No. 651,972. Patented June 19, 1900.

S. MATTSON.

DERRICK APPARATUS.

(Application filed Aug. 10, 1899.)

(No Model.) 2 Sheets—Sheet 1.

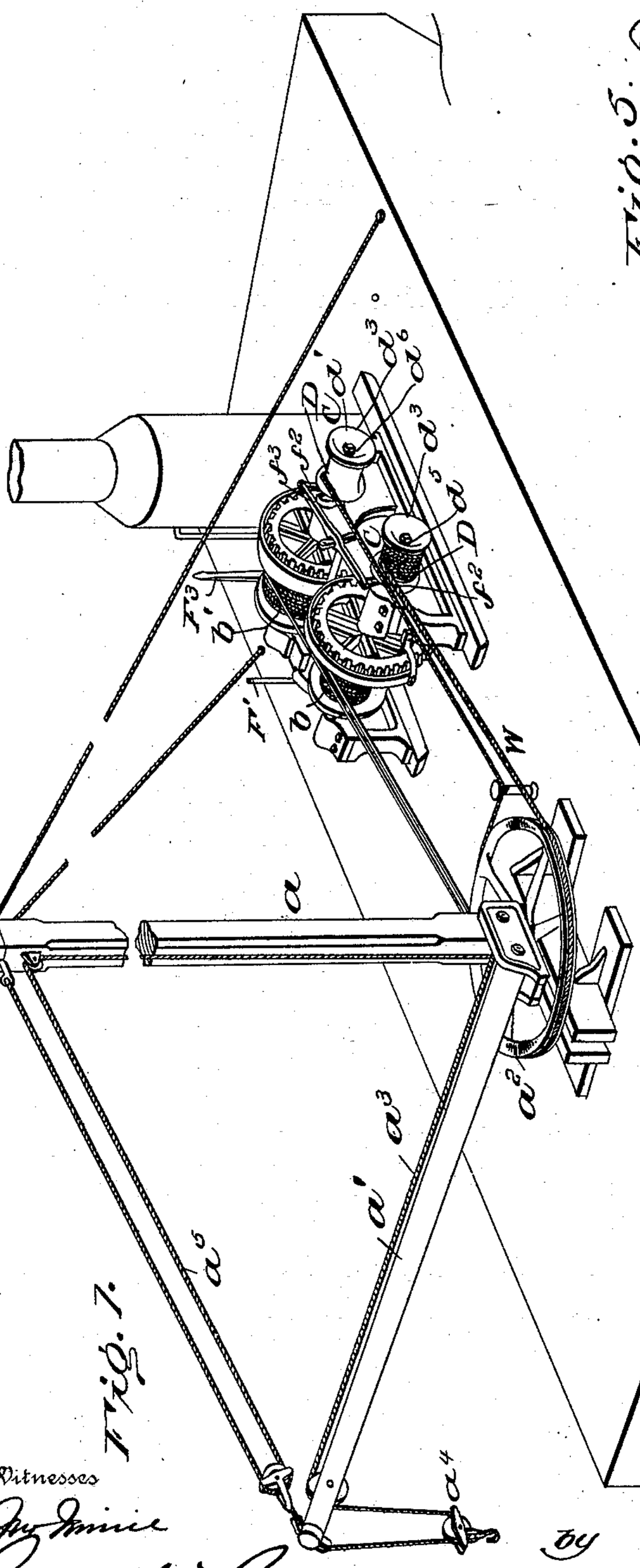


Fig. 5.

