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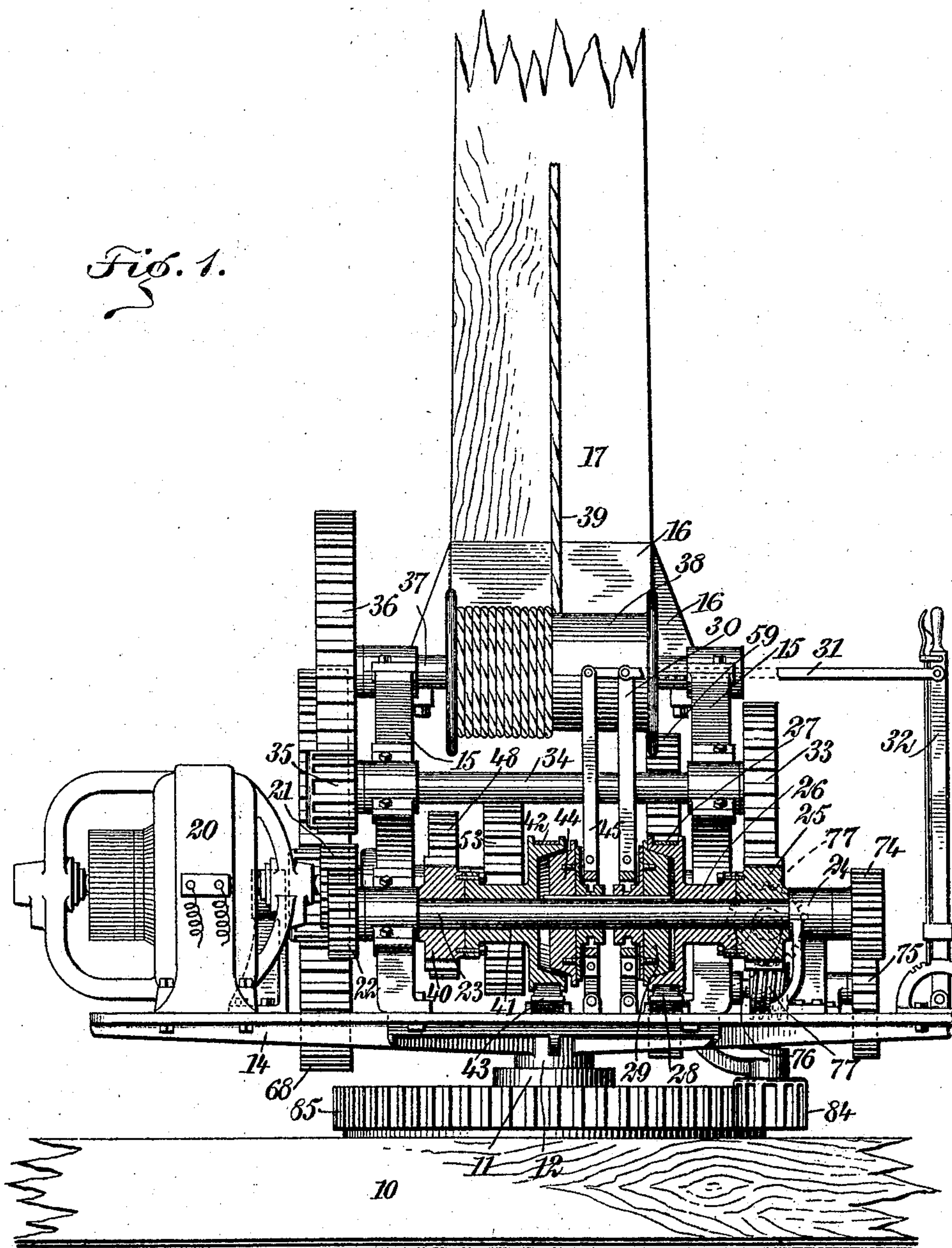
PATENTED NOV. 28, 1905.

E. A. SOHN.
DERRICK.

APPLICATION FILED MAY 11, 1905.

4 SHEETS—SHEET 1.

Fig. 1.



