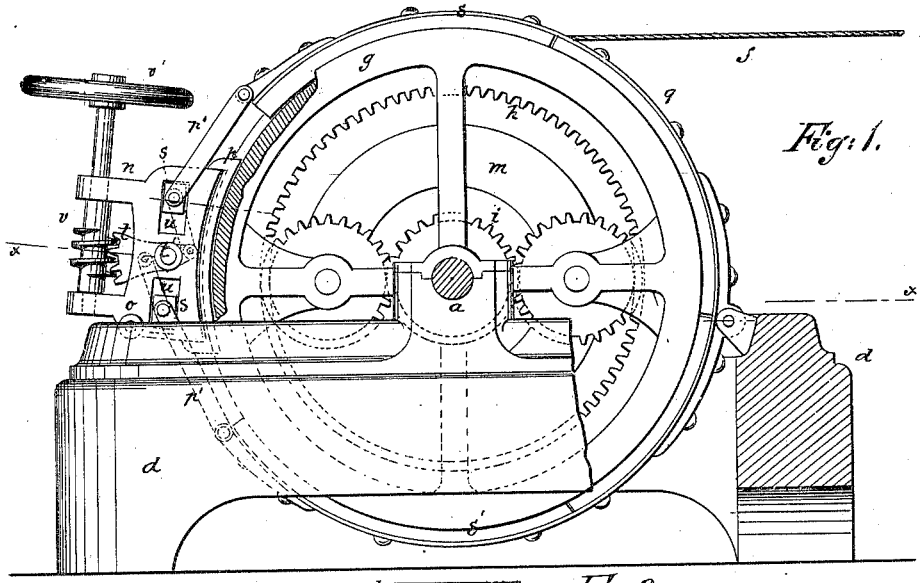

Fig: 1.

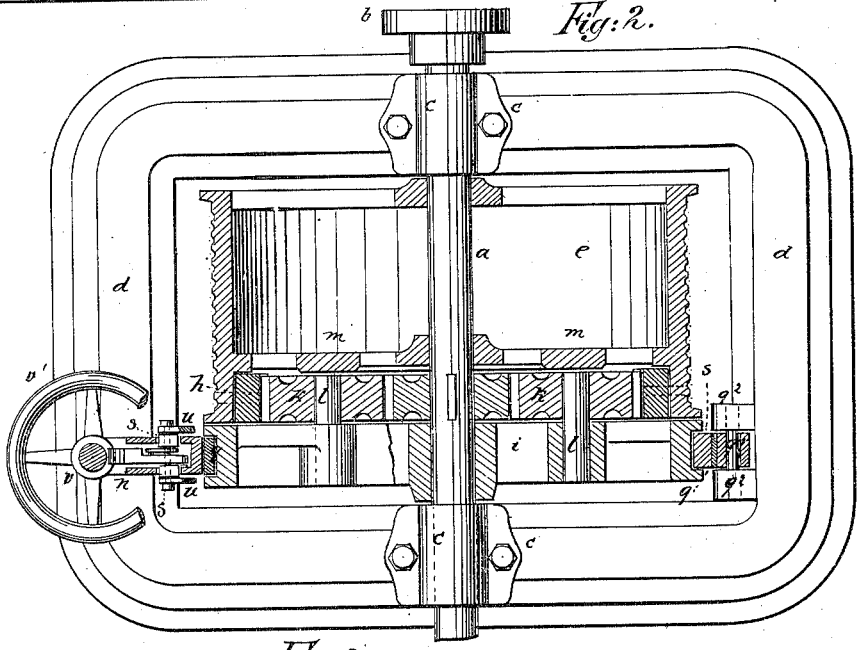

Fig: 2.

