

No. 776,230.

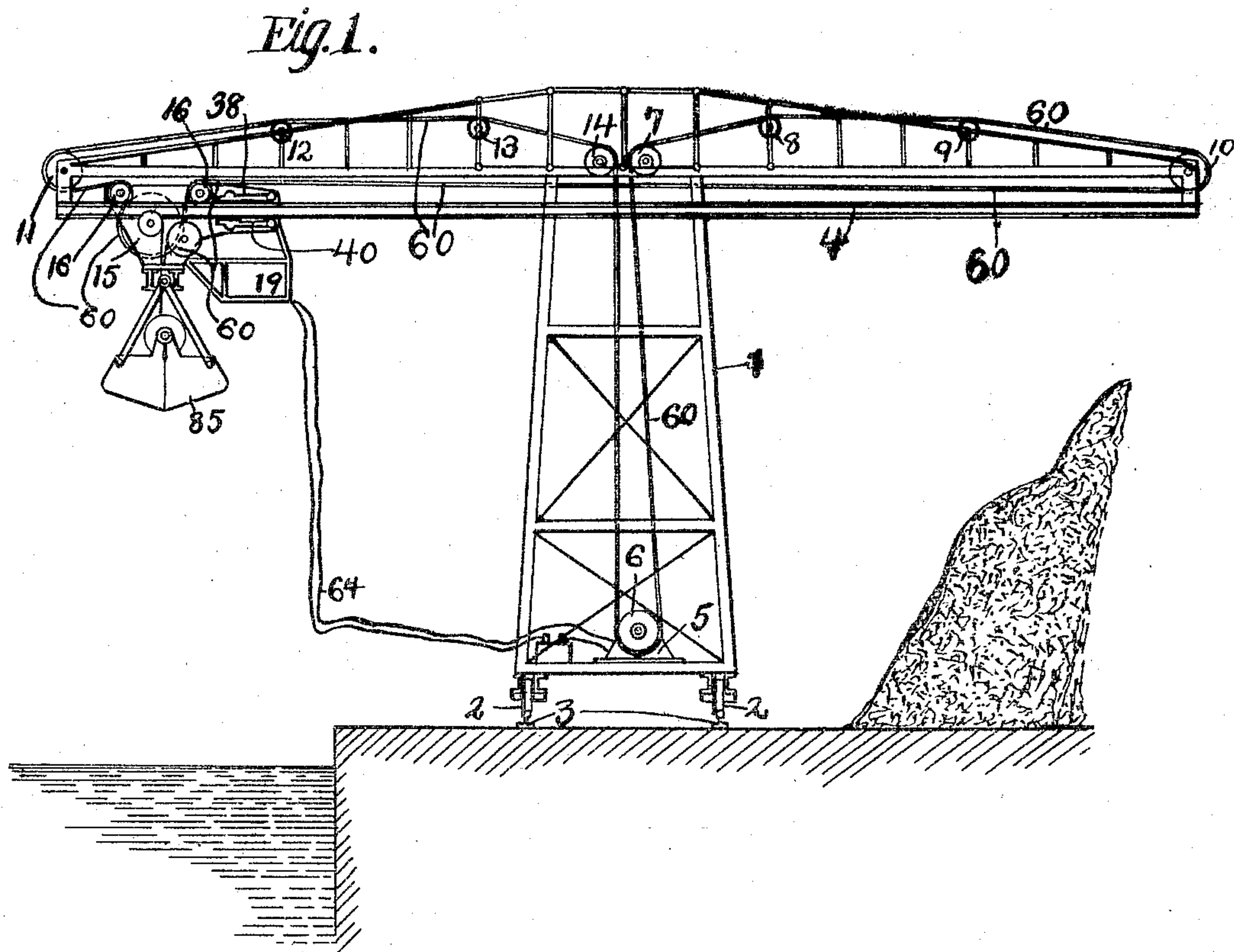
PATENTED NOV. 29, 1904.

