

(No Model.)

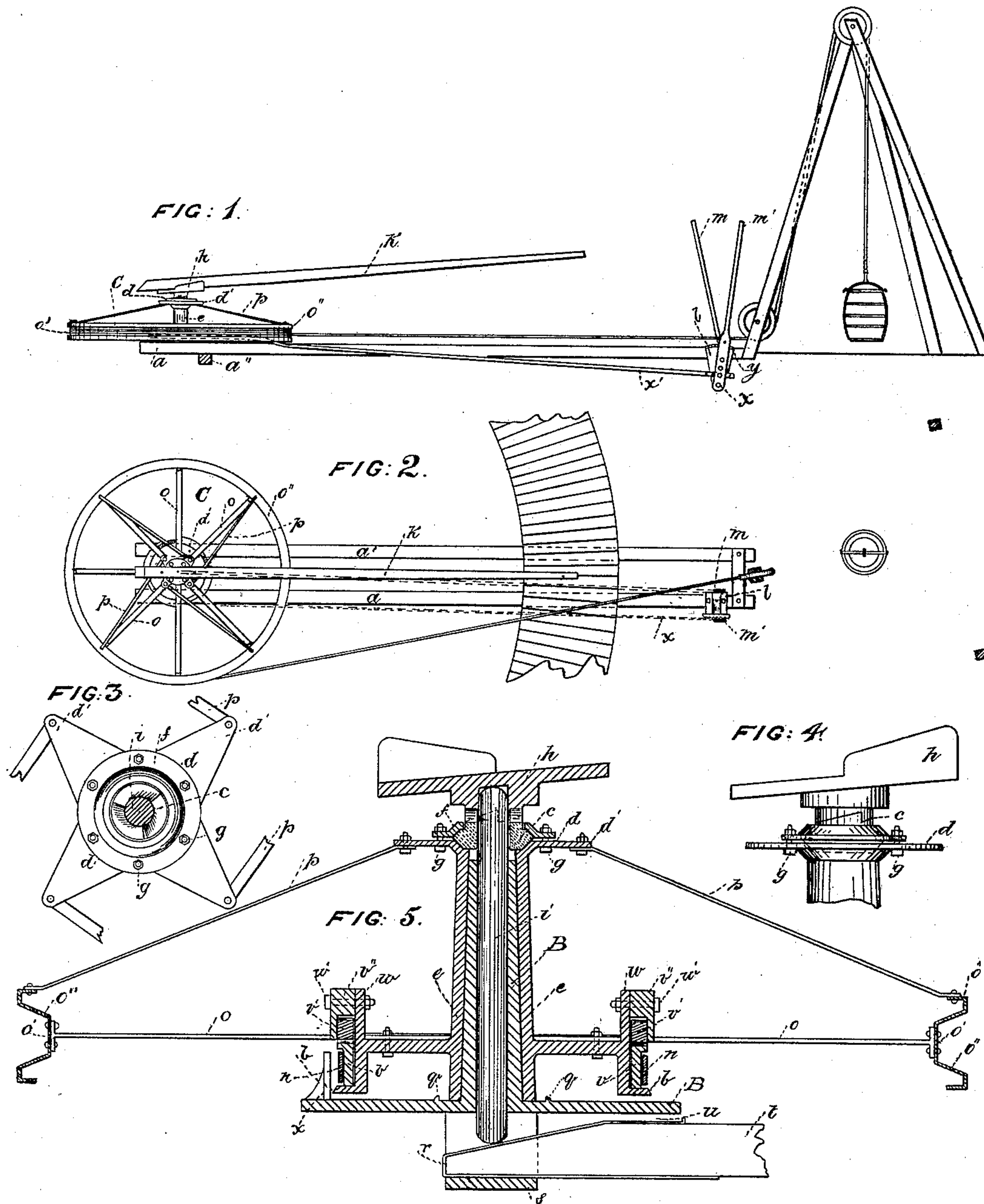
3 Sheets—Sheet 1.

J. H. MONTGOMERY.

HOISTING APPARATUS.

No. 409,656.

Patented Aug. 20, 1889.



WITNESSES:

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(No Model.)

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FIG. 6.

