C. CAMPBELL.

HOISTING ENGINE.

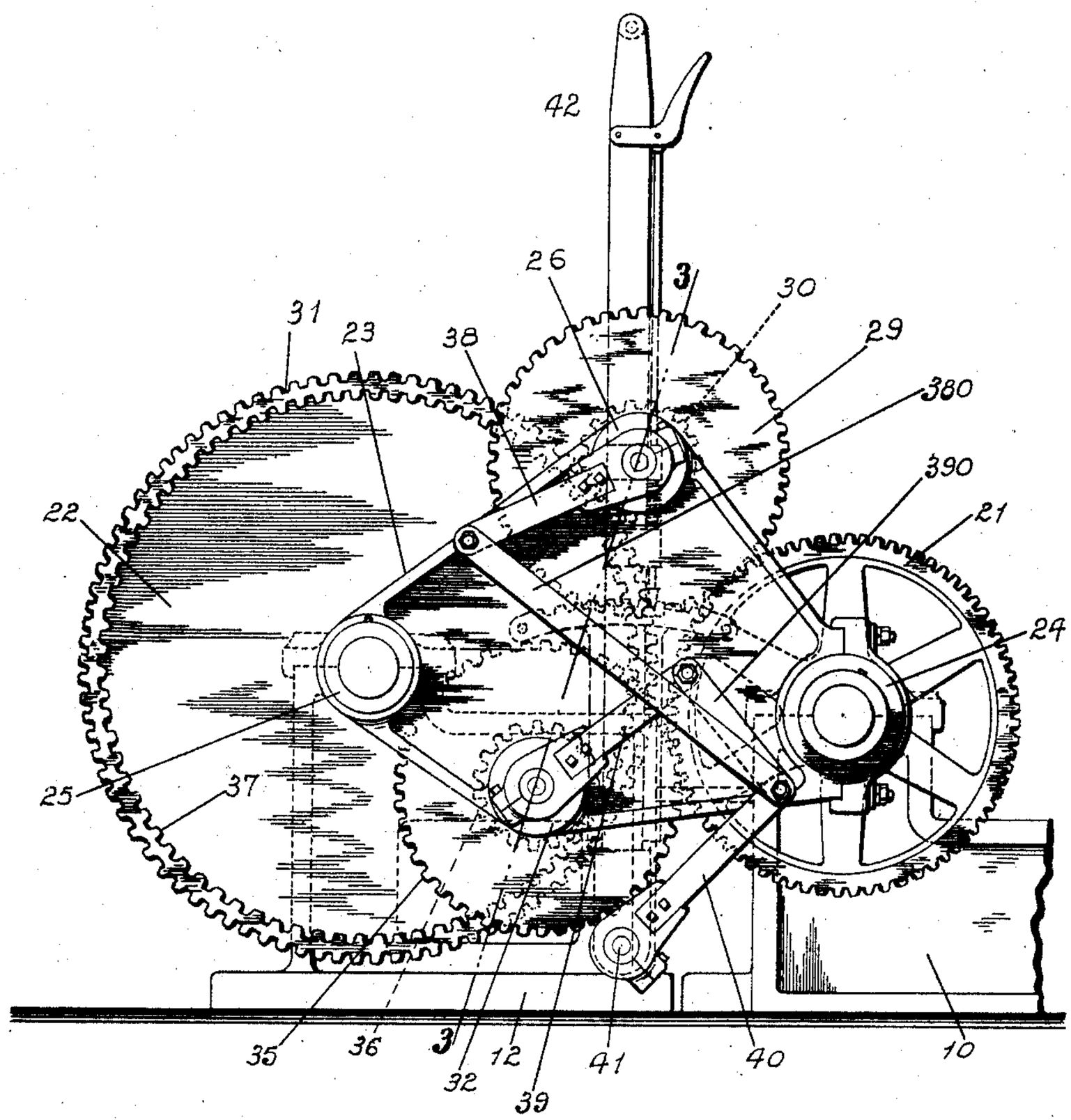
APPLICATION FILED JUNE 11, 1908.

908,948.

Patented Jan. 5, 1909.

3 SHEETS—SHEET 1.

FIG. 1.



WITNESSES

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3 SHEETS—SHEET 2.