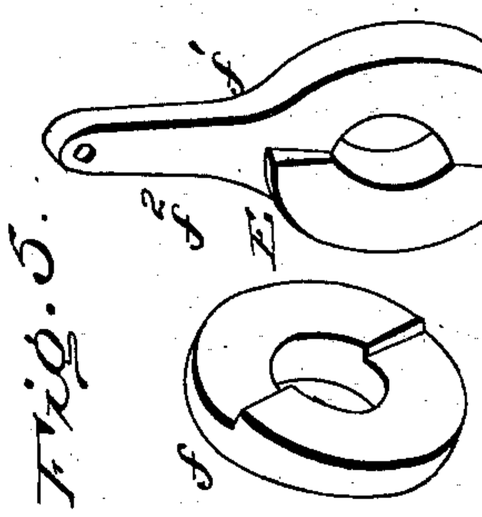
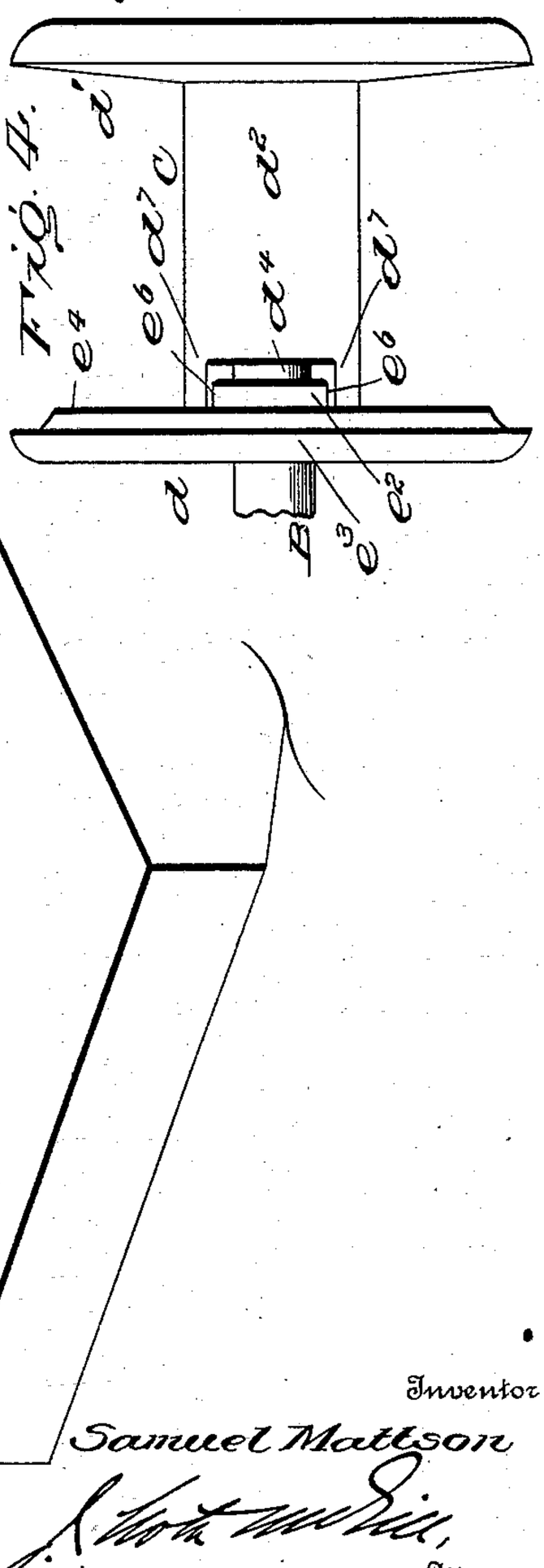


Fig. 4.



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2 Sheets—Sheet 2.

Fig. 2.