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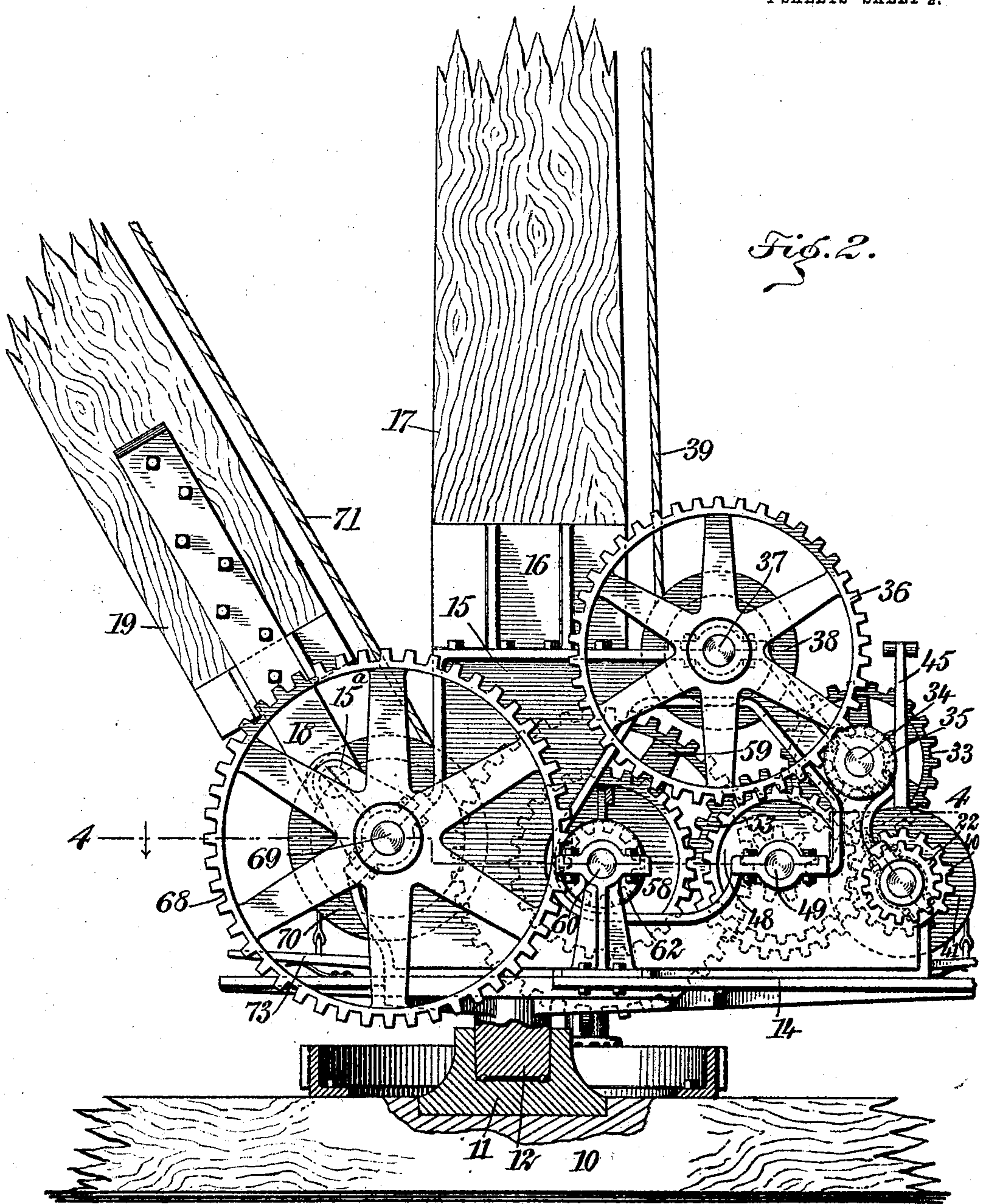
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4 SHEETS—SHEET 2.