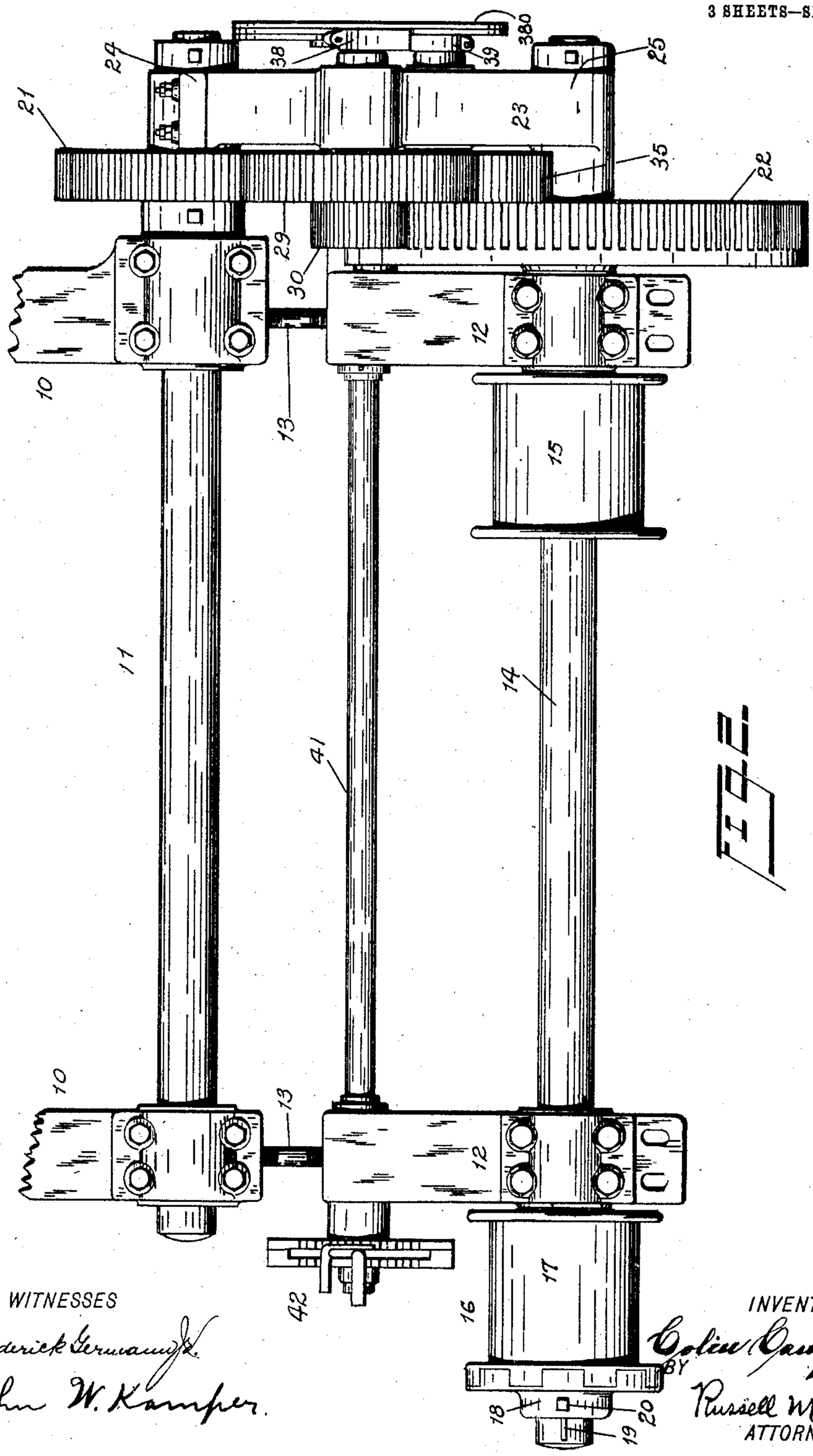

FIG. 2.

