(No Model.)

F. C. BIRCH.

HOISTING AND CONVEYING MACHINERY.

No. 489,785. Patented Jan. 10, 1893.

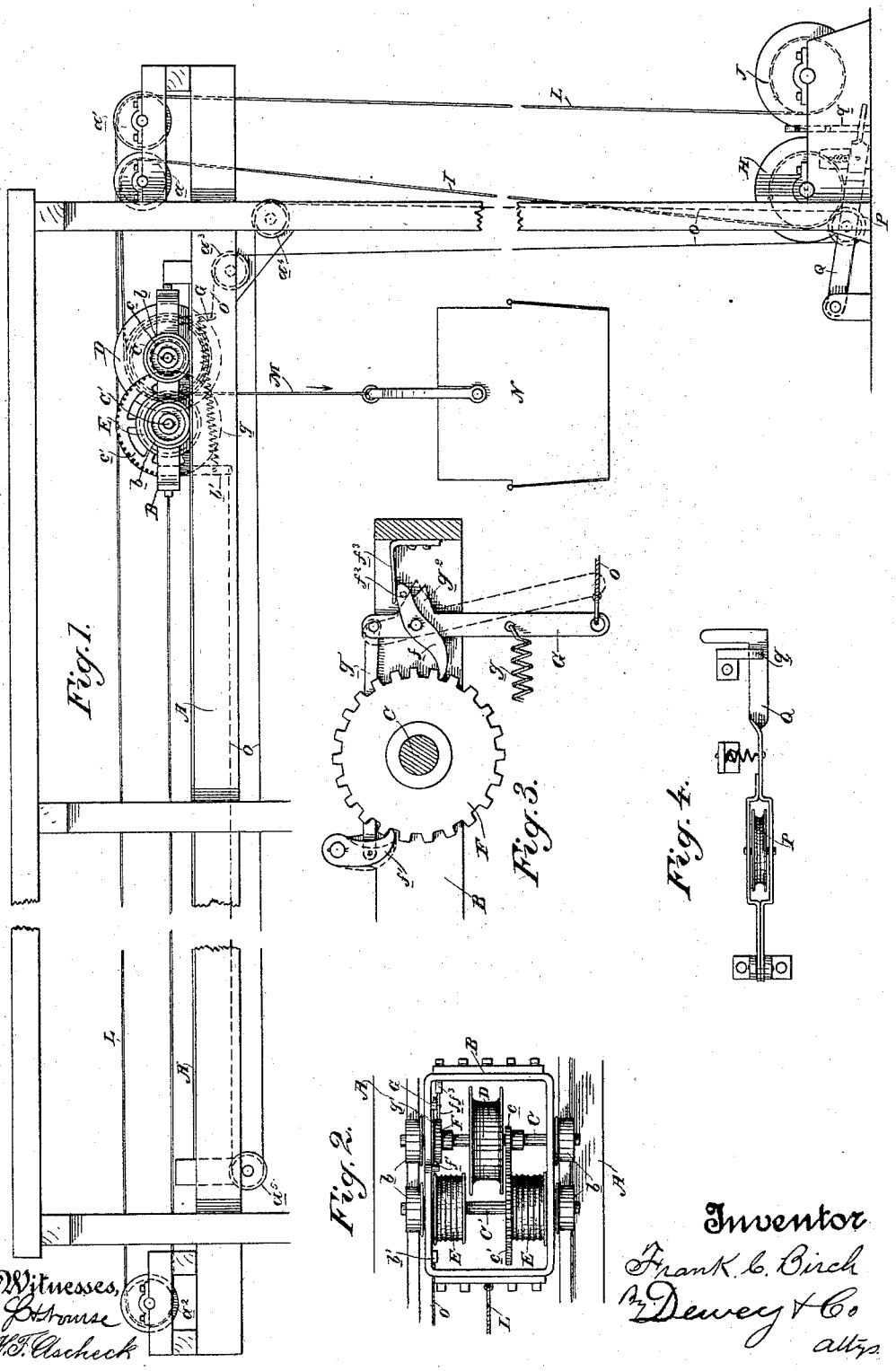

Fig. 1.

Fig. 3.

Fig. 4.

Fig. 2.

Witnesses,
L. Strouse
H. F. Ascheck

Inventor
Frank C. Birch
by Dewey & Co
attys.