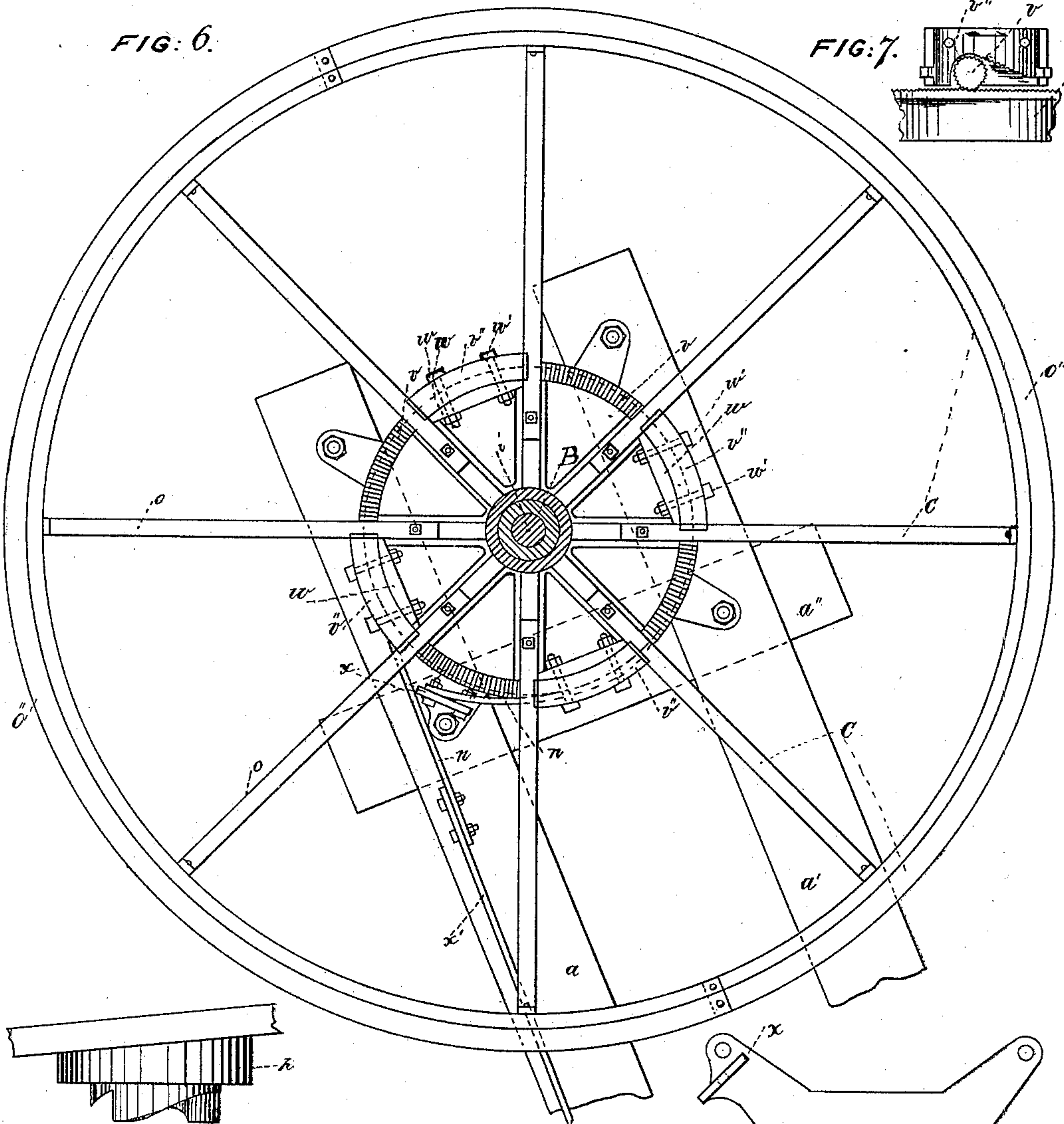


FIG. 7.

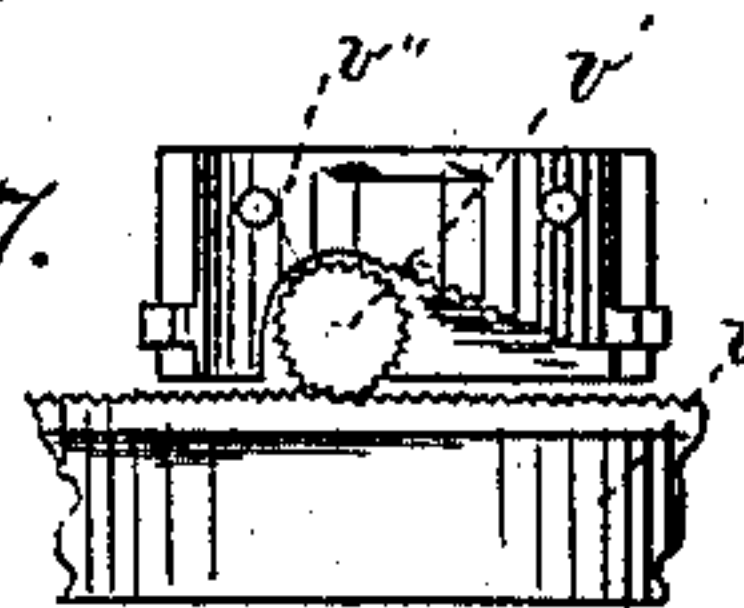


FIG. 8.



FIG. 9.