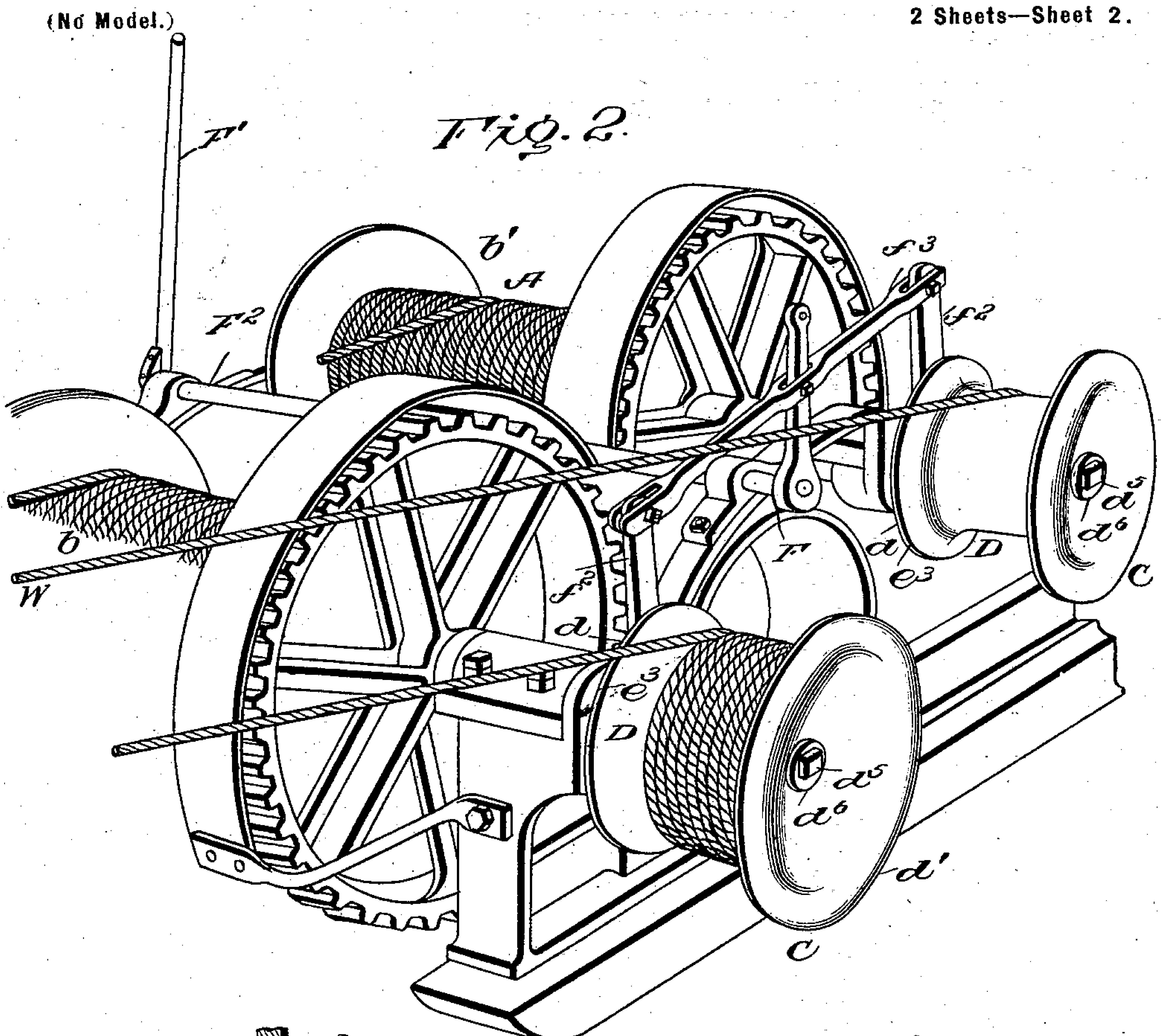
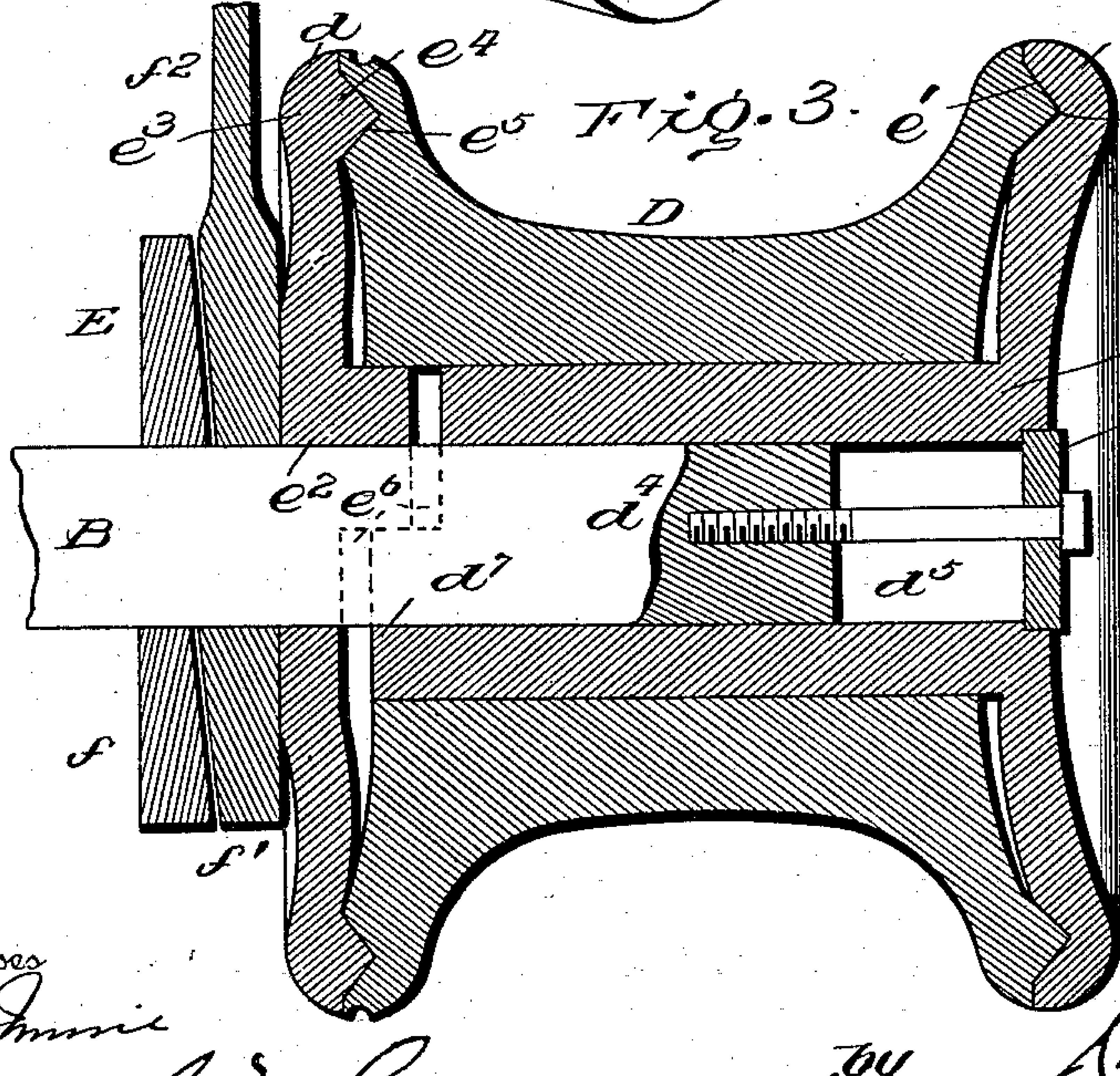


