

No. 742,539.

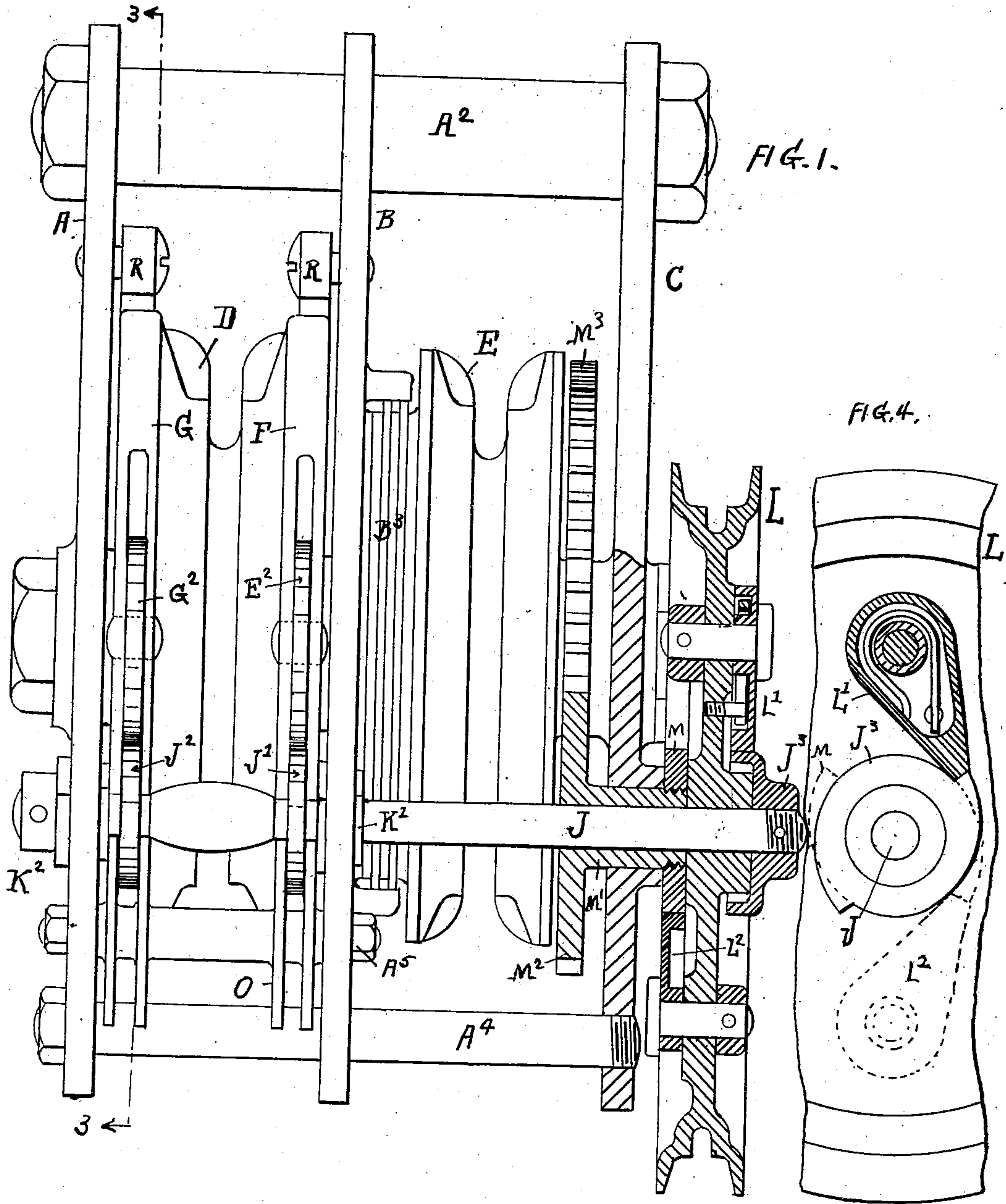
PATENTED OCT. 27, 1903.

T. A. WESTON.
CHAIN HOIST.

APPLICATION FILED FEB. 7, 1903.

NO MODEL.

3 SHEETS--SHEET 1.



WITNESSES:

F. W. Wright
E. W. Collins

INVENTOR

THOMAS A. WESTON.