H. D. GA NUNG.
HOISTING AND CONVEYING APPARATUS.

APPLICATION FILED MAY 22, 1903.

NO MODEL.

6 SHEETS—SHEET 1.



WITNESSES:
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Victor C. Lynch.

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BY
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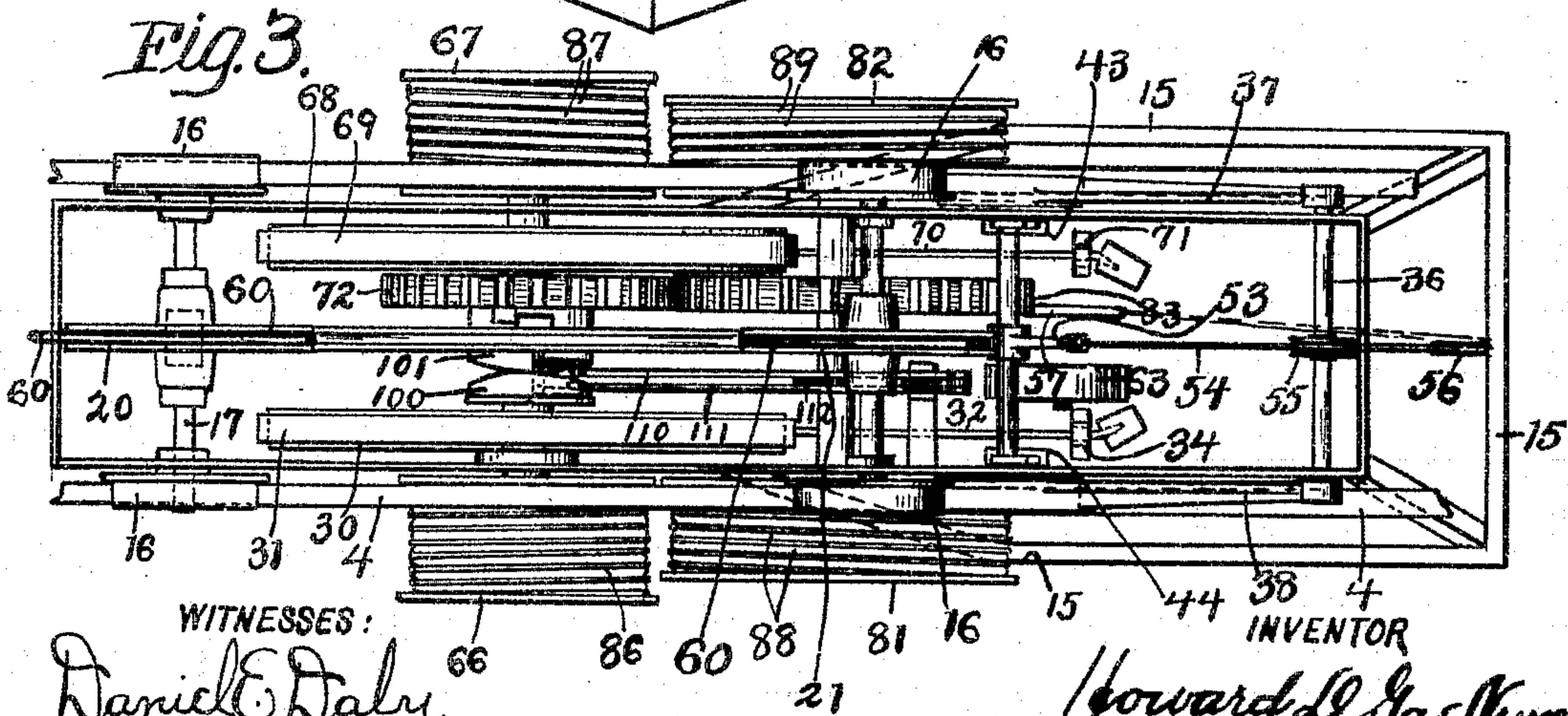
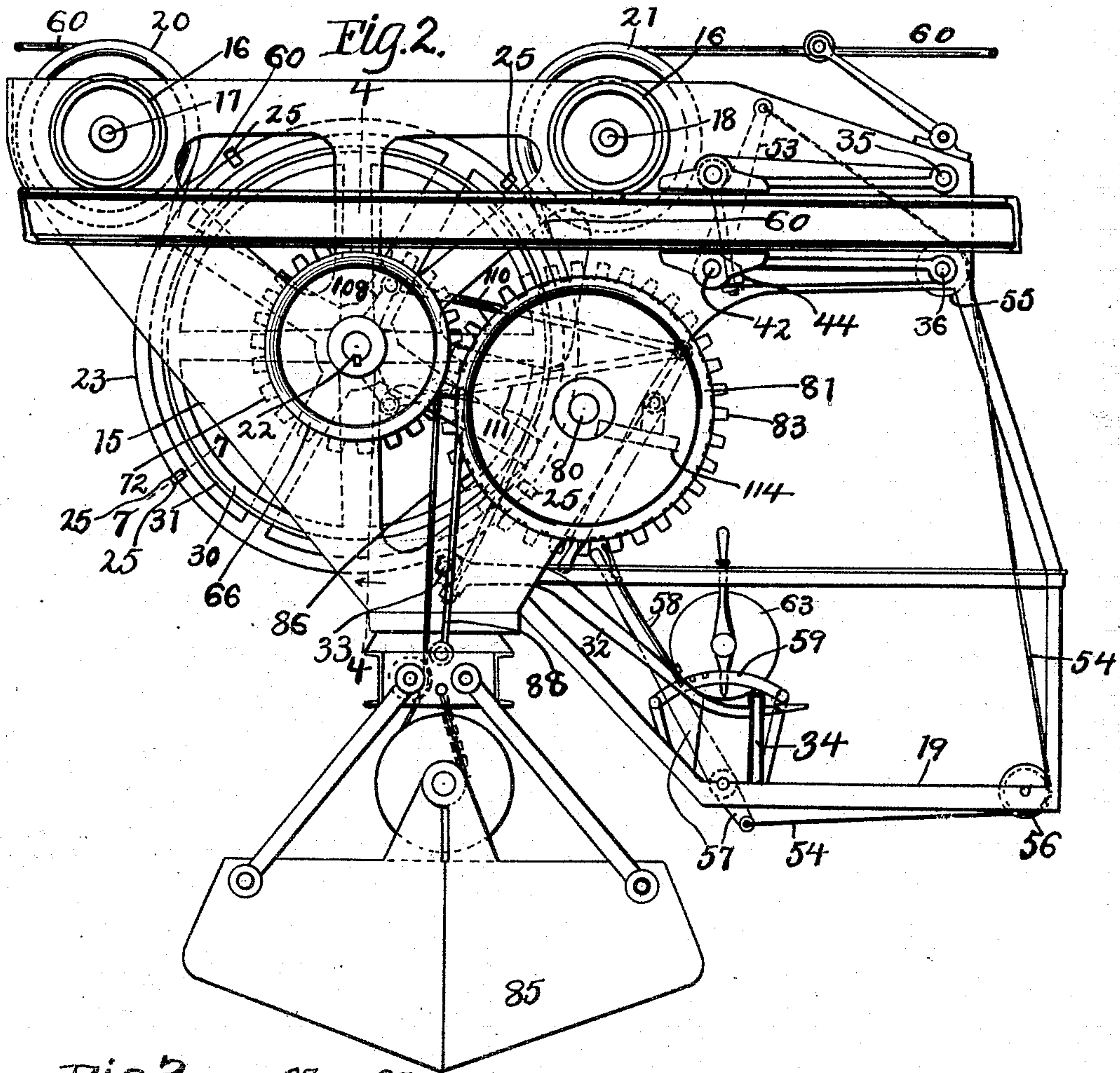
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5 SHEETS—SHEET 2.



