(No Model.) 3 Sheets—Sheet 1.

D. H. MERRITT.

EXPANDING AND CONTRACTING DEVICE FOR FRICTION CLUTCHES.

No. 256,236. Patented Apr. 11, 1882.

Fig. 1.

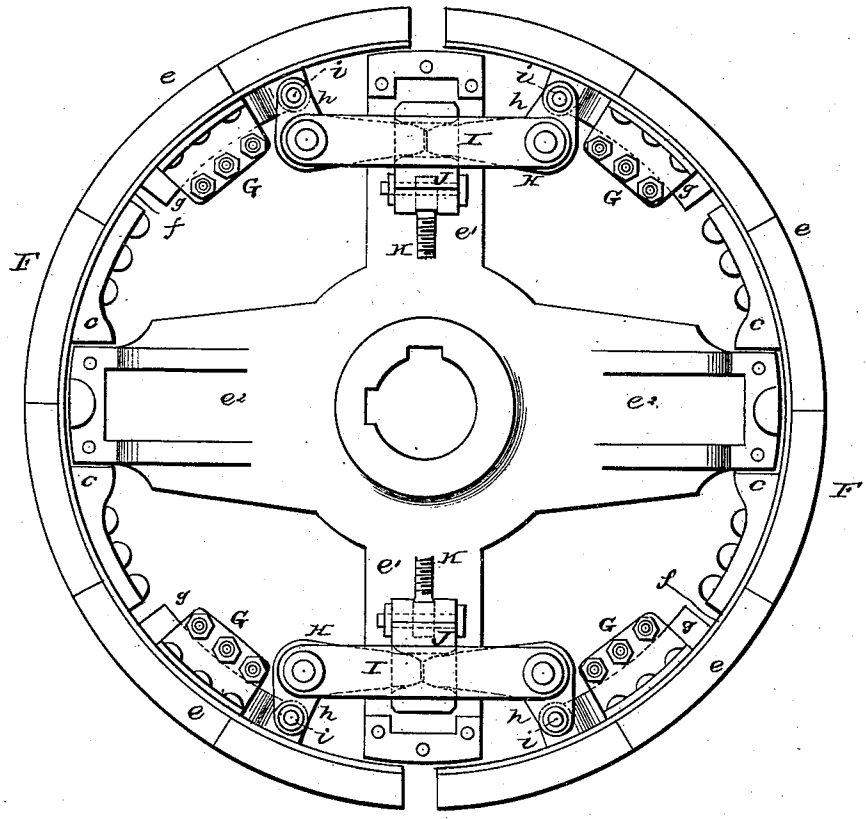


Fig. 3.

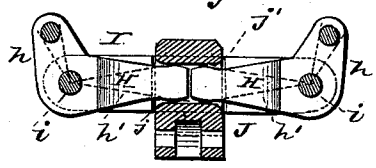
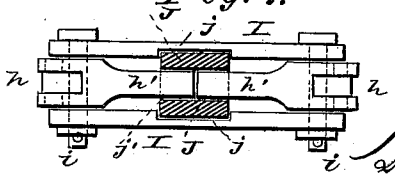


Fig. 4.