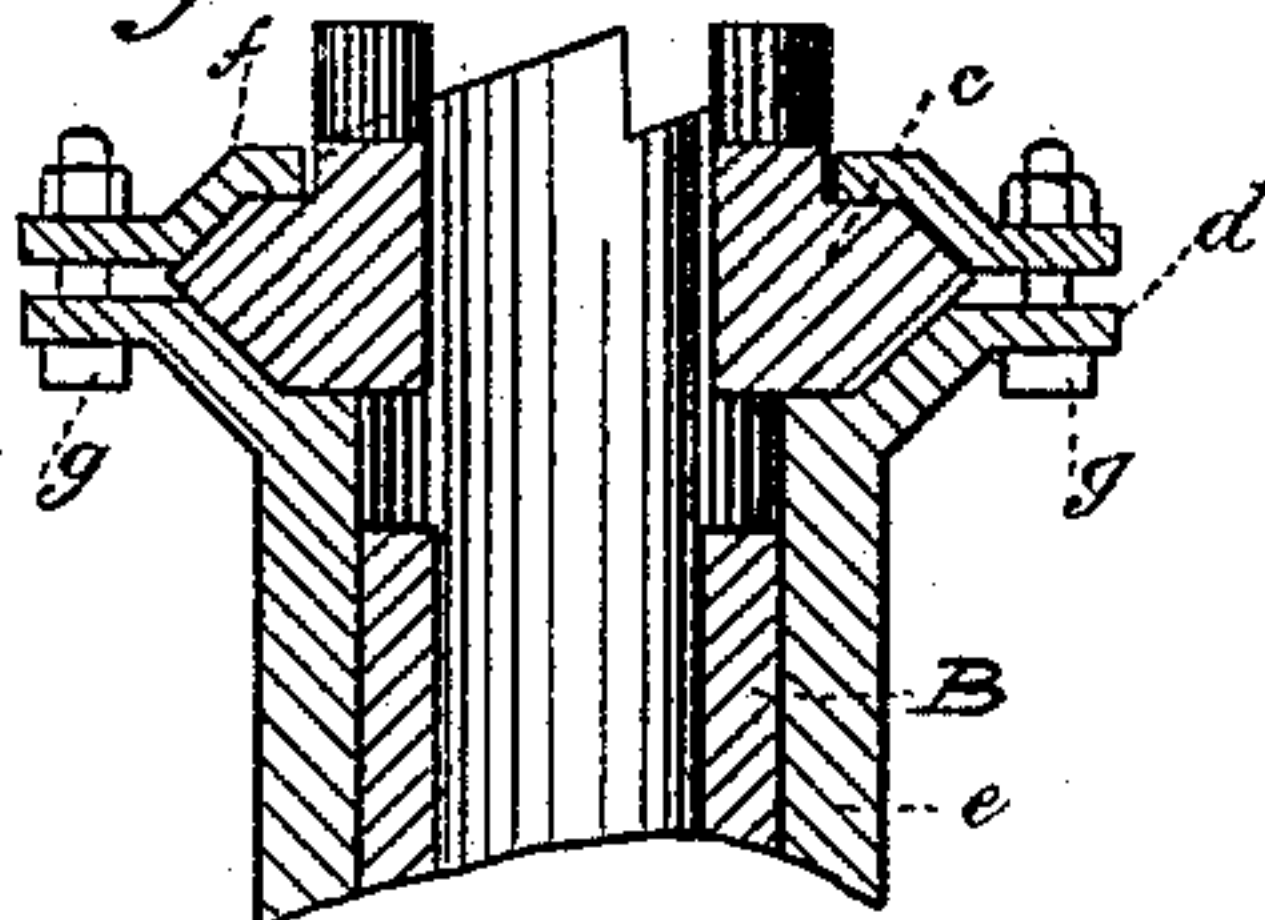
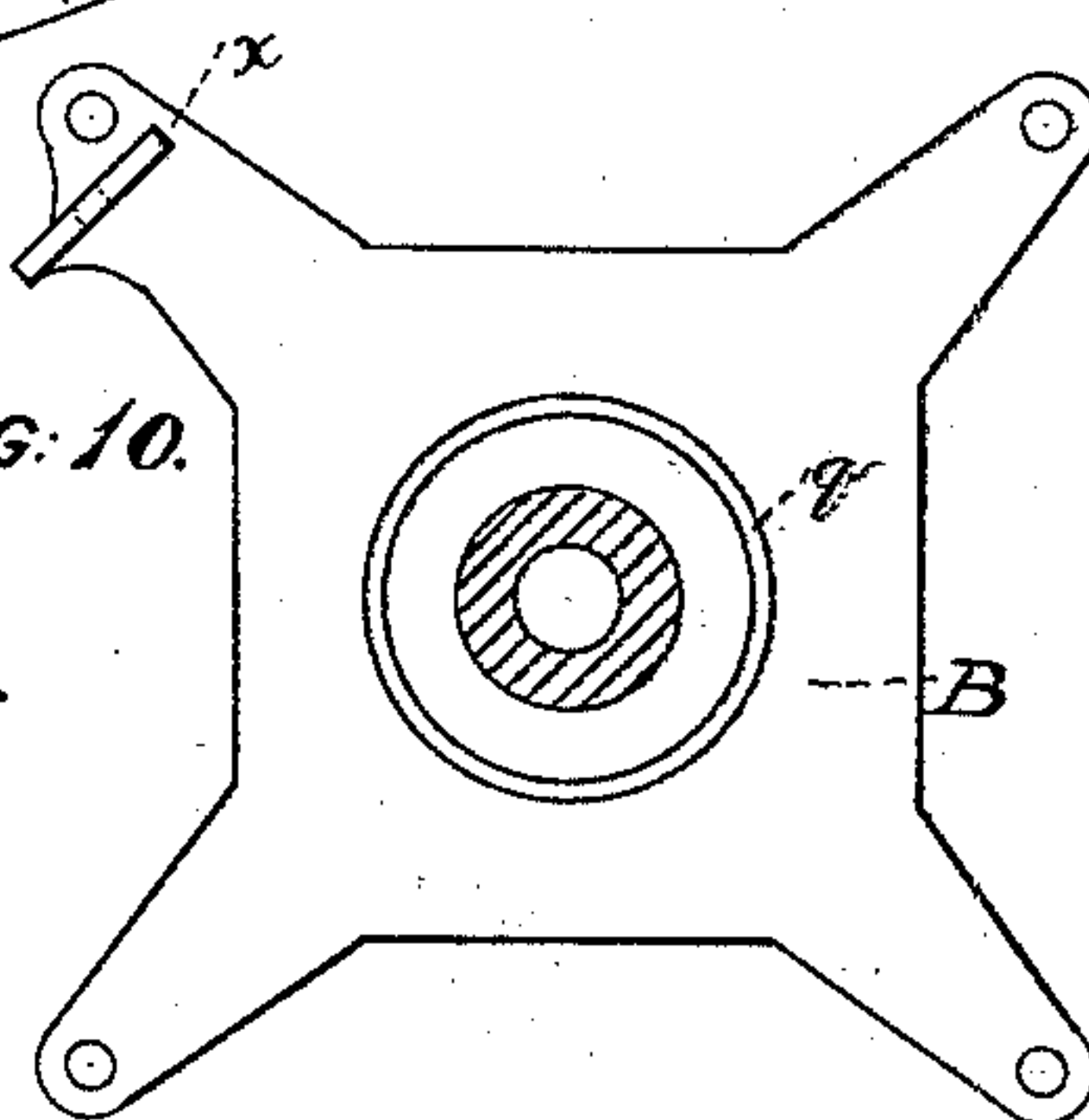


FIG. 10.