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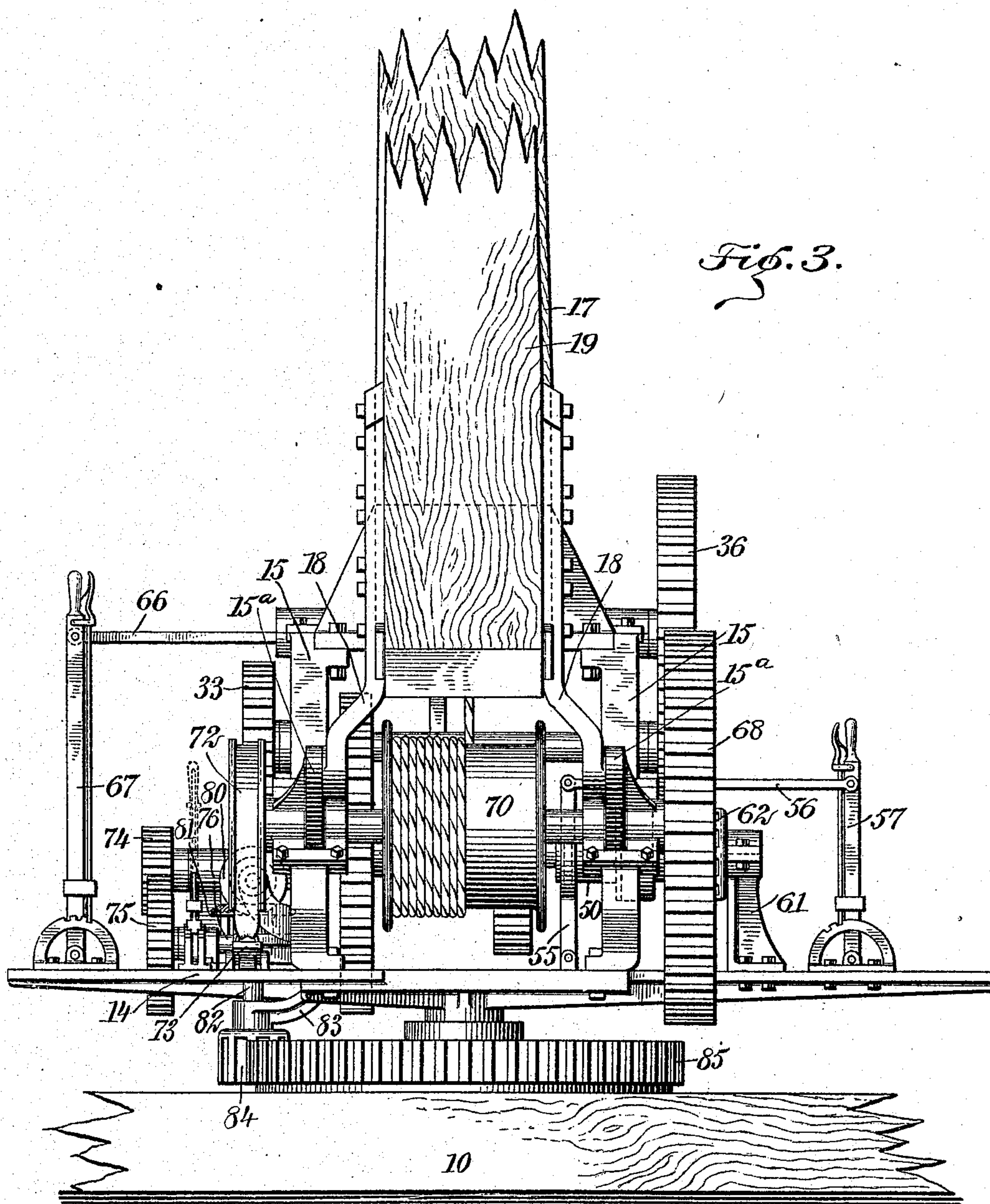