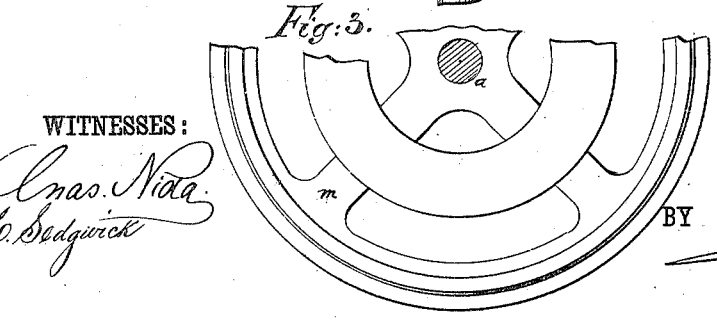

Fig: 3.

WITNESSES:

Chas. Nida

C. Sedgwick

INVENTOR:

M. Jacker

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

MAXIMILIAN JACKER, OF MARQUETTE, MICHIGAN, ASSIGNOR TO HIMSELF AND DANIEL H. MERRITT, OF SAME PLACE.

IMPROVEMENT IN HOISTING-MACHINES.

Specification forming part of Letters Patent No. **206,734**, dated August 6, 1878; application filed June 6, 1878.

To all whom it may concern:

Be it known that I, MAXIMILIAN JACKER, of Marquette, in the county of Marquette and State of Michigan, have invented a new and useful Improvement in Hoisting Machinery, of which the following is a specification:

Hoisting-machinery for mines and other places where heavy loads are to be raised is usually constructed as follows: A main shaft is driven continuously by the power. Chain drums or reels are mounted loosely upon the main shaft or adjacent thereto, and gearing, friction-wheels, or clutches are used to apply the power of the main shaft to the winding-reels, or disconnect the same, at will.

The object of this arrangement is to obtain rapid hoisting from the one motor upon as many drums as possible. This object has not been fully attained, and the difficulties increase in proportion as the number of drums upon one shaft is increased.

The principal difficulty results from the fact that the drums are not independent of each other, but when it is necessary to slow down one all the others are affected. This slowing down is necessary when starting to hoist a heavy load, especially when a clutch is used, as the sudden starting of the load at full speed will break the rope or clutch.

If a friction-clutch is used, the great pressure of starting at full speed cuts out the friction-wheels and throws the winding-reel to one side, which tends to rapidly wear out the bearings.

Another difficulty is experienced when the load reaches its highest point and it becomes necessary to reverse the motion of the reel. Considerable skill is required at this time, as the drum must be released from the main shaft and the brakes applied soon enough to prevent the load getting a downward headway. It is usual to apply the brakes partially before the clutch is entirely freed; but this causes heavy strain and wear upon the machinery, and considerable skill is required to prevent accident.

To avoid these difficulties auxiliary engines have been used, and two brakes have been applied, one for hoisting and the other for reversing. The difficulty with two brakes is that the workman has not positive control of the load at all times. There is a point of time at which neither brake is in use, and consequently the load may run back, or else both brakes are applied at once and are working against each other.

The object of my invention is to overcome the difficulties heretofore mentioned, and I use for that purpose a single differential friction-brake, applied to the winding-drum, in connection with gearing, in such a manner that the starting, stopping, and reversing of the drum are accomplished by manipulation of the one brake, and this is done without interfering with the operation of any other winding-drum which may be operated from the same main shaft.

In the drawing, Figure 1 is an elevation of the hoisting reel or drum, partially in section. Fig. 2 is a sectional plan of the same at the line *x x;* and Fig. 3 is an end view of the drum, partially broken off.

Similar letters of reference indicate corresponding parts.

a is the main hoisting-shaft, which is connected to or driven by the motor so as to be revolved continuously. Any desired number of drums may be driven from this main shaft, and I have shown a clutch, *b*, for connecting a second drum or reel. The shaft *a* is mounted in boxes *c c* upon the frame *d*, which is of a character suitable to support the machinery.

e is the hoisting drum or wheel, and *f* is the hoisting-rope. *g* is a flanged friction-wheel upon the shaft *a*, adjacent to the drum *e*. The friction-wheel *g* and drum *e* are loose upon the main shaft *a*. The drum *e* has an internal gear, *h*, keyed or bolted fast to the drum upon the end next to the friction-wheel *g*. *i* is a gear-wheel, fast upon the main shaft *a*, in the same plane as the internal gear *h*.