Fig. 3.



Witnesses
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Grafton L. McGill.

Inventor
Samuel Mattson
by [signature]
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

SAMUEL MATTSON, OF NEW YORK, N. Y., ASSIGNOR TO THE LIDGERWOOD MANUFACTURING COMPANY, OF NEW YORK.

DERRICK APPARATUS.

SPECIFICATION forming part of Letters Patent No. 651,972, dated June 19, 1900.

Original application filed March 23, 1898, Serial No. 674,939. Divided and this application filed August 10, 1899. Serial No. 726,767. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL MATTSON, of New York, (Brooklyn,) in the county of Kings and State of New York, have invented certain new and useful Improvements in Derrick Apparatus; 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.

The invention will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings I have shown one form of mechanism in which my invention may be embodied, but to which form my invention is not limited.

Figure 1 is a view showing the general outline of a hoisting apparatus and derrick containing my invention. Fig. 2 is an enlarged view of a part of the hoisting apparatus. Fig. 3 is an enlarged vertical sectional view taken through one of the friction-drums. Fig. 4 is an elevation of one of the latter. Fig. 5 shows one of the clutches.

Referring to the drawings, A designates a hoisting apparatus; a, a mast; a', a boom extending from said mast, and a^2 a bull-wheel keyed on mast a.