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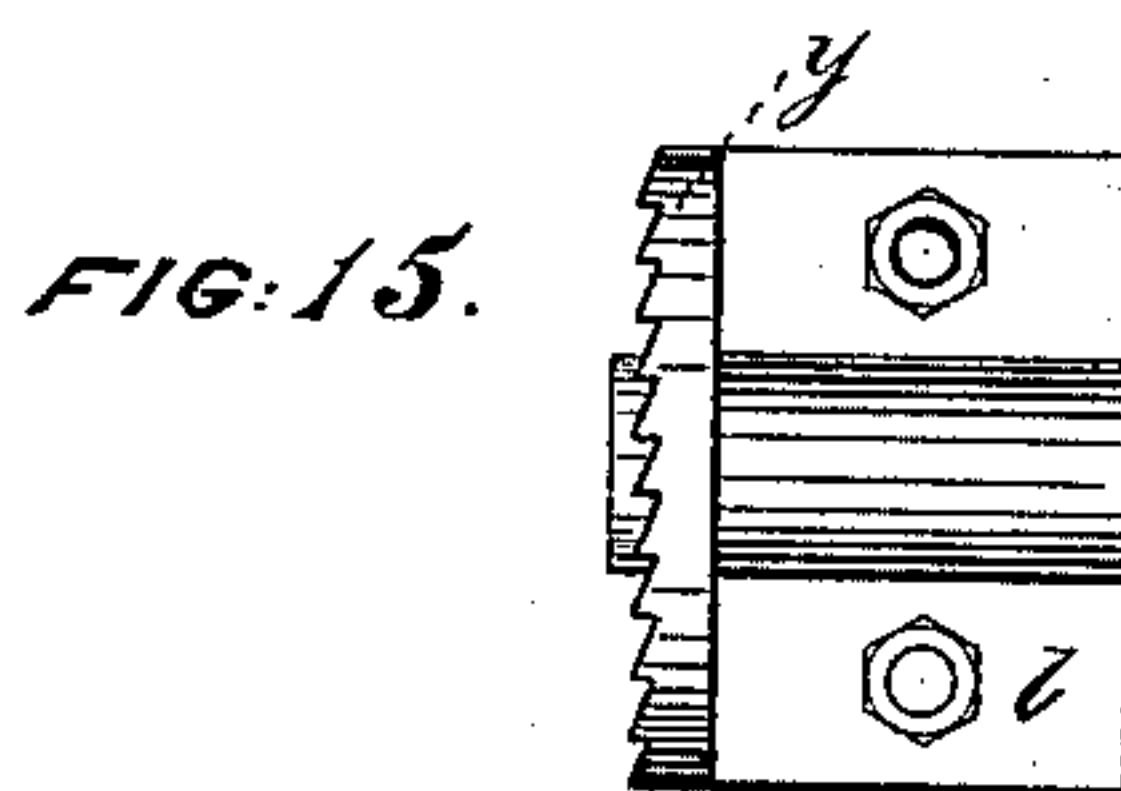