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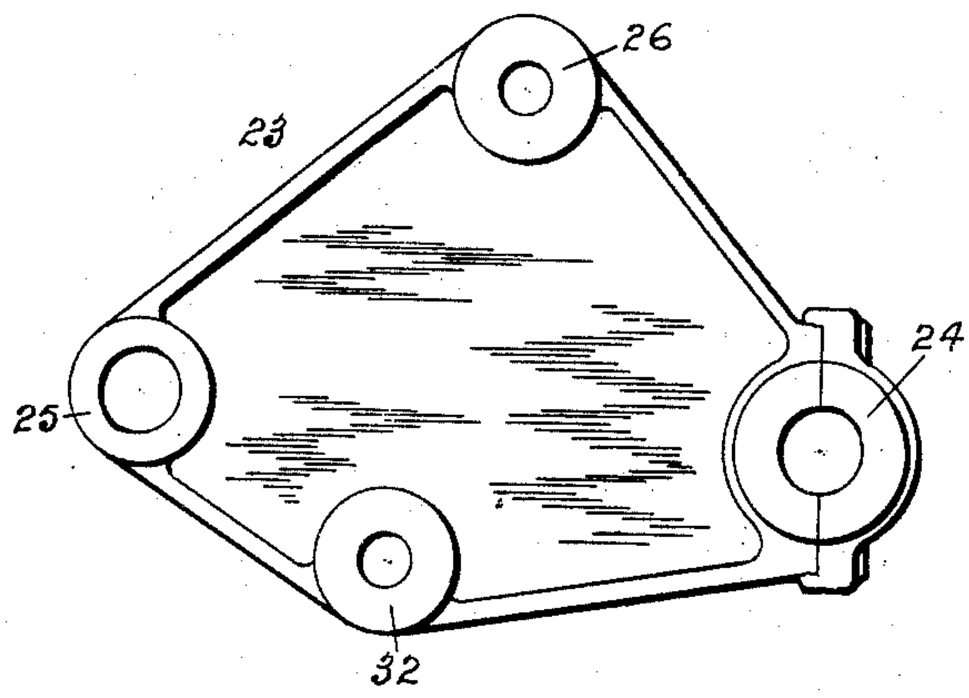

FIG. 4.

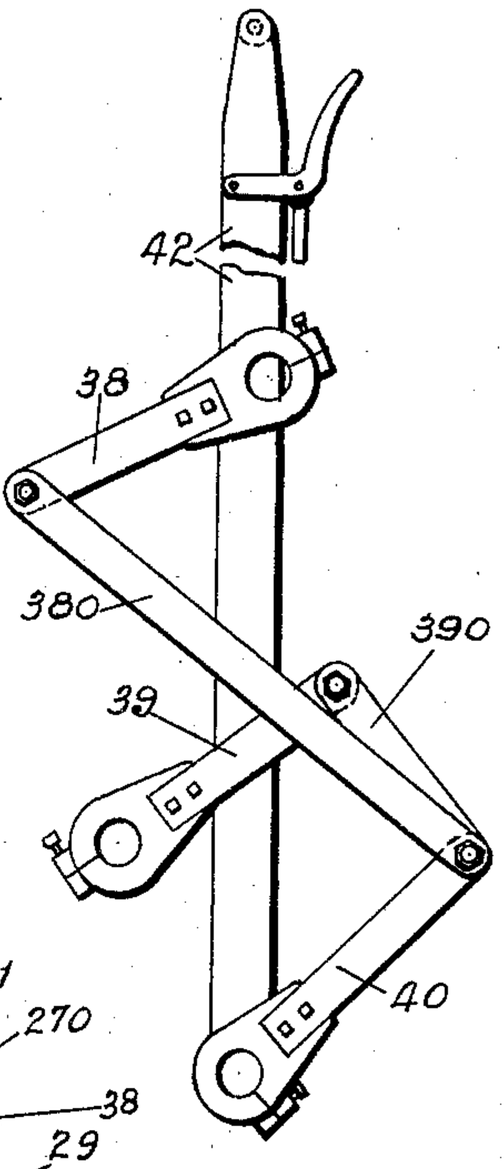

FIG. 5.