The hoisting apparatus A is provided with two friction-drums b b', which may be operated in any suitable manner in accordance with well-known forms of construction, such as that shown in the Beekman patent, No. 541,308, dated June 18, 1895. a^3 is the rope by which the fall-block a^4 for carrying the load is raised and lowered by one of said drums. a^5 is the rope by which the boom is raised and lowered by the other of said drums. The shafts B of the friction-drums b b' have their bearings in two frame members. On the extended end of the shaft B of each drum, overhanging outside one of the frame members, is placed a supplemental friction-drum in the form of a winch-head C. To these winch-heads are connected the ends of a rope W, which is passed around the bull-wheel a^2 and by which the mast a is capable of being rotated. Each winch-head consists of a central part or section D and two end parts or sections d d'. The former, D, has an annular concavity to accommodate the rope W and is normally loose, while the parts or sections d d' are interlocked and held to their shaft, so that they constantly revolve therewith, and one of them is capable of being so moved on said shaft as to bind all three parts or sections in frictional contact. The part or section d' consists of a hub or sleeve d^2 and an outer circular flange d^3. This section is held firmly on shaft B by an extension d^4 thereof, a bolt d^5, and a washer d^6. The inner end of this sleeve d^2 has two opposite cut-aways, forming two prongs or extensions d^7. On the inner face of the flange d^3, near the periphery thereof, is formed an angular V-shaped groove e, designed to conform with and accommodate an annular V-shaped rib e', formed on the outer side of the central part of section D. The part of section d consists of a central hub or sleeve e^2 and a circular flange e^3, the latter being formed near its periphery with an annular V-shaped rib e^4, which is designed to project into and snugly fit a corresponding groove e^5 in the adjoining face or end of section D. The end of the hub or sleeve e^2 is also provided with opposite cut-aways e^6, which accommodate the extensions d^7 of the sleeve of section d'. This latter section being fast to shaft B and its sleeve being in engagement with the sleeve of the part d, both are caused to revolve in unison with said shaft. The cut-away portions in the sleeves d^2 and e^2 are of such depth as to permit the section d to have a limited sliding movement on shaft B without being disengaged from the sleeve of the section d'. On the shaft B of each of the drums of the hoisting apparatus is placed a clutch E, the same consisting of two collars f f', the former being stationary and the latter loose, both having concentric openings to accommodate shaft B. The inner opposed faces of these collars have cam-like inclinations, whereby by moving the collar f' so that the opposed faces of the two collars will force it outward against the adjoining face of section d of the winch-head said section will be moved so as to bind in frictional contact the three sections of the head. It will be understood that the inclina-

tions of the collars of one clutch are the reverse of those of the collars of the other clutch. From each of the collars f' projects an arm f^2. These arms of the two clutches are connected together by a bar f^3, and with the center of the latter engages an operating-lever F, which is operated from a hand-lever F′, located at the opposite end of the drums b and b' and connected with the lever F by a rock-shaft F^2, extending across the machine substantially parallel with the axes of the drum-shafts. The clutches are so arranged that when one of them forces the parts of the sections of the adjoining winch-head into frictional engagement with one another the other clutch will release the sections of the other winch-head, thereby allowing the rope or central section D to rotate independently of the shaft B, as well as of the other parts or sections of the head. By adjusting the bolt d^5 the power of the friction for a given position of the clutch or cam member f' may be regulated and kept substantially constant notwithstanding the wear of the friction-surfaces. The hand-lever F′ is located at the same side of the machine with the handles (one of which, F^3, is shown) by which the attendant controls the frictions operating the drums b and b', respectively.

From what has been said it will be seen that by means of my invention the mast of a derrick can be readily and easily turned and the boom carried thereby may be held at any desired point. While I have specified the winch-heads as being so constructed and arranged that as one is having the rope wound thereon the rope is being unwound from the other, yet by so moving the operating-lever F′ and holding it at an intermediate point both winch-heads may be loosened as not to cause the rope-sections to rotate with their respective shafts.

I use the term "winch-head" in this application as a convenient term to designate the winding-drum C, because I employ them for the operation of the bull-wheel rope W in lieu of ordinary winch-heads. I therefore by the use of the term "winch-head" do not limit myself to the form of either of said winding-drums C or to its location upon its shaft relatively to the frame or other parts of the machine.

