J. S. LANE.

Combined Clutch and Brake of Hoisting-Drum for Elevators, &c.

No. 203,744. Patented May 14, 1878.

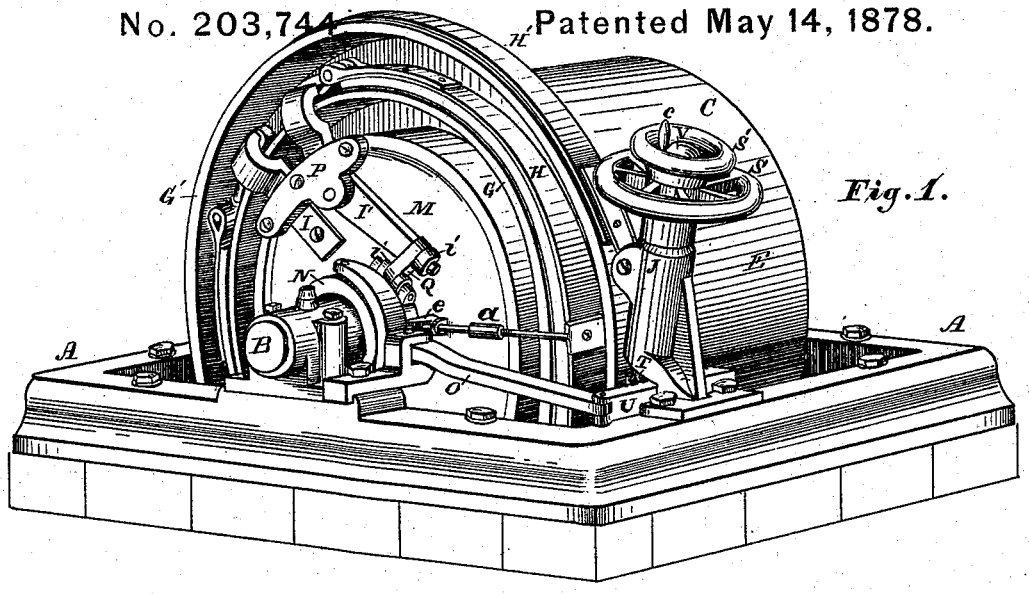

Fig. 1.