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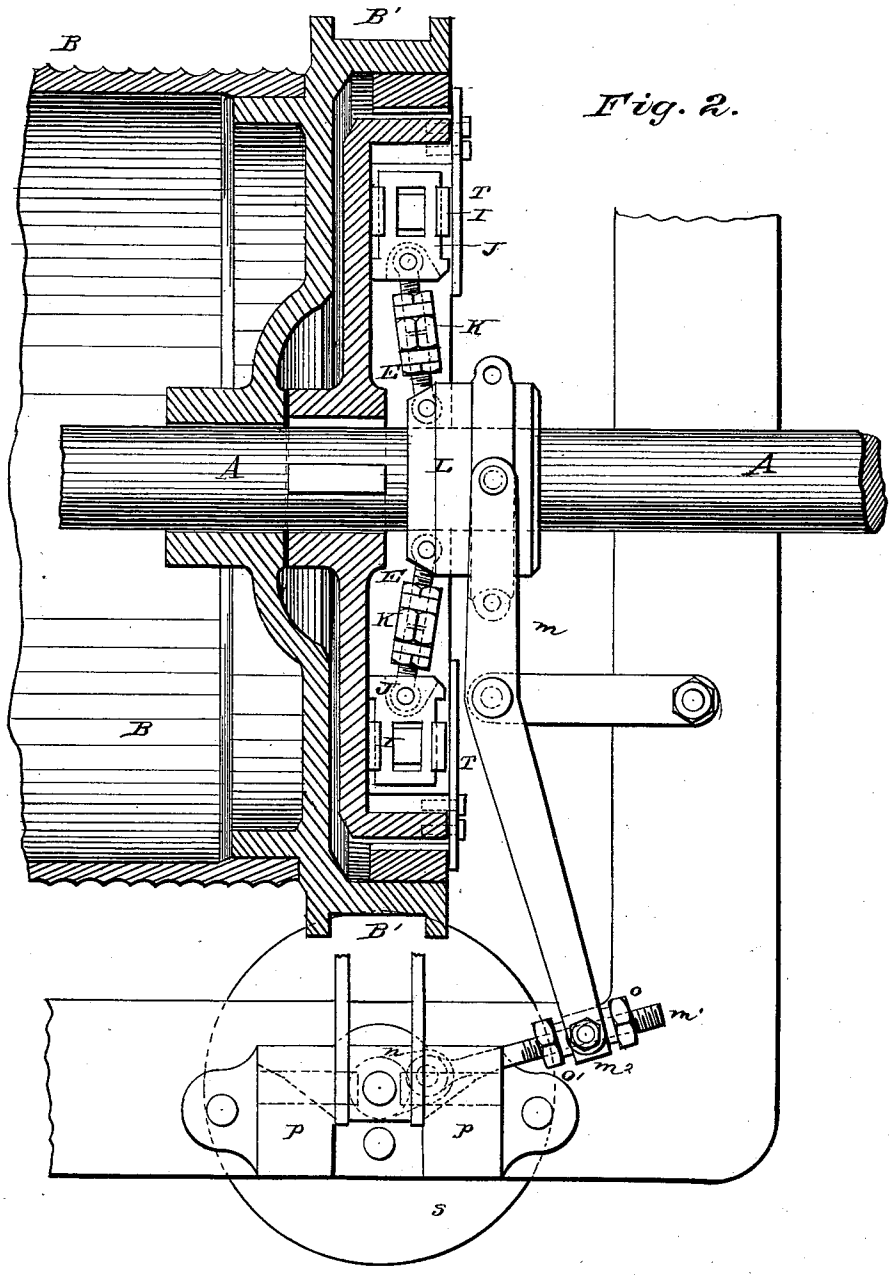
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Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 7.

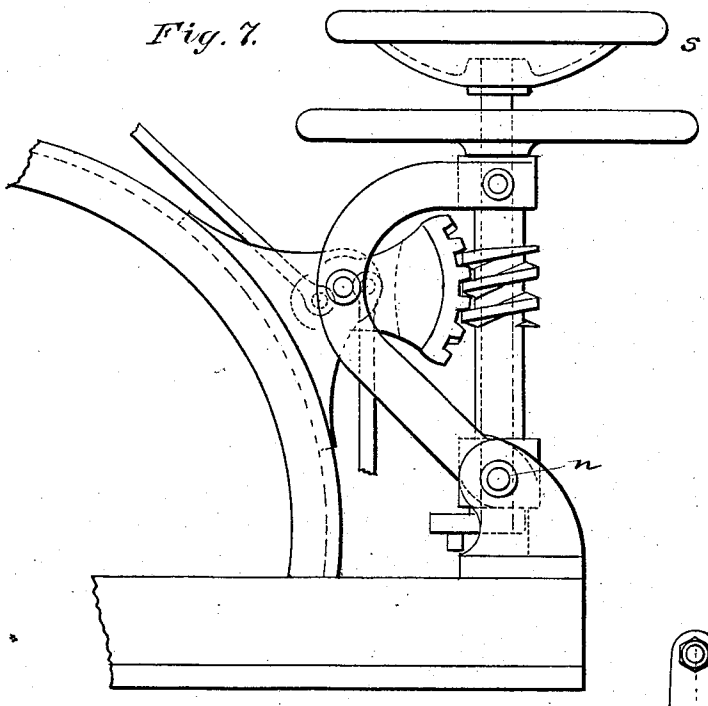


Fig. 5.