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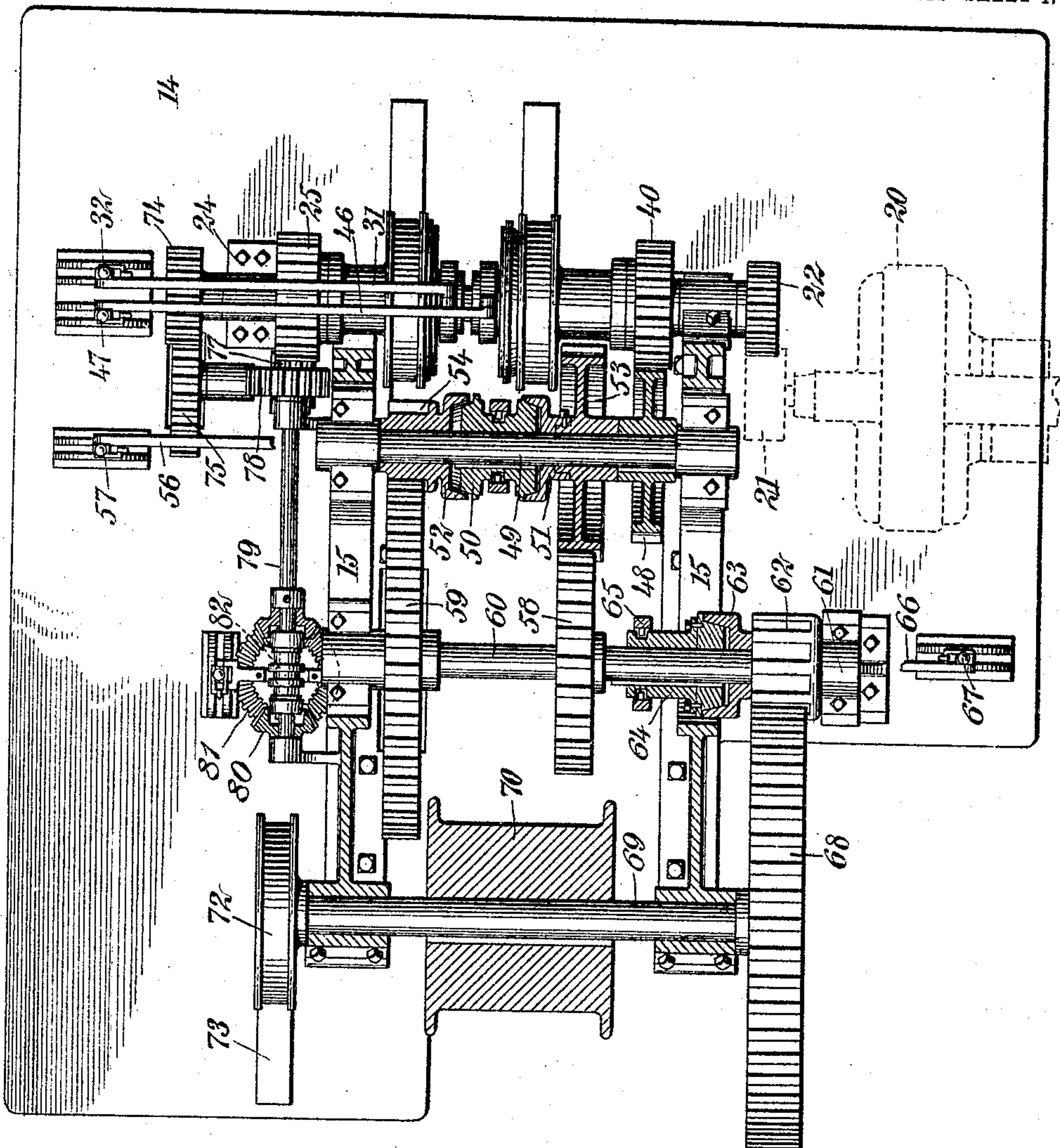