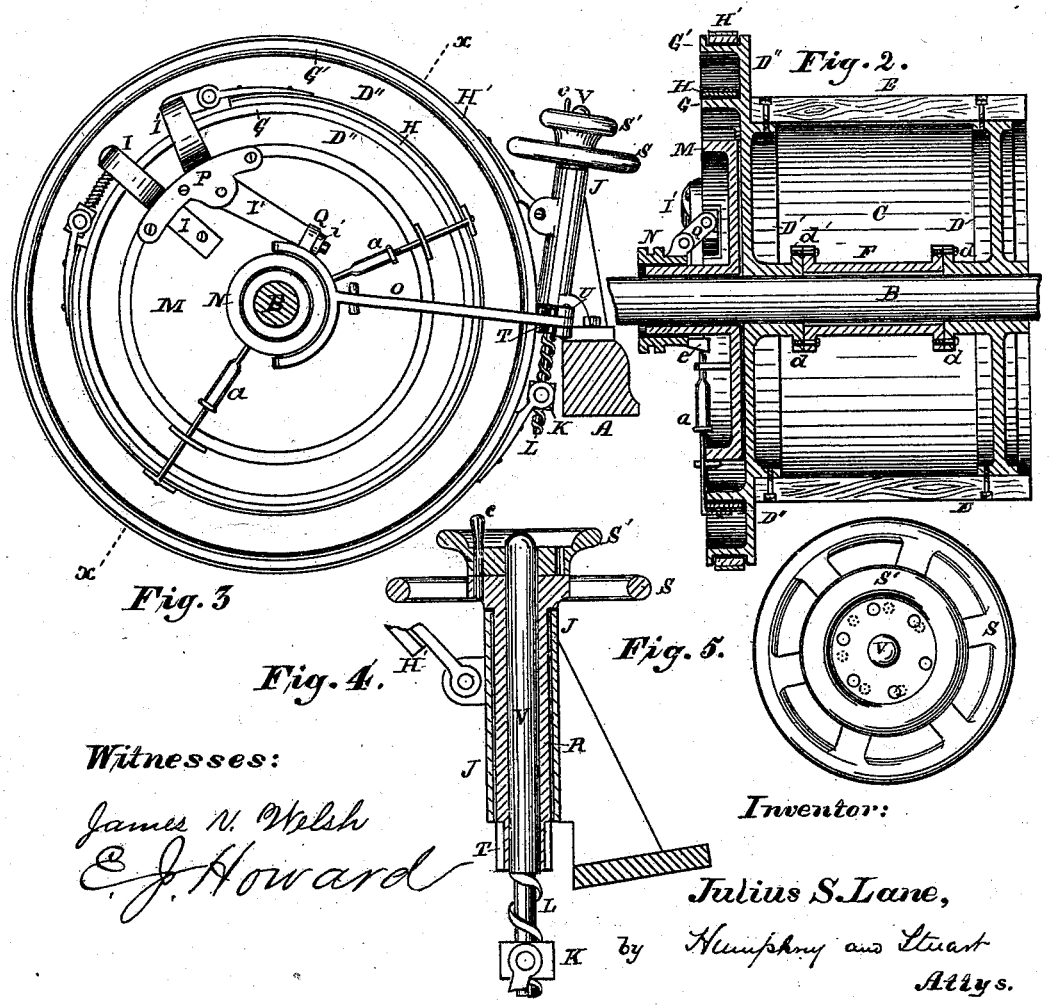

Fig. 2.

Fig. 3

Fig. 4.

Fig. 5.

Witnesses:

James N. Welsh

E. J. Howard

Inventor:

Julius S. Lane,

by Humphrey and Stuart

Attys.

UNITED STATES PATENT OFFICE.

JULIUS S. LANE, OF AKRON, OHIO.

IMPROVEMENT IN COMBINED CLUTCH AND BRAKE OF HOISTING-DRUMS FOR ELEVATORS, &c.

Specification forming part of Letters Patent No. **203,744**, dated May 14, 1878; application filed April 1, 1878.

To all whom it may concern:

Be it known that I, JULIUS S. LANE, of Akron, in the county of Summit and State of Ohio, have invented a new and Improved Hoisting-Machine, of which the following is a specification:

The invention relates to hoisting machinery for mines, elevators, mills, &c., which is moved or stopped at will by being connected with or disengaged from moving mechanism, and arrested at any desired point by a friction band-brake.

It also relates to the construction of the winding-drum of such hoisting-machines.

Heretofore in such machines motion has been communicated to the drum from a shaft parallel to the drum-shaft through the medium of gear or friction wheels. The drum and brake have been operated by distinct, separate, and disconnected machinery, and the band-brake has been applied by being drawn at both ends.

The first part of the foregoing arrangement is objectionable, in that it not only causes the friction of two shafts, but, if friction-wheels are used to drive the drum, this is greatly increased in the journal-bearings of the shafts. It occupies as much more space as is necessary for the counter-shaft, and requires great power to operate it, as either the drum-shaft or counter-shaft must be moved toward the other to bring the friction-wheels into contact. The second part of the foregoing arrangement is objectionable, for the reason that it is desirable to have the brake operate the moment the drum, by being disengaged from the moving machinery, ceases to revolve, which is almost impossible if the two results are to be produced by two distinct, independent, and consecutive operations; while the objection to the third part of the foregoing arrangement is found in the fact that, being drawn at each end, the band-brake is at one end drawn against the motion of the brake-pulley, thereby requiring great outlay of power to set the brake.

Heretofore, also, in the construction of the winding-drum, it has been customary to connect and brace the two heads upon which the outer casing is placed by a series of rods passing diagonally from the rim of each head to that of the other; but this arrangement affords no adequate provision for a twisting strain upon the drum, which tends to rack it.

The objects I seek to attain by my invention are simplicity and compactness in construction; reduction of friction, by lessening the number of bearing-surfaces; ease, facility, and safety of operation; the avoiding of all shock in starting and stopping the drum, and the prevention of racking the drum by twisting strains.

The invention consists in having the driving-power applied directly to the drum-shaft, and in communicating it thence to the drum by a band-clutch; the combination of the band-clutch and band-brake, arranged to be operated by a single hand-wheel or by two hand-wheels, at pleasure; a differential device for taking up wear of the driving and brake bands; and a device for holding the band-clutch from contact with its pulley when not turning the drum.

It also consists in the manner of connecting the heads upon which the drum-casing is placed; and it finally consists in the particular construction and arrangement of the various parts.

In the accompanying drawing, in which similar letters of reference indicate like parts, Figure 1 is a perspective of my improved hoisting-machine. Fig. 3 is an end elevation of the drum with driving and brake mechanism; Fig. 2, a longitudinal section of Fig. 3 at the line *x x;* Fig. 4, a vertical central section of the hand-wheels, shafts, and posts, enlarged; and Fig. 5, a plan view of the two hand-wheels, enlarged, exhibiting the differential connection.

Journaled in suitable boxes in the frame A is the shaft B, which supports the drum and its connections, and to which the driving-power is directly applied.

Upon this shaft is fitted the winding-drum C, arranged to revolve freely thereon. This drum consists of two heads, D D′, upon the peripheries of which is bolted the wood casing E. The hubs of these heads, which are fitted to freely revolve on the shaft B, are prolonged inwardly, terminating in flanges *d d′*.