BY

Howson and Howson
HIS ATTORNEYS

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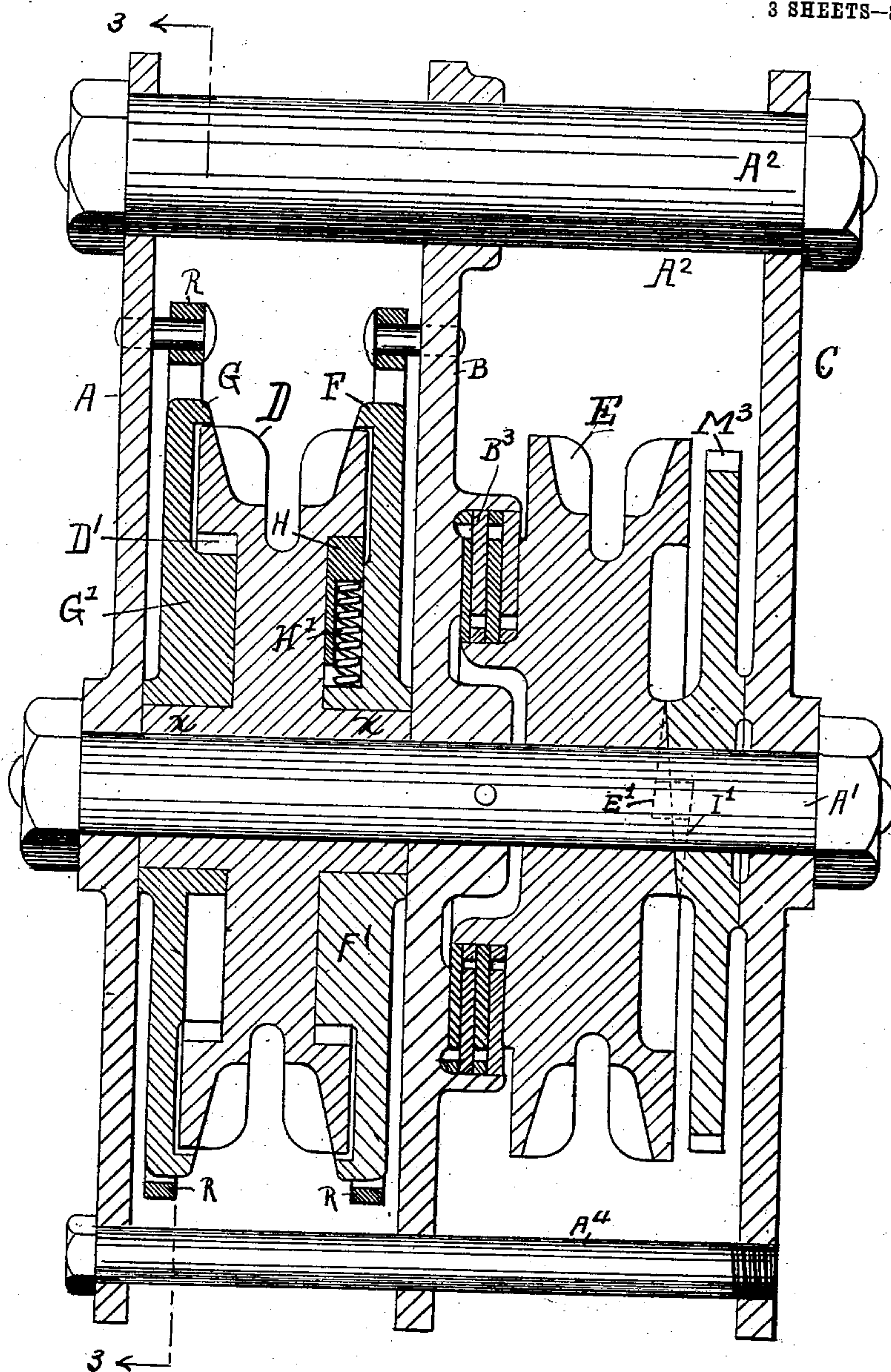
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FIG. 2.