UNITED STATES PATENT OFFICE.

FRANK. C. BIRCH, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO LOUIS ROSENFELD, OF NEW YORK, N. Y.

HOISTING AND CONVEYING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 489,785, dated January 10, 1893.

Application filed October 18, 1892. Serial No. 449,269. (No model.)

To all whom it may concern:

Be it known that I, FRANK. C. BIRCH, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Hoisting and Conveying Machinery; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of mechanisms designed for hoisting material from a given point, conveying it thence to another point, and there lowering it.

The object of my invention is to provide simple and effective means, capable of easy and accurate operation, for hoisting coal and other material from given stations, conveying it rapidly to another station and there lowering and delivering it gently, whereby breakage is avoided.

My invention consists in the novel construction, arrangement and combination of the traveling trolley and the means for operating it and hoisting and lowering the bucket or tub to and from said trolley, as I shall hereinafter fully describe and specifically point out in the claims.

Referring to the accompanying drawings for a more complete explanation of my invention:—Figure 1—is a side elevation of my apparatus. Fig. 2—is a plan of the trolley. Fig. 3—is a side elevation of the ratchet and pawl mechanism for locking and releasing drum D. Fig. 4—is a plan of the swinging tightener pulley P and lever Q.

A is an elevated track or roadway, extending between the point from whence the material is to be taken to the point to which it is to be delivered.

B is a trolley, having wheels *b*, adapted to travel on said track. Upon the trolley is mounted a shaft C upon which is carried a drum D. Upon the trolley is also mounted a shaft C′, on which are carried the drums or drum E. On shaft C is a pinion *c* which meshes with a gear *c′* on shaft C′. On shaft C is a ratchet wheel F with which engage the locking pawls *f* and *f′*, one on each side and adapted to prevent the ratchet wheel from turning in either direction. These pawls are thrown into and out of engagement by the lever G, controlled by a spring *g* the other end of which is secured to a downwardly extending arm *b′* of the trolley. This lever is connected by a link *g′* with pawl *f′* and it has a lug g^2 working under a pin f^2 on pawl *f*, said pawl being controlled by a spring f^3. When the lever G is at rest, the spring *g* throws and holds pawl *f′* to its engagement with the ratchet; and the spring f^3 holds pawl *f* to its engagement, thus locking the ratchet and preventing shaft C from turning. But when the lever G is pulled upon, it will, through link *g′*, first throw pawl *f′* out of engagement and then, under continued movement, its lug g^2 rising under pin f^2, will throw pawl *f* out of engagement, thus releasing the ratchet and shaft.

H is a power drum, suitably driven and controlled. To it is secured a rope or cable I, which passes upwardly to and over a guide sheave *a* on one end of the track A, and thence to the drum D to which it is secured.

J is a second drum. To this is secured a rope or cable L which passes up to and over a fixed guide sheave *a′* on the end of track A, and thence to and around another guide sheave a^2 at the other end of the track and thence back to the end of trolley B to which it is secured.

To the drums E are secured the ropes or cables M, the lower ends of which are connected with the bucket or tub N.

O is the locking lever rope or cable. At one end it is attached to lever G. It thence passes back over a fixed guide sheave a^3, thence down to and around a swinging pulley P, thence up to and over a fixed sheave a^4, thence forwardly to a guide sheave a^5 at the other end of the track, from which it extends back and is secured to the arm *b′* of the trolley.

The swinging pulley P is carried by a spring-controlled pivoted lever Q, engaging a three-notched rack *q*.

The operation is as follows:—Suppose the bucket or tub to be lowered and about to be