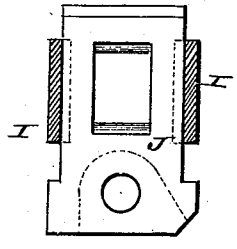


Fig. 6.

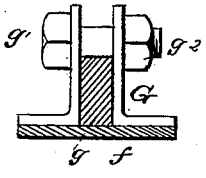
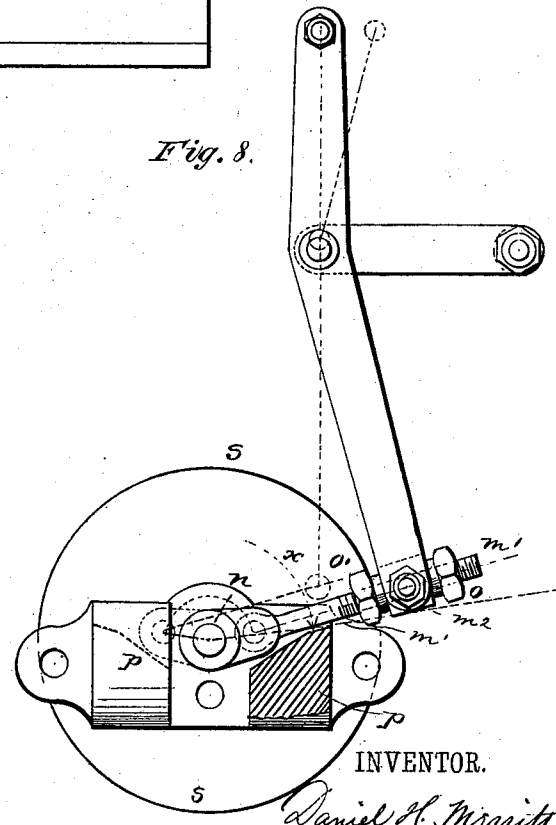


Fig. 8.



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UNITED STATES PATENT OFFICE.

DANIEL H. MERRITT, OF MARQUETTE, MICHIGAN.

EXPANDING AND CONTRACTING DEVICE FOR FRICTION-CLUTCHES.

SPECIFICATION forming part of Letters Patent No. 256,236, dated April 11, 1882.

Application filed February 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, DANIEL H. MERRITT, a citizen of the United States, residing at Marquette, in the county of Marquette and State of Michigan, have invented certain new and useful Improvements in Expanding and Contracting Devices for Friction-Clutches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in expanding and contracting devices for friction-clutches of hoisting and other machinery, and more particularly to improvements adapted to be used in connection with the internal clutch-band shown in my former patents, granted February 8, 1881, No. 237,570, and January 31, 1882, No. 253,083.

The internal clutch-band, when released, should be perfectly clear of the inside of the friction-rim of the winding-drum, and it is very desirable that the contraction and expansion of the clutch-band should have sufficient range to allow for the usual wear without so frequent readjustment. At the same time the movement of the mechanism for throwing the clutch-band into and out of engagement with the friction-rim should be quick, and yet give a powerful gripe at the moment the clutch-band takes hold or is brought into engagement with the friction-rim; and to this end the invention consists in novel features of construction and combination and arrangement of parts for obtaining the above-desired results, all as will be hereinafter fully described, and set forth in the claims hereto annexed.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 represents an end view or plan of internal clutch-band, driver, and expanding and contracting mechanism. Fig. 2 is a plan of expanding and contracting mechanism and horizontal section through friction-rim, clutch-band, and driver, and showing the mechanism for connecting the operating-lever with the hand-wheel; Figs. 3 and 4, sectional and plan views, respectively, of the expanding and contracting mechanism detached; Fig. 5, central section through Fig. 3; Fig. 6, section through one of the clamps for adjustably connecting one of the hinged bars of the expanding and contracting mechanism with the clutch-band; Fig. 7, detached view, showing the mechanism for simultaneously operating both the internal and external clutch and brake bands; Fig. 8, detailed view of clutch-band-operating mechanism, to be hereinafter referred to.