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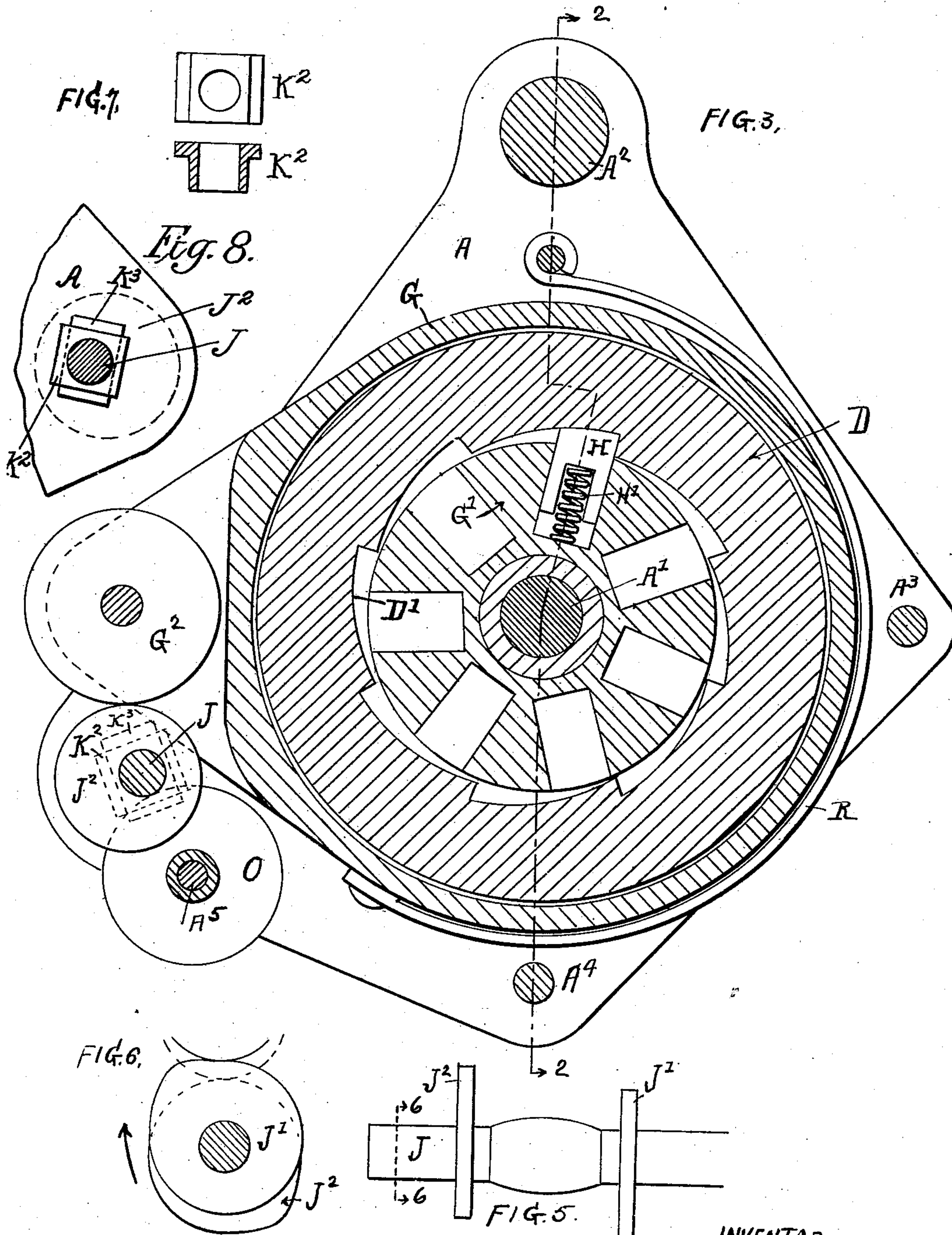
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UNITED STATES PATENT OFFICE.

THOMAS A. WESTON, OF ARDEN, NORTH CAROLINA.

CHAIN HOIST.

SPECIFICATION forming part of Letters Patent No. 742,539, dated October 27, 1903.

Application filed February 7, 1903. Serial No. 142,357. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. WESTON, a citizen of the United States of America, residing in Arden, in the county of Buncombe, in the State of North Carolina, have invented Improvements in Chain Hoists, of which the following is a specification.

The object of this invention is to improve the construction of differential chain hoists, such as shown in the printed specification of my British Patent No. 8,563 of 1895, to adapt them to heavier loads, and secure simplicity of construction. This I accomplish in the manner which I will now describe.

In the accompanying drawings, Figure 1 is a front elevation having the sprocket-driving sheave and allied parts in section. Fig. 2 is a vertical section on line 2 2, Fig. 3. Fig. 3 is a transverse vertical section on the line 3 3, Figs. 1 and 2. Fig. 4 is a segment of the sprocket-driving sheave, partly sectional. Fig. 5 is a detail in elevation of the cam-shaft and cams. Fig. 6 is a sectional view on line 6 6, Fig. 5. Fig. 7 is a journal-box in plan and section. Fig. 8 is a further view of the journal-box.

A B C are the three frame-plates, united centrally by the fixed shaft A' and likewise by the suspension cross-head A². A³ A⁴ A⁵ are smaller fixed stays. The latter, A⁵, also serves as the supporting-axle of the friction-spool O.

D is the lifting-sheave; E, the lowering-sheave, upon the toothed rims of which is placed the endless lifting-chain in two depending loops, as shown in the aforesaid British patent.

L is the chain-sprocket-driving wheel. Its shaft J carries at its farther end the cams J' J², whereby the lever ends, through their rollers E² G², are alternately lifted. The levers F G thus effect continuous rotation on the lifting-sheave for raising a load, as explained hereinafter. The reverse rotary driving of the wheel L and shaft J leaves the cams and levers at rest, but rotates the lowering devices of the sheave E, lowering the load so long as the said reverse motion is maintained.