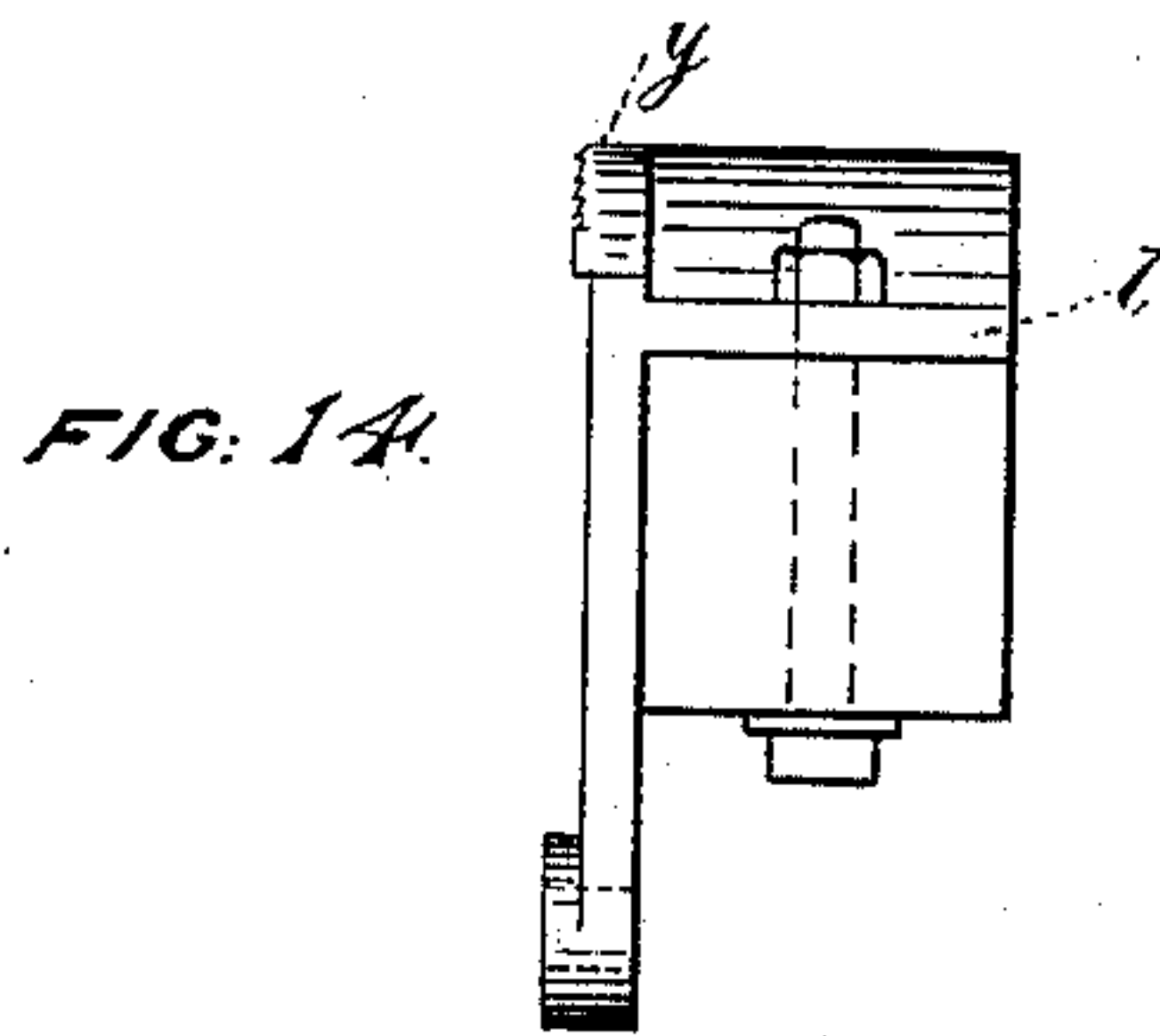
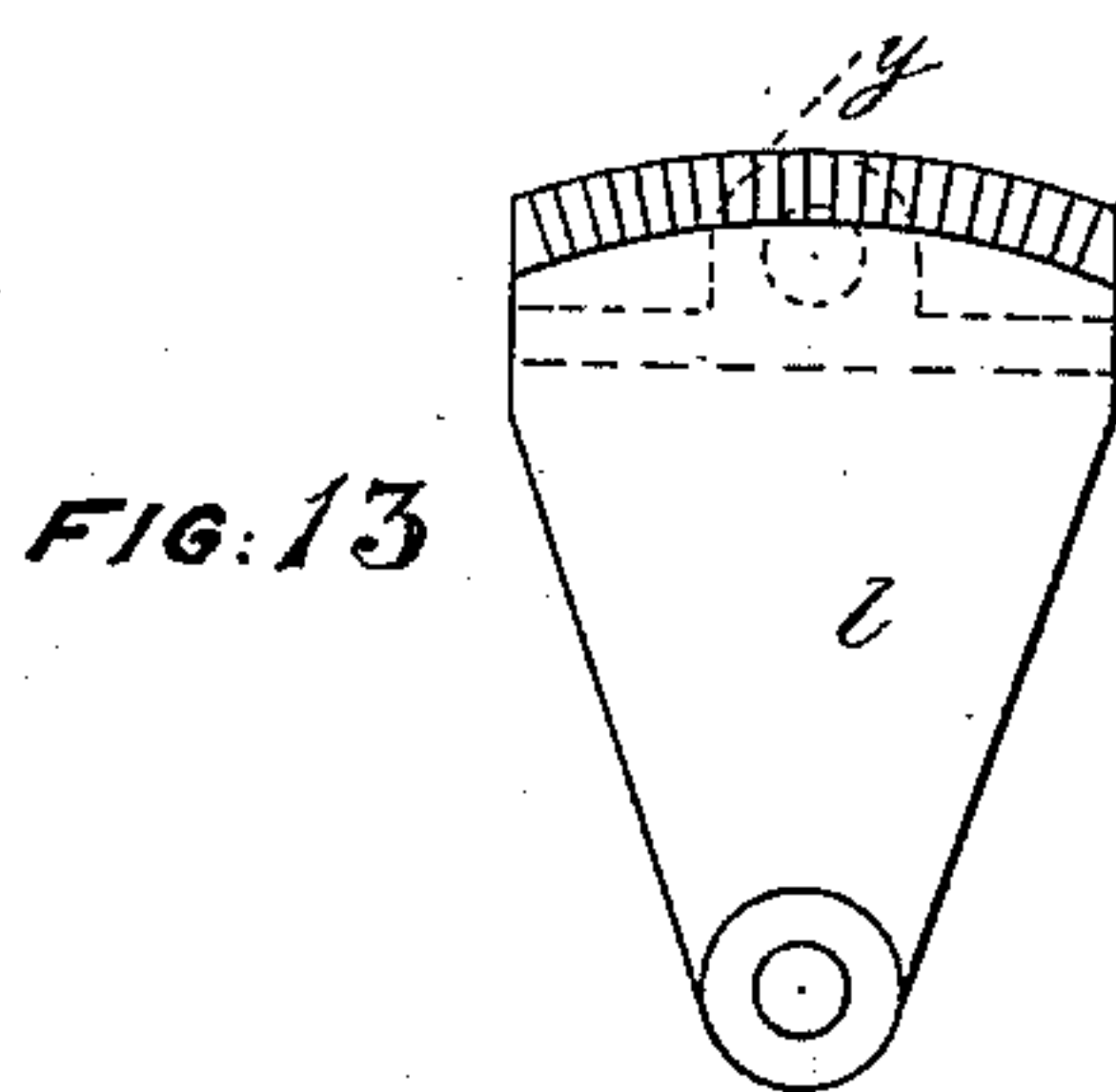
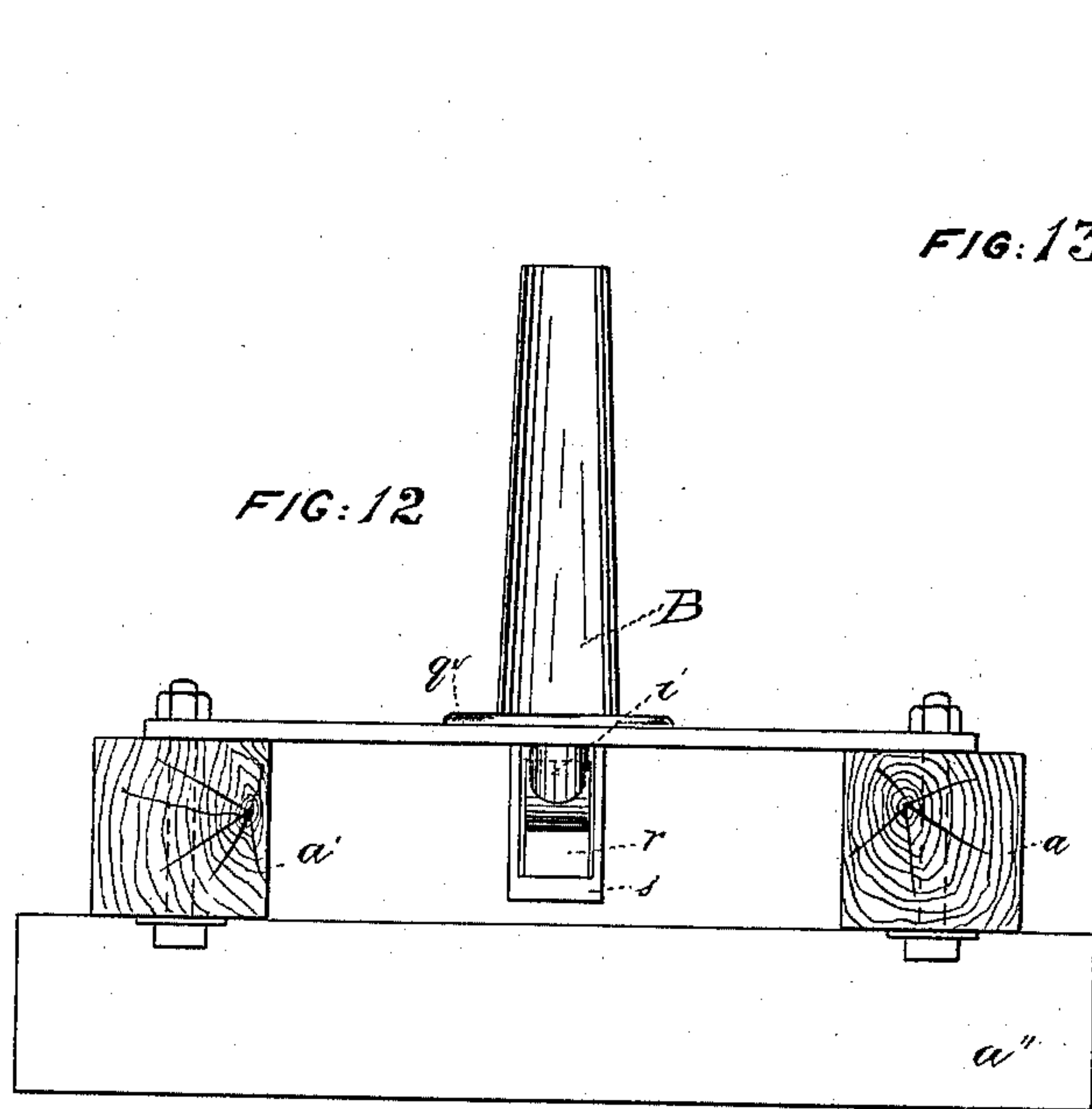