Fig. 4.

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UNITED STATES PATENT OFFICE.

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DERRICK.

No. 805,889.

Specification of Letters Patent.

Patented Nov. 28, 1905.

Application filed May 11, 1905. Serial No. 259,893.

To all whom it may concern:

Be it known that I, EDWARD A. SOHN, a citizen of the United States, and a resident of Bedford, in the county of Lawrence and State of Indiana, have invented a new and Improved Derrick, of which the following is a full, clear, and exact description.

The invention relates particularly to a derrick involving a mast and boom arranged to turn bodily, so that the load may be lifted from and deposited at any point within the radius of the boom of the derrick.

The object of the invention is to provide such an apparatus in which the source of motive power, the drums, and all of the gearing are connected with the derrick as an integral part and all arranged to turn with the boom and mast, producing thereby a self-contained derrick and avoiding the usual practice of leading the boom and fall lines from the derrick to a power-house located at some more or less distant point from the derrick.

The invention involves certain special features of construction and relative arrangement of parts, all of which will be set forth hereinafter, and particularly pointed out in the claims.

Reference is to be had to the accompanying drawings, which illustrate, as an example, the preferred embodiment of the invention, in which drawings like characters of reference indicate like parts in the several views, and in which—

Figure 1 is a rear elevation showing the motor, the gearing partly in section, and the foundation on which the derrick is mounted and the lower part of the mast of the derrick. Fig. 2 is a side elevation with the step-bearing of the derrick in section, this view showing the lower part of the mast and lower part of the boom. Fig. 3 is a front elevation of the derrick, and Fig. 4 is a sectional plan on the line 4 4 of Fig. 2.

10 indicates the foundation or body on which the derrick is placed. As shown best in Fig. 2, this is provided with a suitable step-bearing 11, in which is received a center stud 12, fastened to and projecting from the lower side of the table 14 of the derrick. On said table is arranged a suitable framing which is preferably formed of side sections 15, carrying a step 16 for the mast 17. Said side sections 15 of the frame have projecting lugs 15^a, (see Figs. 2 and 3,) to which the jaws 18 of the

boom 19 are pivoted, so as to allow the boom to swing from vertical position alongside of the mast downwardly into essentially horizontal position. The mast is intended to be braced or guyed at its upper end in the usual manner, and the device for effecting this result is not illustrated. It will be observed, therefore, that the table 14, with its connected mast and boom, is free to turn around the center of the stud 11, and this table carries the motor and the gearing incident thereto, as will now be described.

The motor 20 is preferably electrical and is indicated by full lines in Fig. 1 and broken lines in Fig. 4; it being mounted on the table 14, as shown. On the armature-shaft of the motor is carried a pinion 21, (see full lines in Fig. 1 and broken lines in Fig. 4,) and this pinion is in mesh with a pinion 22, fast on the main driving-shaft 23. This shaft extends horizontally over the table and is suitably mounted in one of the side portions 15 of the frame at one end of the shaft and in a pedestal 24 at the other end of the shaft, which pedestal rises from the table 14. In this manner the main shaft 23 is continuously driven during the operation of the motor.

Mounted loosely on the shaft 23 is a pinion 25, which is attached to a clutch member 26, also loose on the shaft. Said clutch member is provided with a brake-band 27, encircling the periphery of the clutch member, and said brake-band is actuated by a foot-lever 28. Splined on the shaft 23 is a clutch member 29, which coacts with the clutch member 26 to connect said clutch member 26 and the gear 25 with the shaft 23. The clutch member 29 may be operated to engage and disengage the member 26 by any desired means—for example, by means of a forked lever 30, connected by a link 31 with a hand-lever 32. Meshed with the pinion 25 is a spur-gear 33, which is fastened on a counter-shaft 34, suitably mounted in the side portion 15 of the frame. Said counter-shaft carries at the end opposite the gear 33 a pinion 35, and this is in mesh with a spur-gear 36 on the shaft 37 of a boom-fall-line drum 38. 39 indicates the boom-fall line, which passes from the drum 38 up along the mast and which is rove over suitable pulleys on the mast and boom, so that by hauling in on the drum 38 the boom may be raised and by permitting the drum to unwind the fall the boom may be dropped. The

shaft 23 also carries loosely a pinion 40, which is fastened to a clutch member 41, similar to the clutch member 26.

42 indicates a brake-strap coacting with the outer periphery of the clutch member 41, and 43 indicates a foot-lever for actuating the brake.

Splined on the shaft 23 is a clutch member 44, coacting with the member 41 and provided with any suitable means for actuating it—for example, a lever 45, connected by a link 46 (see Fig. 4) with a hand-lever 47. By operating the clutch member 44 the gear 23 may be connected with or disconnected from the main driving-shaft.