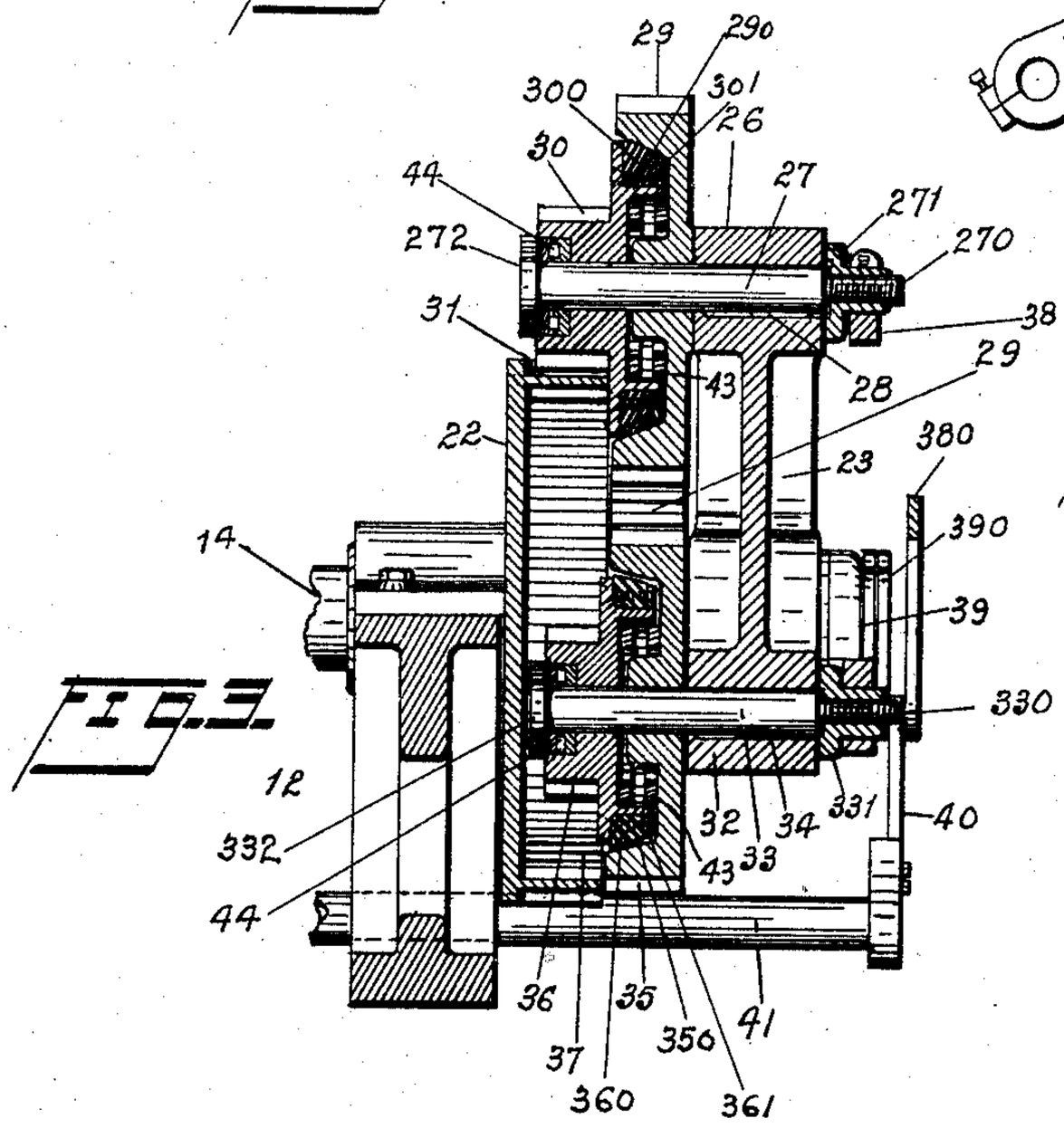

FIG. 3.

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UNITED STATES PATENT OFFICE.

COLIN CAMPBELL, OF NEWARK, NEW JERSEY, ASSIGNOR TO NATIONAL HOISTING ENGINE COMPANY, A CORPORATION OF NEW JERSEY.

HOISTING-ENGINE.

No. 908,948. Specification of Letters Patent. Patented Jan. 5, 1909.

Application filed June 11, 1908. Serial No. 437,803.

To all whom it may concern:

Be it known that I, COLIN CAMPBELL, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain Improvements in Hoisting-Engines, of which the following is a specification.