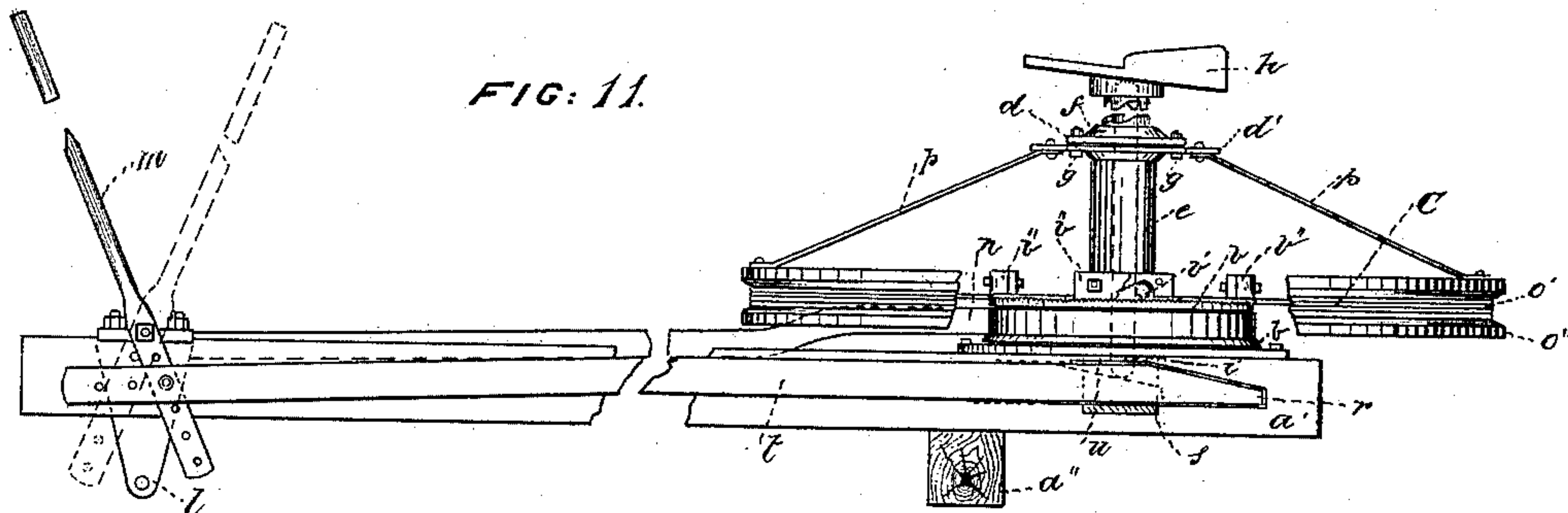
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3 Sheets—Sheet 3.