loaded at a station near the power drum end of the track. The cable I is, in this position, wound up on drum D. The bucket being now loaded, the lever Q is moved to the middle notch of rack *q*, whereby the pulley P, drawing down on cable O, will pull lever G back far enough to throw pawl *f'* out of engagement with ratchet F, though not far enough to release pawl *f*, which latter thus serves as a retaining pawl. The drum D can now turn to pay off the cable I, the teeth of ratchet F slipping the pawl *f*. Power drum H is now operated; it winds up cable I on itself, said cable paying off drum D and thereby rotating said drum. This movement, through pinion *c* and gear *c'*, rotates drums E and causes them to wind up cables M, thereby hoisting the loaded bucket. During this movement, the drum D cannot slip back because of retaining pawl *f* which will hold the bucket at any height. When the bucket is raised, pawl *f'* is thrown to its engagement again, by lifting lever Q to the top notch of rack *q* thus fully locking the drum D. Now drum J is operated, whereby cable L is wound up, and the trolley with its suspended bucket will be caused to travel to the other end of the track or to the station at which it is desired to deposit the load. During this advance of the trolley the cable I pays off from drum H which is allowed to run freely: and cable O simply moves upon its sheaves and pulleys as an endless cable. When the position for lowering is reached, the lever Q is depressed to the lowest notch of its rack, thereby, through cable O and its connections, throwing both pawls *f'* and *f* from their engagement with ratchet F and wholly freeing drum D. The loaded bucket, of its own weight, will now descend, its suspending cables M paying off from drums E and, through the gearing *c*, *c'*, causing drum D to wind up cable I upon itself. When the load is discharged, power drum H is again operated, and the bucket being now empty will be hoisted, while the trolley remains stationary. But when raised to the position desired, lever Q is lifted to the top notch of rack *q*, thereby relieving cable O, and thereupon both pawls *f* and *f'* return to their engagement with ratchet F, whereby drum D is locked. Now by continuing the movement of power drum H in the same direction, cable I, pulling upon locked drum D will draw the trolley and bucket back to the place of starting. During this return movement, drum J runs freely, and pays out cable L. Now the lever Q is again depressed to the lowest notch of rack *q*, to throw pawls *f'* and *f* out of engagement and free drum D, and thereupon the bucket descends, and causes the drum D to wind up cable I, ready for the hoisting of the bucket again.

By this apparatus the material may be readily conveyed from one point to another and discharged gently and without breakage, which, in the case of coal, is important.

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

1. In a hoisting and conveying apparatus, the combination of a traveling trolley having connected drums, from one of which the bucket or tub is suspended, a cable connected with the other drum for raising and lowering the bucket or tub and retracting the trolley, a cable connected with the trolley for advancing it, and power drums for operating said cables, substantially as described.

2. In a hoisting and conveying apparatus, the combination of a traveling trolley having connected drums, from one of which the bucket or tub is suspended, a cable connected with the other drum for raising and lowering the bucket or tub and retracting the trolley, a cable connected with the trolley for advancing it, power drums for operating said cables and means for locking and releasing the main drum of the trolley, substantially as described.

3. In a hoisting and conveying apparatus, the combination of a traveling trolley, the main drum D and the drum E mounted thereon, from the latter of which the bucket or tub is suspended, said drums being geared together, the cables I and L for operating the main drum and retracting and advancing the trolley, means for locking and releasing the main drum consisting of the ratchet wheel F, a pawl engaging said wheel and a cable for operating the pawl, and means for operating the cable, substantially as described.

4. In a hoisting and conveying apparatus, the combination of a traveling trolley having the connected drums D and E from the latter of which the bucket or tub is suspended, the cables I and L for operating the drums and causing the travel of the trolley, and the means for locking and releasing the main drum, consisting of the ratchet wheel, the pawls *f* and *f'*, the lever G and connections for actuating the pawls, the cable O connected with the lever, and means for tightening and relieving the cable, substantially as described.

5. A hoisting and conveying apparatus consisting of a traveling trolley, the main drum D mounted on said trolley, means on the trolley for locking and relieving said drum, a hoisting and lowering drum E on the trolley and a cable suspending the bucket or tub therefrom, gearing between the drums on the trolley, independent stationary power drums, a cable connecting one of said drums with the main drum on the trolley, a cable connecting the other of said power drums with the trolley, and connections for operating the locking and releasing device of the main drum, substantially as described.

6. A hoisting and conveying apparatus con-

sisting of the traveling trolley, the main drum D and drums E thereon, geared together, the cables suspending the bucket or tub from drums E, the ratchet wheel, spring-controlled pawls and lever G for locking and releasing the main drum, the cables I and L for operating the drums and causing the travel of the trolley, the power drums for operating said cables, the cable O for operating lever G, and the swinging pulley P and lever Q for tightening and relieving cable O, substantially as described.

In witness whereof I have hereunto set my hand.

FRANK. C. BIRCH.

Witnesses:
S. H. NOURSE,
J. A. BAYLESS.