Interposed between the heads is a hollow cylinder, F, having an inside diameter exceeding the diameter of the shaft B, also terminat-

ing in flanges corresponding with the flanges *d d'*, and to which said flanges are bolted, thereby rigidly connecting the heads D D', and preventing any racking from a twisting strain.

The head D' is, at one side, enlarged into a circular disk, D'', from the face of which, opposite to the drum, project two circular webs, G G', and these webs are accurately turned concentrically with the pulley D', and form pulleys, connected at one edge with the disk D''.

H' is a band-brake surrounding the pulley G', and H is a similar driving-band surrounding the pulley G. These bands consist of metallic belts lined with bent wood, with the grain lengthwise of the belt.

The driving-band H is, at one end, attached to the fixed bar I through a screw-coupling, by which it can be adjusted, and at the other to the pivoted lever I'.

Upon the frame A is bolted the hollow post J, to lugs on which is anchored one end of the band-brake H', the other end being attached to the nut K, in which fits the screw L, hereinafter referred to.

A disk, M, slightly separated from the disk D'', is keyed to and revolves with the shaft B, the hub whereof is prolonged on the side opposite the disk D''. This hub is turned smoothly, and upon it slides the collar N, which is moved toward and from the disk M by the pivoted forked lever O. To this disk is rigidly attached the bar I, and the lever I' is pivoted therein under the plate P.

A link, Q, connects the lever I with the collar N, and at its points of connection with those parts small steel rollers *i* are placed at each side of it on the pins upon which the link turns, which serve to remove friction between the link and the disk M and collar N, respectively.

Within the hollow post J is fitted a hollow shaft, R, attached at the upper end to the hand-wheel S, and having upon its lower end a pinion, T. This pinion meshes into the rack U, which is hinged to and serves to move the lever O.

Within the shaft R is a solid shaft, V, attached at its upper end to the hand-wheel S', and having upon its lower end a screw-thread, L, which fits the nut K, and the hand-wheels S S' are caused to revolve together by a pin, *c*, passing through coincident holes in each.

To start the drum, the brake H' being set, the drum at rest, and the shaft B revolving, the hand-wheel S is turned so as, by means of the pinion T, rack U, and lever O, to cause the collar N to slide toward the disk M. This, through the link Q, swings the end of the lever I' from the center of the disk, thereby drawing the driving-band H tight about the pulley G, and causing the drum to revolve with the shaft B.

The same operation turns the screw L in the nut K, thereby slacking the band-brake H'; and it is obvious that by reversing the operation the opposite results will be secured.

By this arrangement, also, the drum is started and arrested gradually, and all shock to the machinery avoided.

It is obvious, also, that the driving-band and brake-band may be operated independently, if desired, by removing the locking-pin *c*.

To enable the wheels S S' to be locked together at any desired point in adjusting for wear or otherwise, said wheels are pierced in coincident circles with a number of holes, equidistant from each other, the number of holes in one wheel exceeding by one the number in the other, as indicated in Fig. 5, wherein dotted lines indicate the position of the holes in the lower wheel, by which arrangement but slight movement is required in one wheel to find coincident holes for the locking-pin *c*.

To prevent contact between the band H and pulley G when the latter is at rest, I employ two or more rods, *a a*, provided with adjustable screws, attached to the band H, and passing through suitable guides toward the center of the disk M.

A corresponding number of wedge-shaped projections, *e e*, are attached to the inner end of the collar N, which, as the collar is thrown outward to slacken the band H, engage the ends of the rods *a a*, thereby forcing them outward and raising the band H from contact with the pulley G.

I am aware that a driving-band is not new, as the same is shown in a patent to Adolph and Felix Brown, and such I do not broadly claim; but

What I claim is—

1. In a hoisting-machine, the combination of a band-brake and a driving-band, both operated by one hand-wheel, substantially as herein shown.

2. In a hoisting-machine, the combination of a band-brake with a driving-band, each operated by an independent hand-wheel, said wheels being adapted to be connected and operated by one motion, substantially as and for the purpose hereinbefore set forth.

3. The combination, in a hoisting-machine, of a hand-wheel for operating the driving-band with a hand-wheel for operating the brake-band, adapted to be operated together, and with a differential device for locking them together, substantially as and for the purpose hereinbefore set forth.

4. In combination with the driving-band of a hoisting-machine, a series of radial arms, attached at one end to the driving-band, and arranged by encountering inclined surfaces at the other to raise the band from contact with the surface of the band-pulley, substantially as shown, for the purpose specified.

5. In combination with the drum-heads D D', the flanged cylinder F, substantially as and for the purpose specified.

JULIUS S. LANE.

Witnesses:
C. P. HUMPHREY,
JOHN MEMMEN.