The gear 40 is in mesh with a gear 48, which is loose on a counter-shaft 49, suitably mounted in the side portion 15 of the frame of the derrick. This counter-shaft 49 is located below, but essentially parallel with, the counter-shaft 34, before described. (See Fig. 2.) Splined on the counter-shaft 49 is a double-faced clutch member 50, which coacts with the two clutch members 51 and 52. These clutch members are loose on the shaft 49 and respectively carry a large gear 53 and a small gear 54. Any desired means may be provided for shifting said clutch member 50—for example, a lever 55, (see Fig. 3,) connected by a link 56 with a hand-lever 57. By so shifting the clutch member either one or the other of the gears 53 or 54 may be rendered fast on the counter-shaft 49, which shaft is driven from the main shaft 23, subject to the action of the clutches 41 and 44, before described. The gears 53 and 54 are in mesh with gears 58 and 59, which are fastened on a shaft 60, extending across the frame and having one end carried in one side part 15 thereof and the other end in a pedestal-bearing 61, which rises from the table 14. It will be seen that according to the position of the clutch member 50 the shaft 60 will be driven from the shaft 49 at a high or low speed, owing to the different ratio of the gears 54 and 59 and 53 and 58. A pinion 62 is loose on the shaft 60 and has a clutch member 63 connected therewith. Coacting with this clutch member is a clutch member 64, which is splined on the shaft 60. The clutch member 64 is operated to engage or disengage the clutch member 63, rendering the pinion 62 fast or loose on the shaft 60, as desired, and this clutch member 64 may be operated by a gear of any desired sort—for example, a forked lever 65, connected by a link 66 with a hand-lever 67. The pinion 62 meshes with a spur 68, fastened on the shaft 69 of the fall-block-line drum 70. In Fig. 2, 71 indicates said line, which operates the tackle at the end of the boom for raising and lowering the load. It will be observed that this drum 70 may by the operation of the clutch 50 be driven at either one of two speeds and that by the operation of the clutch member 64 the gear 62 may be discon-

nected from the shaft 60, so as to render the drum 70 free and permit the load to be dropped at will. The shaft 69 of the drum 70 carries a brake-wheel 72, through which a suitable strap and foot-lever 73 operate, permitting the drum 70 to be controlled at all times.

The main driving-shaft 23 carries at the end opposite the motor 20 a gear 74, which is in mesh with a gear 75, carried on a short horizontal shaft 76. (See Fig. 1.) This shaft 76 has a worm 77 attached thereto, (see Figs. 1 and 4,) and the worm 77 is in mesh with a worm-wheel 78. The worm-wheel is carried on a revoluble shaft 79, extending along one side portion 15 of the frame. This shaft 79 is provided with two loosely-mounted bevel-gears 80, meshed with opposite sides of a gear 81, which last-named gear is keyed to the upper end of the shaft 82.

80^a indicates double friction member splined to the shaft 79 and movable by any suitable device to engage either of the gears 80, thus fixing one or the other to the shaft.

The shaft 82 is revolubly mounted in a bracket 83, depending from the table 14, (see Fig. 3,) and carries at its lower end a pinion 84, which meshes with a gear-ring 85, fastened to the bed or foundation 10, on which the derrick is mounted. In this manner by shifting the gears 80 to fasten one or the other of said gears to engage the shaft 79 the shaft 82 may be revolved in either direction and the pinion 84 caused to climb around the gear-ring 85, revolving the table 14 bodily with all of its attachments in either direction.

In the operation of the derrick the operator or operators stand on the platform and control the motor and the various clutches and brakes by the hand and foot levers provided therefor, and in this way the boom may be raised or lowered and the hoisting or fall rope 71 wound or unwound from the drum 70 at will, and the entire derrick may be swung bodily around the center pin or stud 12, so as to take the load from or deposit the load at any desired point. It will be seen that this arrangement provides a self-contained derrick which obviates the necessity of separate gangs of men to operate the derrick and hoisting-machine in the power-house, as heretofore commonly employed. It brings together in close juxtaposition all of the controlling elements and very materially reduces the labor involved.

While I prefer the motor 20 to be electrical, it is clear that steam or other power may be employed, if desired.

Having thus described the preferred form of my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a framing mounted to turn, a motor carried thereby, a main shaft driven from the motor, a counter-shaft, a variable-speed connection between the main shaft and the counter-shaft, a hoisting means, a

gear connection between the counter-shaft and the hoisting means, and a clutch for controlling the said connection.

2. The combination with the framing mounted to turn, of a motor carried thereby, a main shaft driven from the motor, a counter-shaft, a plurality of trains of gearing connecting the main shaft and the counter-shaft, means whereby to connect the counter-shaft to either train of gearing, a hoisting means, a gear connection between the counter-shaft and the hoisting means and a clutch for controlling the said connection.