In the operation of friction-drums of a derrick-engine for hoisting and lowering the load and boom, respectively, it is well known that the operator stands within reach of the handles F^3 at the opposite end of the drums from the winch-heads and that it is necessary for safe and successful operation of said drums that he should remain at that position. Hence the utilization of the winch-heads heretofore for the operation of the bull-wheel rope has required it to be done by another man or men, and it was impossible to control the bull-wheel rope relatively to the boom-hoisting and load-hoisting ropes with that degree of promptness and precision which are desirable for success and safety. By employing the supplemental friction-drums C and C′ as winch-heads and coupling their friction and controlling mechanisms together and combining with them a connection extending to a hand-lever at the opposite end of the drums b b' the operator of the drums b b' may without substantially leaving his position operate the winch-heads of supplemental friction-drums C C′. Therefore my invention puts it in the power of a single operator to control with promptness and precision and safety not merely the ropes for raising and lowering the load and boom, but also the rope for swinging the boom, which, so far as I know, is a result never before accomplished by a derrick-engine.

I claim as my invention—

1. In a derrick, in combination, a mast, a hoisting and swinging boom, a boom-hoisting rope, a load-hoisting rope, a boom-swinging rope, two frame members containing the bearings for rope-drum shafts, a load-hoisting-rope drum and a boom-hoisting-rope drum revolubly mounted between said frame members, a boom-swinging-rope drum revolubly mounted and overhanging outside one of said frame members, a driven friction-clutch for each of said drums and mechanisms whereby all of said friction-clutches may be shifted by the operator.

2. In a derrick, in combination, a mast, a hoisting and swinging boom, a boom-hoisting rope, a load-hoisting rope, a boom-swinging rope, two frame members containing the bearings for rope-drum shafts, a load-hoisting-rope drum and a boom-hoisting-rope drum revolubly mounted between said frame members, a boom-swinging-rope winch-head revolubly mounted and overhanging outside of one of said frame members, a driven friction-clutch for each of said winch-heads and mechanisms whereby all of said friction-clutches may be shifted by the operator.

3. In a derrick, in combination, a mast, a swinging boom, two hoisting-drums whereby the boom and load are respectively hoisted, the two shafts upon which said drums run, an auxiliary friction-drum upon each of said shafts, a rope connection with each of said auxiliary drums whereby the boom is swung in opposite directions, and mechanism whereby the friction is applied to said auxiliary drums alternately, substantially as described.

4. In a derrick, in combination, a mast, a swinging boom, two hoisting-drums whereby the boom and load are respectively hoisted, the two shafts upon which said drums run, an auxiliary friction-drum upon each of said shafts, a rope connection with each of said auxiliary drums whereby the boom is swung in opposite directions, a hand device located adjacent to the opposite ends of said shafts from said auxiliary drums and a connection between said hand device and the friction devices of said auxiliary drums whereby said friction may be applied alternately by the

movement of said hand device, substantially as described.

5. In a derrick, in combination, a mast, a swinging boom, two hoisting-drums whereby the boom and load are respectively hoisted, the two shafts upon which said drums run, an auxiliary friction-drum upon each of said shafts, a rope connection with each of said auxiliary drums whereby the boom is swung in opposite directions; each of said auxiliary friction-drums containing a spool D, a sleeve d^2 fixed to the shaft upon which sleeve said spool rotates, a friction member d' and the cam members f and f' whereby said spool is shoved against said friction member d^2, substantially as described.

6. In a derrick, in combination, the mast, the swinging boom, the bull-wheel, the boom-hoisting rope, the load-hoisting rope, the boom-swinging rope, two shafts, the load-hoisting-rope friction-drum on one shaft, the boom-hoisting-rope friction-drum on the other shaft, a supplemental friction-drum on each shaft, a boom-swinging rope extending around said bull-wheel and having one end connected with each of said supplemental friction-drums and connections whereby the friction mechanism of said supplemental friction-drums is operated inversely, substantially as described.

7. In a derrick, in combination, a mast, a swinging boom, two hoisting-drums whereby the boom and load are respectively hoisted, the drum-shafts working in bearings at opposite ends of the drums and overhanging the bearings at one end, said bearings, two drums revolubly mounted on the overhanging ends of said shafts whereby the boom is swung in opposite directions and friction mechanism whereby said boom-swinging drums are caused to rotate with said shafts alternately, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

SAMUEL MATTSON.

Witnesses:
JOS. W. SIMM,
JOE BURGY.