In the drawings, A represents the driving-shaft, to which power is applied; and B, the winding-drum loosely mounted thereon. One end of the winding-drum is formed with a friction-rim, B′, having a finished face on both its outer and its inner sides, with which the external and internal brake and clutch bands respectively engage. The end of the drum from which the friction-rim projects is recessed, and in the recess is arranged the driving-hub E, having driving-arms e', which is keyed to and revolves with the driving-shaft A. This armed hub carries a friction clutch-band, F, which also lies in the recess of the drum, and when expanded engages the inner face of the friction-rim, and when relaxed revolves clear of the same in a noiseless manner.

The clutch-band is formed of a wrought-iron band, f, on the outside of which wooden segments or shoes e are fixed, and this band is formed in semicircular sections, which are joined across the divisions in the following manner:

G G are angle-plates riveted or otherwise secured to the band f, as shown more clearly in Fig. 6; and $g\ g$ are adjustable bars clamped fast between said plates G G by bolts and nuts $g'\ g^2$. These bars $g\ g$ are pivotally connected to the short arms $h\ h$ of bell-crank levers H H, while the ends of the long arms $h'\ h'$ of said levers butt against each other, which levers are fulcrumed at the points $i\ i$ between the plates I I. These plates are provided on their inner faces with vertical grooves $j\ j$, which serve as guides for the sliding block J, which is provided with a slot, j', in which the ends of the long arms $h'\ h'$ of the levers H H rest, all as clearly shown in Figs. 3 and 5, thus permitting of the levers H H being moved in or out independently of the bars or plates I I, said bars or plates following only so far as is necessary for bringing the clutch-band fairly up to the inside of the friction-rim or back to a bearing in the four arms of the driver.

The sliding blocks J J are thrown in and out by toggle-joints K K, which connect said blocks with the sliding sleeve L, to which they are hinged or pivotally connected. These toggle-joints are adapted to be adjusted in order to set them to the best advantage for throwing the blocks J in and out.

The sliding sleeve is moved in and out by lever *m*, which is shifted through the medium of the short crank *n* at the lower end of an arbor, with hand-wheel *s* on the top, as shown more clearly in Fig. 7. There is an adjustable connection between crank-pin *n* and lever *m*, which consists of a rod, *m'*, having its threaded end passing through a smooth hole in a block, m^2, made large enough to allow of the free passage of said rod *m'*, and which block m^2 is swiveled to the end of lever *m* and nuts *o o'*, arranged on the rod *m'* and on opposite sides of the block m^2, all as clearly shown in Fig. 8, which also shows the position of the crank-pin *n* as the adjustable connection or rod *m'* strikes the bracket P at the point indicated by the arrow *x*, (part of the bracket P being broken away to show clearly in full lines where and how the connection or rod *m'* strikes.) The crank-pin *n* has just passed its center and the lever *m* in gear as far as it can go in throwing the sleeve L toward the friction-rim to throw the clutch-band in contact therewith, and said lever is locked in that position, because no amount of pressure against it in the direction of the connection or rod *m'* can start the crank-pin *n* from its position before it is backed over its center by the hand-wheel *s*.