3. The combination with the framing mounted to turn, of a motor carried thereby, a main shaft driven from the motor, a counter-shaft, a plurality of pinions having different diameters on the main shaft, a plurality of pinions having different diameters loosely mounted on the counter-shaft and meshing with the pinions on the main shaft, means whereby to connect the counter-shaft with either of the pinions thereon, a hoisting means, a gear connection between the counter-shaft and the hoisting means and a clutch for controlling the said connection.

4. The combination of a framing, means for mounting the same to turn, a mast-step supported by the framing, a mast carried in said step, a boom having jaws pivotally connected with the framing to permit the boom to swing, a boom-line drum mounted on the framing at the heel of the mast, a hoisting-line drum mounted on the framing between the jaws of the boom, a motor supported by the framing, a main shaft driven by the motor, means operated by said shaft for turning the framing and its attachments, and two trains of gearing connecting the said shaft with the said drums, each train of gearing including a controlling or clutch means.

5. The combination of a framing mounted to turn, a hoisting means mounted thereon, a main shaft connected with the hoisting means to drive the same, a motor adapted to drive the main shaft, a second shaft supported on the framing, gearing connecting the main and the second shafts, a third shaft mounted on the framing and having a worm-and-gear connection with the second shaft, a fourth shaft carried vertically on the framing, a friction-gearing connecting the fourth shaft and the third shaft, a gear attached to the fourth shaft, and a stationary gearing in mesh with said gear for the purpose specified.

6. The combination of a framing mounted to turn, a motor mounted thereon, a shaft driven from the motor, a hoisting means driven from the shaft, a second shaft carried by the framing, gearing connecting the two shafts, a third shaft carried by the framing, a worm and worm-wheel connecting the second and third shafts, a fourth shaft mounted vertically in the framing, friction-gearing connecting the third and fourth shafts, a pinion

carried by the fourth shaft, and a stationary gear with which the pinion is meshed.

7. The combination of a framing, means for revolubly mounting the same, a hoisting means carried by the framing, a motor also carried by the framing, a shaft driven from the motor and having connection with the hoisting means, a stationary gear, a pinion meshing with the gear, a shaft carried by the framing and having the pinion attached thereto, a second shaft, a worm and gear for driving said second shaft from the main shaft and a reversible friction-gearing connecting said second shaft with the first shaft.

8. The combination of a framing, means for mounting the same to turn, two hoisting-drums carried thereon, a main driving-shaft carried by the framing, means for driving said shaft, two gears loose on the shaft, two clutch members respectively connected with said gears, clutch members splined on the shaft and coacting with the first-named clutch members whereby either of said gears may be fastened to the shaft, and devices connecting said gears respectively with the hoisting-drums.

9. The combination of a framing, means for mounting the same to turn, a main driving-shaft carried by the framing, controllable means driven from said shaft for turning the framing, means for driving the main driving-shaft, a hoisting-drum carried on the framing, a counter-shaft also carried on the framing, gearing connecting said drum and counter-shaft, an additional gear on the counter-shaft, a gear meshed with the additional gear and loose on the driving-shaft, a clutch member mounted loose on the driving-shaft and connected with the gear thereon, and a clutch member splined on the driving-shaft and coacting with the first-named clutch member.

10. The combination of a framing, means for mounting the same to turn, a main driving-shaft carried by the framing, controllable means driven from said shaft for turning the framing, means for driving the main driving-shaft, a hoisting-drum carried on the framing, a counter-shaft also carried on the framing, gearing connecting said drum and counter-shaft, an additional gear on the counter-shaft, a gear meshed with the additional gear and loose on the driving-shaft, a clutch member mounted loose on the driving-shaft and connected with the gear thereon, a clutch member splined on the driving-shaft and coacting with the first-named clutch member, a brake-band coacting with the first-named clutch member, and a means for operating said brake-band.

11. The combination of a framing, means for mounting the same to turn, a main driving-shaft carried by the framing, controllable means driven from said shaft for turning the framing, means for driving the main driving-shaft, a hoisting-drum carried on the framing,

a counter-shaft also carried on the framing, gearing connecting said drum and counter-shaft, an additional gear on the counter-shaft, a gear meshed with the additional gear and
 5 loose on the driving-shaft, a clutch member mounted loose on the driving-shaft and connected with the gear thereon, a clutch member splined on the driving-shaft and coacting with the first-named clutch member, and a
 10 brake coacting with the first-named clutch member.