HOISTING APPARATUS.

No. 409,656.

Patented Aug. 20, 1889.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JAMES H. MONTGOMERY, OF DENVER, COLORADO.

## HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 409,656, dated August 20, 1889.

Application filed November 4, 1887. Serial No. 254,295. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES H. MONTGOMERY, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Hoisting Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to a hoisting apparatus or whim mechanism, and is an improvement on the apparatus shown in my prior Letters Patent, No. 296,433, granted to me April 8, 1884. Its objects are to produce a hoisting mechanism of simple, compact, and strong construction, and so arranged that its parts are readily separable for convenience of transportation, and as readily assembled for use, in which provision shall be made for guarding against dangerous effects from overloading or from the load meeting with an unexpected and unyielding obstruction, in which provision also shall be made for the automatic action of a brake, that accidental falling of the load may be prevented, a hoisting mechanism readily operated, easily controlled, efficient, and durable; to which ends the invention consists in the features, constructions, and combinations more particularly hereinafter described and claimed.

In the drawings is illustrated an embodiment of the invention, Figure 1 thereof being a side view or elevation of my improved hoisting apparatus; Fig. 2, a plan view thereof; Fig. 3, a top view of a friction-coupling; Fig. 4, a side view of the same friction-coupling and of a clutch; Fig. 5, an enlarged cross-section of the winding-drum and its immediately-associated parts; Fig. 6, an enlarged plan view of the drum and its supports with the details shown in Fig. 4 removed; Fig. 7, a view, partly in elevation and partly in section, of a detail of construction; Fig. 8, an elevation of a clutch with the clutch members separated; Fig. 9, a vertical section of the friction-coupling shown in Fig. 3; Fig. 10, a plan view of the king-post and its base; Fig. 11, a side view or elevation of the mechanism with a part of the drum broken away; Fig. 12, a view or elevation of the king-post; Figs. 13, 14, and 15, front, side, and top views, respectively, of a bracket for supporting the levers

controlling the braking and the clutching devices.

In these figures the reference-letters *a a' a''* indicate the base timbers or sills on which the operative parts are secured, and by which they are supported, the longer timbers *a a'* being quite close together comparatively and secured together, yet at the proper distance apart, by a suitable number of transverse timbers *a''*. Suitably secured upon them is the king-post B, (shown in detail in Figs. 10 and 12,) which is hollow throughout its length. Upon such post is rotatably seated the hub *e* of the winding-drum C, such hub being hollow, that it may fit easily upon the exterior of post B, its lower or bottom end taking within an oil-reservoir formed upon the flanged base of the post by a ledge *g*, formed, cast, or raised thereon.

The hub *e* has a flange extending outwardly at a little distance from its lower end, and thereto are secured a number of radial arms *o*, forming spokes by which is supported the rim for receiving the rope or cable. Such rim has a depressed portion or land *o'*, bounded on either side by flanges *o''*, so that the rim is grooved, the width and depth thereof being proportioned to the amount of rope or cable to be wound thereupon. This hub has another flange *d* at its upper end, to which are secured arms *d'*, from which proceed to the rim the inclined brace-rods *p*, fastened to both the rim and the arms *d*, such rods serving to strengthen and stiffen the entire drum or wheel. This drum is the largest single member of the apparatus; hence for ease of transportation, especially over mountain roads and in localities where goods transported are "packed" on animals' backs, preferably it should be made in separable sections, to which end the rim is made in a plural number of sections joined together by screws or bolts, two such sections being indicated in Fig. 6. Then as all the parts may be united by bolts or screws, as indicated in Figs. 5 and 6, they may readily be separated into parts of convenient size for transportation.

Passing through and seated in the hollow king-post is a shaft *i*, adapted to be rotated therein and carrying at its upper end a seat whereto a sweep *k* may be secured. This seat *h* has its lower edge formed as a clutch mem-



ber adapted to engage or mesh with a corresponding clutch member formed on the upper edge of collar *c*, secured to the hub *e*, so that when the clutch members are in engagement the rotation of the sweep in one direction will cause the rotation of the winding-drum, but when the sweep rotates in the other direction the clutch member carried thereby will move over or by the other without rotating the drum. This of course can be done in many ways, the simple form of clutch herein shown being shown as typical only of various clutch mechanisms for accomplishing the same result.

It may sometimes happen that some obstruction or an overweighting occurs, putting such unusual strain upon the mechanism that the continued operation of the drum would lead to breakage of some of the parts. Such danger may be obviated by securing a clutch member to the hub in such manner that the two move together under normal and safe conditions, but that the clutch member slips relatively to the hub on the appearance of dangerous conditions. One of several ways by which this may be done is exemplified in the figures and in enlarged detail in Fig. 9, wherein the collar *c* is shown as beveled at its edge and on both sides, the flange *d* at the head of hub *e* having a seat for the collar of corresponding shape. The collar being placed therein, a ring *f* is secured thereupon and to the flange *d* by bolts *g*, holding the collar between the flange and the ring with such friction that under normal conditions all move together. Then if the movement of the winding-drum be opposed by a dangerous force or obstacle the collar slips in its seat upon flange *d* and injury to the parts is prevented.