As the wooden segments or shoes *e* of the clutch-band wear down by service the adjustable connection or rod *m'* is lengthened by turning the outside nut, *o*, loose, and following up with the jamb-nut *o'* behind the block m^2 to compensate for said wear. The other end of the adjustable connection or rod *m'* being linked to the crank-pin *n*, as shown in Fig. 7, when the lever *m* is out of gear, as above explained, the crank-pin *n* takes the position as indicated by the dotted lines, in which position the clutch-band pressure is removed from contact with the inner surface of the friction-rim of the drum, heretofore explained. When the crank-pin *n* is thrown a little past its dead-center by a partial turn of the hand-wheel *s* the adjustable connection or rod *m'* will strike the bracket *p*, as before explained, when the clutch-band has taken hold or been brought in contact with the inner surface of the friction-rim of the drum, and will stop there until released by the reversing of the hand-wheel *s*. By this construction the greatest force is on the clutch-band the moment it comes in contact with the friction-rim of the drum as the crank-pin *n* passes the dead-center, while half a turn of the hand-wheel *s* will with very little exertion throw the clutch-band (through the medium of the intermediate connections) clear off or out of contact with the friction-rim of the drum after the crank pin *n* has passed back of its dead-center. The amount of expansion and contraction thus obtained for the clutch-band is quite considerable, as indicated by heavy dotted lines in Fig. 3, and the wooden segments or shoes constituting the lining of the clutch-band can wear away a great deal before it becomes necessary to adjust the hinged or pivoted bars *g g*, which is done very conveniently and quickly by loosening the nuts on the bolts of the clamps G G and drawing the four hinged or jointed bars *g* an equidistance forward, and then securing them in position by said clamps.

T represents metallic covering-plates bolted or otherwise secured to the outside of the friction-rim of the drum for protecting or partially inclosing the interior clutch mechanism. The outside brake-band being connected and operated by the hand-wheel *s* in a similar manner shown and described in my former patent, before referred to, numbered 253,083, it is deemed unessential to further describe its operation here.

c c are butt-plates riveted to the iron bands, *f f*, in pairs, so as to fit loosely over the two opposite arms, e^2, of the driver, which carries the bands round with it.

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

1. The combination, with the friction-rim and clutch-band adapted to engage therewith, of the hinged or pivoted bars *g g*, clamping mechanism for adjustably securing them to said band, pivoted bell-cranks H H, having long and short arm, sliding block J, and bars I I and toggle K for connecting said block J with the sliding sleeve L, substantially as and for the purpose specified.

2. The combination, with the friction-rim and clutch-band adapted to engage therewith, and formed in semicircular sections, of the hinged or pivoted bars *g*, clamping mechanism for adjustably securing them to the band, pivoted bell-crank bars I I, sliding blocks J J, and toggles K K for connecting said blocks with the sliding sleeve L, substantially as and for the purpose specified.

3. The combination, with the clutch-band, of the hinged or pivoted bars *g* and clamping-plates G G, bell-cranks H H, having short arms *h h*, pivotally connected to said bars *g*, sliding block J, having a slot or opening for the ends of the long arms *h' h'*, grooved bars I I for the reception of the sliding block, and to which the bell-cranks are pivotally connected, and a toggle for connecting said sliding block with operating mechanism, substantially as and for the purpose specified.

4. The combination, with a clutch-band and a lever for operating it, of the intermediate connecting mechanism consisting of hinged or pivoted and adjustable bars *g*, pivoted bell-cranks H H, grooved bars I I, sliding and slotted blocks J J, sliding sleeve L, and connecting rods or toggles, substantially as and for the purpose specified.

5. The combination, with a clutch-band, sliding sleeve L, and intermediate connecting mech-

anism, and a lever, *m*, for operating said sleeve, of the hand wheel or shaft having the crank-pin *n*, the bracket *p*, and connection or rod *m'*, intermediate of and connecting the crank-pin *n* with lever *m*, substantially as and for the purpose specified.

6. The combination, with a clutch-band, sliding sleeve, and intermediate connecting mechanism, and a lever for operating said sleeve, of the hand wheel or shaft having the crank-pin *n*, the bracket *p*, and adjustable connection or rod *m'*, substantially as and for the purpose specified.

7. The combination, with a clutch-band, of hinged bars *g*, adjustably connected thereto, sliding sleeve, and means, substantially as described, for connecting said bars *g* with said sleeve, the pivoted lever *m* for operating said sleeve, adjustable connection or rod *m'*, hand wheel and shaft having a crank-pin, *n*, and the bracket *p*, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

DANIEL H. MERRITT.

Witnesses:

MAX JAEKER,

EDWARD A. MERRITT.