k k are intermediate gear-wheels between the gear *i* and internal gear *h*. These intermediate gears *k* revolve upon pins or bosses *l* projecting from the friction-wheel *g*. One only of the gears *k* is essential to the operation of the machine, but I provide a second gear, *k*, to balance the wheel *g*. The drum *e* is provided with a head, *m*, next to the gearing to prevent the displacement of the intermediate gears *k*. *n* is the brake-head upon the frame *d*, and swinging thereon by a pin, *o*.

p is a shoe upon the brake-head n, taking against the periphery of the friction-wheel g, between the flanges thereof. q is a friction-strap, secured midway of its ends to the frame d on the opposite side to the brake-head n. A pin, q^1, passing through ears q^2 and the friction-strap q, secures the strap to the frame d. The ends of the friction-strap q pass around the wheel g, and are attached by links p' to boxes s, which are placed in grooves in the brake-head n. s' s' are the wooden shoes attached to the friction-strap q.

The means shown for tightening the friction-brake upon the wheel g consists of a gear-segment, t, hung as a lever on a pin, t', in the brake-head n. Short links u connect the lever t with the boxes s s. A worm-shaft, v, operated by a hand-wheel, v', and gearing with the segment t, can be used to draw the boxes s s together, thereby tightening the strap q upon the wheel g, and at the same time causing the shoe p of the brake-head n to bear upon the wheel g.

The operation of the machine is as follows: The main shaft a and gear-wheel i revolve continuously, and the motion is communicated to the intermediate gears k upon the friction-wheel g, and as long as the brake is not applied to the wheel g the wheel g simply revolves, while the hoisting-drum e remains stationary. Supposing it is desired to hoist a load, the workman applies the brake by operating the hand-wheel v', and increases the pressure of the brake as the load starts until the full speed is attained. When the full pressure of the brake is on the wheel g, said wheel g has stopped its revolution, and the power of the main shaft a is transmitted wholly to hoisting-drum e by the gearing. As soon as the load reaches the desired point the speed of the hoisting-drum e is lessened by gradually relieving the brake until the drum e stops, and the motion is reversed by the weight of the load.

The descent of the load can be accurately regulated by operating the brake, and in mines the return of the skip or cage after being unloaded can be made at any desired speed.

I have described my invention as available for hoisting purposes at mines, but it is to be understood that the same can be applied to other purposes, either as a portable or permanent hoisting-machine.

The hoisting-machine above described is simple and composed of few parts, and those all easy of access. It can be operated by unskilled workmen, and there is no danger of the line of hoisting-drums getting out of true bearings, as the pressure of the brake is equal upon all sides of the friction-wheel, and is always concentric with the driving-shaft and the bearings of the hoisting-drum.

I do not limit myself to the precise details herein set forth, as they may be changed to suit the circumstances where the apparatus is in use; neither do I limit myself to the relative size or position of the gearing. The size of the gearing is regulated by the desired speed for the drum, and the arrangement of the gearing may be reversed—as, for instance, the internal gear may be upon the brake-wheel, and the intermediate gear upon the reel, thus reversing the motion of the drum relative to the main shaft. These variations of position may be combined for the purpose of running the drum forward or backward by the driving-shaft, while the driving-shaft continues to revolve in the one direction. The principle and effect of my invention will remain the same in all these variations.

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

1. The friction-wheel g, drum e, internal gear h, intermediate gear k, main shaft a, gear-wheel i, and brake q, combined and arranged substantially as and for the purposes set forth.

2. The gear-segment t, sliding boxes s s, links u, and worm v, for operating the brake-strap, substantially as set forth.

3. The combination, with the flanged friction-wheel g, of the shoe p on a brake-head, n, swinging on pin o, and the strap q, secured midway to frame d by the pin q^1, link connected to the boxes s and provided with shoes s', as and for the purpose specified.

MAXIMILIAN JACKER.

Witnesses:
D. H. MERRITT,
FRANK W. MERRITT.