The sheave D, mounted on the shaft A', has projecting hubs *xx* on both sides. On these hubs levers G' F' are mounted. These levers have projecting hubs G' F' centrally bored,

so as to fit nicely over the hubs *xx* of the sheave. These hubs G' F' have radial slots containing pawls H and actuating-springs H'. The pawls take into ratchet-teeth D', formed on the inner portion of the sheave D. (See Figs. 2 and 3.) I have shown the hubs or central portions F' G' of the levers F G as each carrying in radial slots seven sliding pawls H, with contained springs H'. Said pawls engage successively with the eight annularly-disposed teeth D' on each side recess of the sheave D. This arrangement of pawls and teeth affords in this example fifty-six engagements to a revolution for each annulus of ratchet-teeth. Within the outer ends of the levers are rollers E² G² in contact with the cams J' J². The lift or throw of the said cams is such as to lift each lever alternately through an arc equal to the one fifty-sixth part of a revolution. Each cam at the beginning of its lift is caused by its peculiarly-increasing radius (shown in Fig. 6) to pick up the load from the other cam before said other cam has ceased to lift its lever. This other cam shortly afterward finishes the remaining small distance of its lifting motion unloaded. By this peculiar relationship of the cams a perfectly-continuous rotation is given to the sheave D, though with a minute increment of angular velocity at the moment when the one cam takes the load from the other. Continuous hoisting is thus secured without backlash.

R is a recoil-spring secured to each lever and to the frame-plates A B to insure the return of the levers.

The cam-shaft J is supported at its cam end by the friction roller or spool O, which has parallel flanges at each end, the space between them receiving the cams and affording a roller-bearing to the shaft close to the cam on both sides thereof. To allow the whole load upon the cams and shaft J to rest on the spool O, that end of the shaft J has floating journal-boxes K' K², held and guided within nearly vertical slots K³ in the frame-plates A B. The spool O turns freely upon the stay A⁵.

J³ is a retaining-collar secured to the shaft J at its outer end, its flange forming a two-toothed ratchet-wheel for the pawl L' to drive when hoisting. L² is a similar pawl on the

inner side of the driving-sheave L, whereby to drive the lowering-gear through the ratchet-wheel M, secured to sleeve M' and pinion M², whereby the latter gears with gear M³, which carries on its inner face the helical boss or incline I'. The coacting helix or incline E' is formed on the adjacent boss of the lowering-sheave E, while friction-disks B³ between the lowering-wheel E and frame-plate B supply the friction in the manner indicated in my British Patent No. 8,563 of 1895.

Without additional parts any desired greater purchase or velocity ratio can be given to my improved lever-driving device by varying the numbers of the differential pawls and teeth and making the cams of corresponding throw or lift, thus adapting my improved portable hoist to the heaviest loads without adding more parts. Any safely rapid speed of lowering desired can be effected in an equally simple manner by the adequate relative diameters being given to the spur-pinion and wheel of the lowering-gear. A slow and powerful hoisting purchase is thus compatible with rapid lowering, both motions controlled by the one driving-sheave and its hand-chain.

Although sliding pawls are shown at the lever centers, it is obvious that pivoted pawls, as upon the driving-wheel L, may be employed without departing from this invention.

I claim as my invention—

1. A hoist having a lifting-sheave and a lowering-sheave, pivoted levers to operate the lifting-sheave, and a common driving-shaft to operate the said levers and also the lowering-sheave.

2. A hoist having a lifting-sheave, a shaft for operating it, roller-bearings for said shaft and sliding journal-boxes therefor.

3. A hoist having a lever-driven lifting-sheave and driving-cams adapted to impart an unintermittent rotation to said lifting-sheave.

4. A hoist having a lifting-sheave, and a lever therefor, annularly-disposed ratchet-teeth and pawls to take into the teeth, to operate the sheave, frame-plates wherein the sheave is rotatably mounted, a cam-shaft mounted in said frame-plates and adapted to operate the lever, said shaft mounted in sliding journal-boxes, and a rotatable spool mounted between the frame-plates having flanges resting against the cam-shaft, and friction devices for lowering, substantially as described.

5. A hoist having a lifting and a lowering sheave, frame-plates, a common stay on which both sheaves are mounted, and operating levers and ratchets and pawls for the hoisting-sheave, and a common operating-shaft adapted to operate and control both the hoisting and lowering sheaves.

6. A hoist having frame-plates, a common stay therefor, a lowering-sheave, friction means and controlling means therefor mounted on the common stay on one side of a central frame-plate, a hoisting-sheave mounted on the common shaft on the other side of said central plate, ratchets and levers to operate said hoisting-sheave, cams to operate the levers, a cam-shaft therefor mounted in said frame-plates and operating means for the cam-shaft, substantially as described.

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

THOMAS A. WESTON.

Witnesses:

HUBERT HOWSON,
F. WARREN WRIGHT.