This invention relates to those means or devices upon a hoisting engine which are commonly known as swing drums and used for turning the bull wheel of a derrick or the like in order to swing the boom in any desired direction, and more particularly the present improvements relate to means for rotating such a swing drum in either direction at the will of the operator and without reversing the engine or drive shaft.

The objects of the invention are to secure in a hoisting engine swing-drum mechanism which shall be simple, strong and efficient; to obtain such a rigid support for the same as will insure its proper action; to provide an improved construction for frictional transmission of motion and power to turn the swing drum in either direction, and to secure other advantages and results as may be brought out in the following description.

Referring to the accompanying drawings, in which like numerals of reference indicate the same parts in the several figures, Figure 1 is a side elevation of a portion of a hoisting engine embodying my improvements, taken from the side of the engine opposite that at which the operator stands; Fig. 2 is a plan of the same; Fig. 3 is a section taken on line 3—3, Fig. 1; Fig. 4 is a view of a certain yoke detached from the machine, and Fig. 5 illustrates the operating levers and their connections detached from the machine.

In said drawings, 10, 10 indicate the side frames of a hoisting engine, having a shaft 11 mounted therein, (hereinafter referred to as the drive shaft), and which projects for a considerable distance outside said side frames at that side of the engine away from the side at which the operator stands, or the right hand side as viewed in Fig. 2. Adjacent to said side frames 10, and in endwise alinement therewith, are auxiliary frames 12, 12, connected to the side frames 10 as by bolts 13 or in any other suitable manner to secure a rigid relation. In said auxiliary frames 12, 12 is journaled the drum shaft 14, which also projects outside the side frames similar to the drive shaft 11, in order to receive certain power transmission means between said shafts as hereinafter described. I have shown the drum shaft 14 provided between the frames 12, 12 with a spool 15 upon which one end of a rope or cable extending around the bull-wheel of a derrick is wound and anchored. The other end of the drum shaft 14 projects outside the side frame 12 and carries another spool 16 upon which the other end of the bull-wheel rope is wound and anchored, and preferably the main portion 17 of this spool is loose upon the shaft and provided at its end with clutch teeth to engage a similarly toothed collar 18 which slides upon a key 19 upon the shaft and is adapted to be clamped in relation thereto by a set screw 20. This is a common and well-known device for enabling the bull-wheel rope to be tightened if it should become slack, and indeed the entire arrangement of two spools upon the shaft 14 is old and well known. Instead of them, a swing-drum of any other ordinary type might be mounted upon the said shaft 14.

It will be understood that the ends of the bull-wheel rope are wound in opposite directions upon the swing-drum, so that as said drum is turned the rope by unwinding at one end and winding up at the other rotates the bull-wheel and turns the derrick to swing its boom. It is to means for transmitting motion from the drive shaft 11, rotating continuously in one direction, to the drum shaft 14 to turn the same in either direction as desired, that this invention is especially directed.

A driving gear 21 is mounted upon the projecting shaft 11, and an internal and external gear wheel 22 upon the projecting end of the swing-drum shaft 14, both said gears being located next the frames 10 and 12. Outside said gears, a yoke 23 extends between the two shafts 11 and 14 being supported thereon by means of bearings 24 and 25 receiving said shafts and in which they may turn. The said yoke is heavy and strong to rigidly support the frictional power transmitting means next to be described, and is shaped to locate said means at the desired points, being preferably somewhat diamond shaped, as shown. An upper

bearing 26 of the yoke receives a stud shaft 27 slidably keyed therein, as at 28, and carrying on its inner end, or end next the frame of the hoisting engine, a gear 29 and pinion 30 having friction clutch means at their adjacent sides. The gear 29 always meshes with the drive gear 21, and the pinion 30 always meshes with the external teeth 31 of the internal and external gear 22 on the drum shaft 14. Similarly, a lower bearing 32 of the yoke receives a stud shaft 33 slidably keyed therein, as at 34, and carrying on its inner end, or end next the frame of the hoisting engine, a gear 35 and pinion 36 having friction clutch means at their adjacent sides. The gear 35 always meshes with the drive gear 21, like the gear 29, and the pinion 36 always meshes with the internal teeth 37 of the internal and external gear 22 on the drum shaft 14. It will be understood, therefore, that when the clutch means of one gear and pinion is tightened motion is transmitted thereto to turn the internal and external gear 22, and its shaft and the swing-drum, in one direction, while when the clutch means of the other gear and pinion is tightened motion is transmitted therethrough to turn the internal and external gear 22, and its shaft and the swing-drum, in the other direction, because of the opposite engagement of the pinion with said internal and external gears. The means employed for thus tightening one clutch means and releasing the other, simultaneously, will next be described.