Beneath the lower end of the shaft *i* of the sweep the inclined or wedge-shaped end *r* of a throw-bar *t* is arranged to take, such end moving in a guideway or bracket-frame *s*, which may be formed integral with the base of the hollow king-post, or may be a separate part secured beneath such base. Such throw-bar is pivoted to a lever *m*, pivoted to the lever-supporting bracket *l*, which has a flange extending at a right angle to its face, by which it is secured upon one of the sills. Then if such lever be thrown to push the wedge or inclined end under the end of shaft *i* the latter is lifted, as shown in full lines in Fig. 11, disengaging the clutch members, the shaft and its clutch member falling by gravity on withdrawal of the throw-bar, so that the clutch members are brought together automatically.

For greater safety in the use and operation of hoisting mechanism, especially when elevating from deep vertical shafts and up the inclines of mines, &c., provision should be made for automatic action of reliable brakes whenever any backward rotation of the winding-drum occurs, that backward movement of

the load may instantly be stopped. The means herein illustrated for the accomplishment of this are as follows:

As before stated, the hub *e* has an outwardly-projecting circular flange near its lower end. At its periphery such flange carries a vertical rim, the rim being at a right angle to the body or plane of the flange, and such rim carries a second flange *b*, upon which is seated a brake shoe or ring *v*, surrounding the vertical rim, but so loosely that the two may move independently of each other.

Secured to a lug or post *x* on the base of the king-post is one end of a brake-strap *n*, which passes around the ring *v* and is united at its other end to a draw bar or rod *x'*, which is pivoted to a lever *m'*, pivoted at *x''* to the lever bracket *l*, before referred to. Such bracket-lever has upon its face contiguous to the lever *m'* a series of serrations or ratchets *y*, while the lever *m'* carries a lip or edge to engage therewith to hold the lever in a set or engaged position therewith, after the common method of holding throw-levers in a fixed position. It is evident, then, that if by operating the lever the strap is so tightened around the ring or shoe as to prevent its movement the hub will rotate within the ring and independently therein unless the two be locked together.

Secured to lugs *w* on the lower flange of hub *e* are one or more roller-carrying pockets *v''*, four being herein shown, each having a single roller *v'*, the surfaces of the rollers being corrugated or serrated, as shown in Fig. 7, as also is the upper edge of the ring or shoe *v*, the pockets being so located that the rollers shall lie and travel upon the upper edge of the ring or shoe. The upper interior surface of these pockets is inclined, the rear end, reference being had to the normal line of travel, (see Fig. 7,) being large enough to permit the rollers to roll around easily therein, the surface inclining from such space downwardly, and being also serrated or corrugated along the face of the inclination. Then when the drum is moving in its forward—that is, winding up or hoisting—direction the rollers rotate loosely over the top edge of the brake ring and shoe, such direction being indicated by the arrow in Fig. 7. If movement in a reverse direction commences, the roller is crowded down into the narrower space, wedging therein, with its serrations or corrugations interlocking with those of the ring or shoe and of the inclined surface, locking the ring or shoe and the hub together, and so automatically holding the drum against further backward or unwinding rotation, so long as the brake-strap *n* and lever *m'* are kept set.

By the constructions thus set out or equivalent constructions the objects of my invention are fully attained.

While, as herein shown, the rotation of the



drum is to be effected by a sweep seated on *h*, it is evident that other means for applying power might be used.

While herein the rim of the wheel or winding-drum is made in two sections, it might be made in more, and the entire drum, including arms and hub, might be made in two or more sections, to be united by bolts in the usual way, the lines of division being radially through some of the arms *a*.

Having thus described my invention, what I claim is—

1. In a hoisting apparatus, the combination of a base or framing, a king or main post seated thereon, a winding-drum mounted on such post or spindle, a clutch member secured to the hub of the drum by a friction-coupling, a second clutch member arranged to receive motion from the prime motor and to mesh with the other clutch member, and a friction-brake and lever for regulating the unwinding of the winding-drum, substantially as set forth.

2. A winding drum or wheel consisting of a hub *e*, a clutch member attached thereto by a friction-coupling, radial arms or spokes secured to the hub and carrying a rim, a sectional rim, and inclined brace rods or arms, substantially as set forth.

3. In a winding or hoisting apparatus, the combination of a hollow king-post, a winding-drum journaled thereon, a spindle journaled therein, a connection from the spindle to the winding-drum, and means for communicating motion to the spindle, substantially as set forth.

4. In a hoisting apparatus, the combination of a hollow king-post, a winding-drum having

a hub journaled upon such post, a clutch member frictionally united to such hub, a stem or shaft journaled within the hollow king-post and carrying a clutch member to which the power is first applied, and an automatic brake mechanism carried and supported by a flange on the hub of the winding-drum, substantially as set forth.

5. In a winding or hoisting mechanism, the combination of a framing, a hollow king-post seated thereon, a winding-drum having a hub mounted on such king-post, a clutch member united to such hub by a friction-coupling, a spindle journaled within the hollow king-post, a second clutch member situated on such spindle and arranged to receive motion from the prime motor, and a throw-bar having an inclined or wedge-shaped end arranged to be thrust beneath the spindle and lift it and disengage the two clutch members, substantially as set forth.

6. In a hoisting apparatus, the combination of a framing, a hollow king or main post seated thereon, a winding-drum having a hub mounted on such king-post and carrying a clutch member, a spindle journaled within the king-post, a second clutch member seated on such spindle, a throw-bar having an inclined or wedge-shaped end adapted to be thrust beneath the lower end of the spindle and lift it for the disengagement of the clutch members, and a lever for operating such throw-bar, substantially as set forth.

JAMES H. MONTGOMERY.

Witnesses:

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HARRY R. THACKER.