12. The combination of a framing, means for mounting the same to turn, a main driving-shaft mounted on the framing, controllable
 15 means mounted on said shaft for turning the framing, means for driving the main shaft, a gear loose on the main shaft, a clutch member connected with said gear, a second clutch member splined on the main shaft and coact-
 20 ing with the first-named clutch member, a counter-shaft, a gear fast thereon and meshed with the gear on the main shaft, a second counter-shaft, means for driving the second counter-shaft from the first counter-shaft at
 25 variable speed, a hoisting-drum, and means for driving the same from the second counter-shaft.

13. The combination of a framing, means for mounting the same to turn, a main driving-shaft mounted on the framing, controllable
 30 means mounted on said shaft for turning the framing, means for driving the main shaft, a gear loose on the main shaft, a clutch member connected with said gear, a second clutch member splined on the main shaft and coact-
 35 ing with the first-named clutch member, a counter-shaft, a gear fast thereon and meshed with the gear on the main shaft, a second counter-shaft, means for driving the second counter-shaft from the first counter-shaft at
 40 variable speed, a hoisting-drum, means for driving the same from the second counter-shaft, said means for driving the second counter-shaft from the first counter-shaft compris-
 45 ing two unlike gears loose on the first counter-shaft, means for fastening either gear to said shaft, and unlike gears attached to the second counter-shaft and respectively meshed with the gears on the first counter-shaft.

50 14. The combination of a framing, means for mounting the same to turn, a main driving-shaft mounted on the framing, controllable means mounted on said shaft for turning the framing, means for driving the main shaft, a
 55 gear loose on the main shaft, a clutch member connected with said gear, a second clutch member splined on the main shaft and coacting with the first-named clutch member, a counter-shaft, a gear fast thereon and
 60 meshed with the gear on the main shaft, a second counter-shaft, means for driving the

second counter-shaft from the first counter-shaft at variable speed, a hoisting-drum, means for driving the same from the second counter-shaft, said means for driving the
 65 hoisting-drum from the second counter-shaft comprising a gear in connection with the drum, a gear loose on the second counter-shaft and meshed with the gear on the drum, and a clutch for fastening the gear of the
 70 counter-shaft to said shaft at will.

15. The combination of a framing, a main driving-shaft mounted thereon, a gear loose on said shaft, a means for connecting said gear to said shaft at will, a counter-shaft, a
 75 gear fastened thereon and meshed with the gear on the main shaft, a second counter-shaft, means for driving the second counter-shaft from the first counter-shaft at varying speed, a hoisting-drum, and means for driv-
 80 ing the hoisting-drum from the second-named shaft.

16. The combination of a framing, a main driving-shaft mounted thereon, a gear loose on said shaft, a means for connecting said
 85 gear to said shaft at will, a counter-shaft, a gear fastened thereon and meshed with the gear on the main shaft, a second counter-shaft, means for driving the second counter-shaft from the first counter-shaft at varying
 90 speed, a hoisting-drum, means for driving the hoisting-drum from the second-named shaft, said means for driving the second counter-shaft from the first counter-shaft comprising two unlike gears loose on the first
 95 counter-shaft, means connecting either gear to the shaft at will, and unlike gears fast on the second counter-shaft and meshed respectively with the gears on the first shaft.

17. The combination of a framing, a main
 100 driving-shaft mounted thereon, a gear loose on said shaft, a means for connecting said gear to said shaft at will, a counter-shaft, a gear fastened thereon and meshed with the gear on the main shaft, a second counter-
 105 shaft, means for driving the second counter-shaft from the first counter-shaft at varying speed, a hoisting-drum, means for driving the hoisting-drum from the second-named shaft, said means for driving the drum from
 110 the second counter-shaft comprising a gear in connection with the drum, a gear meshed therewith and carried loose on the second counter-shaft, and a clutch for attaching the counter-shaft gear to said shaft at will.
 115

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

EDWARD A. SOHN.

Witnesses:

W. R. MARTIN,
 WM. H. MARTIN.