The outer end of each pin, 27 or 33, is screw-threaded adjacent to the yoke 23, as at 270 or 330, and receives a nut 271 or 331, adapted to tighten against the said yoke. Obviously, when these nuts are tightened, the gear and pinion at the other side of the yoke on each pin will be brought in clutched relation, and when the nuts are loosened, said gear and pinion may be released.

An arm 38 is clamped fast upon the nut 271 of the upper pin 27, and projects radially downward and forward, while a similar arm 39 clamped fast upon the nut 331 of the lower pin 33 extends radially upward and rearward; said arms are thus substantially opposite in direction, as clearly shown in Figs. 1 and 5. Each is connected, by a link, 380 or 390, with a crank arm 40 projecting from a rock shaft 41 suitably journaled in bearings in the side frames of the machine and extending across the same to the operator's side, where said shaft 41 is provided with an operating lever 42 of common and well-known type. It will be seen that according as this lever is swung in one direction or the other, one clutch means or the other will be tightened and the second loosened, so as to transmit motion from the drive gear 21 to turn the internal and external gear 22, and therefore its shaft and the swing drum, in one direction or the other, at will. In an intermediate position of the lever 42, neither clutch means is tightened, and the internal and external gear, with its shaft and swing drum, remains stationary.

While the clutch means employed may be of any suitable construction, I have shown each gear, 29 or 35, provided with a conical chamber, 290 or 350, which receives a beveled friction ring, 300 or 360, of wood or the like, fastened upon the pinion, 30 or 36, by means of a ring, 301 or 361, suitably bolted in place. A stiff spiral spring 43 between each gear and pinion serves to separate the said clutching surfaces thereof when the tightening means is relaxed. Preferably, roller bearings 44 are placed beneath the head, 272 or 332, of each pin, 27 or 33, to reduce the friction of turning of the pinion, 30 or 36, on said pin.

Obviously, since the arms 38 and 39 of the two nuts on the stud shafts project in opposite directions, the threads on said stud shafts are of the same kind or direction each as the other. By making said threads opposite, however, as one right hand and the other left hand, nuts could be provided with arms projecting in the same direction, and such a construction would be considered an equivalent and is intended to be covered by the following claims.

As shown, it will be noted that the gears and pinions on the stud shafts lie between the yoke and the side frame of the engine, and the nuts for operating the friction clutches are on the opposite or outer side of the yoke. This is the preferred construction, but it will be apparent that such details could be modified at will without departing from the spirit and scope of the invention as claimed.

Having thus described the invention, what I claim as new is:

1. In a hoisting engine, the combination with parallel side frames, of a drive shaft and a swing-drum shaft, both journaled in said side frames and projecting outside the same, a yoke mounted upon and extending between the said projecting ends of said shafts, a driving gear on one of said shafts, an internal and external gear on the other shaft, stud shafts mounted in said yoke, pinions on said stud shafts engaging opposite surfaces of said internal and external gear, gears on said stud shafts engaging the said driving gear, and means for connecting or disconnecting each pinion and gear on the same stud shaft to transmit motion from one to the other or to cause one to turn independent of the other.

2. In a hoisting engine, the combination with parallel side frames, of a drive shaft

and a swing-drum shaft, both journaled in said side frames and projecting outside the same, a yoke mounted upon and extending between the said projecting ends of said shafts, stud shafts extending through said yoke, a driving gear on the drive shaft, an internal and external gear on the swing-drum shaft, pinions on the stud shaft engaging opposite surfaces on said internal and external gear, gears on said stud shafts engaging the said driving gear, all said gears and pinions being located between the yoke and side frame of the engine and each gear and pinion on the same stud shaft providing friction clutch members at their adjacent surfaces, and means at the outside of said yoke for tightening or loosening said clutch members.

3. The combination with two shafts, of a yoke extending between said shafts, a driving gear on one of said shafts, an internal and external gear on the other shaft, stud shafts mounted in said yoke, pinions on said stud shafts engaging opposite surfaces of said internal and external gear, gears on said stud shafts engaging the said driving gear, and means for connecting or disconnecting each pinion and gear on the same stud shaft to transmit motion from one to the other or to cause one to turn independent of the other.

4. The combination with two shafts, of a yoke providing bearings for said shafts and extending therebetween, a driving gear on one of said shafts, an internal and external gear on the other shaft, stud shafts mounted in said yoke to slide without turning and being screw-threaded at one end and headed at the other, pinions on said stud shafts engaging opposite surfaces of said internal and external gear, gears on said stud shafts engaging the said driving gear, each gear and pinion on the same stud shaft providing friction clutch members at their adjacent surfaces, nuts on the screw-threaded ends of said stud shafts, and means for turning said nuts in unison to tighten the said clutch members on one stud shaft and loosen those on the other.

5. The combination with two shafts, of a yoke providing bearings for said shafts and extending therebetween, a driving gear on one of said shafts, an internal and external gear on the other shaft, stud shafts mounted in said yoke to slide longitudinally and being headed at one side of said yoke, pinions on said stud shafts engaging opposite surfaces of said internal and external gear, gears on said stud shafts engaging the said driving gear, said gears and pinions on the stud shafts being between the yoke and heads of said shafts and each gear and pinion on the same stud shaft providing friction clutch members at their adjacent surfaces, and means engaging the said stud shafts on the opposite side of the yoke from their heads for tightening or loosening said clutch members.

6. The combination with two shafts, of a yoke providing bearings for said shafts and extending therebetween a driving gear on one of said shafts, an internal and external gear on the other shaft, stud shafts mounted in said yoke to slide longitudinally and having stops, pinions on said stud shafts engaging opposite surfaces of said internal and external gear, gears on said stud shafts engaging the said driving gear, each gear and pinion on the same stud shaft having friction clutch members at their adjacent surfaces, and means engaging each shaft on the opposite side of its gear and pinion from the said stop for sliding said shaft longitudinally.

7. The combination with two shafts, of a yoke providing bearings for said shafts and extending therebetween, a driving gear on one of said shafts an internal and external gear on the other shaft, stud shafts mounted in said yoke, pinions on said stud shafts engaging opposite surfaces of said internal and external gear, gears on said stud shafts engaging the said driving gear, each gear and pinion on the same stud shaft forming friction clutch members at their adjacent surfaces, and means for simultaneously moving the said friction clutch members on one stud shaft into engagement and those of the other stud shaft out of engagement.

8. The combination with two shafts, of a yoke providing bearings for said shafts and extending therebetween, a driving gear on one of said shafts, an internal and external gear on the other shaft, stud shafts mounted in said yoke to slide without turning and having screw-threaded portions, pinions on said stud shafts engaging opposite surfaces of said external and internal gear, gears on said stud shafts engaging with said driving gear, each gear and pinion of the same stud shaft providing friction clutch members at their adjacent surfaces, nuts on the said screw-threaded portions of the stud shafts, arms projecting from said nuts in opposite directions, a movable operating member, and links connecting said arms to said operating member.

9. The combination with two shafts, of a yoke providing bearings for said shafts and extending therebetween, a driving gear on one of said shafts, an internal and external gear on the other shaft, stud shafts mounted in said yoke to slide without turning and having screw-threaded portions, pinions on said stud shafts engaging opposite surfaces of said external and internal gear, gears on said stud shafts engaging

with said driving gear, each gear and pinion of the same stud shaft providing friction clutch members at their adjacent surfaces, nuts on the said screw-threaded portions of the stud shafts, arms projecting from said nuts in opposite directions, a rock shaft, an operating lever for turning said rock shaft, an arm fast on said rock shaft, and links connecting said rock shaft arm to the said arms of the nuts on the stud shafts.

COLIN CAMPBELL.

In the presence of—
BERTHA S. FULTON,
ETHEL B. REED.