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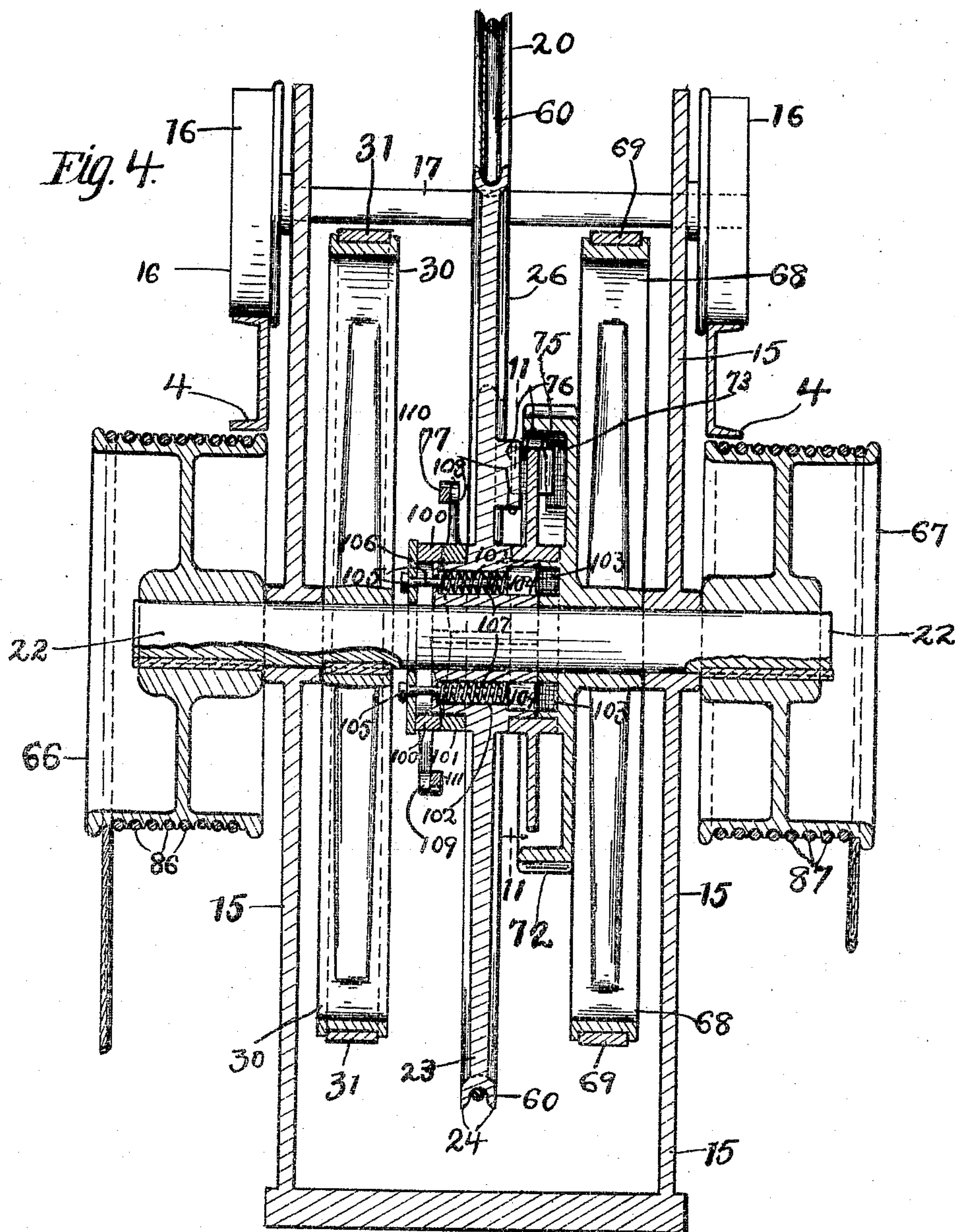
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5 SHEETS—SHEET 3.



WITNESSES:

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INVENTOR

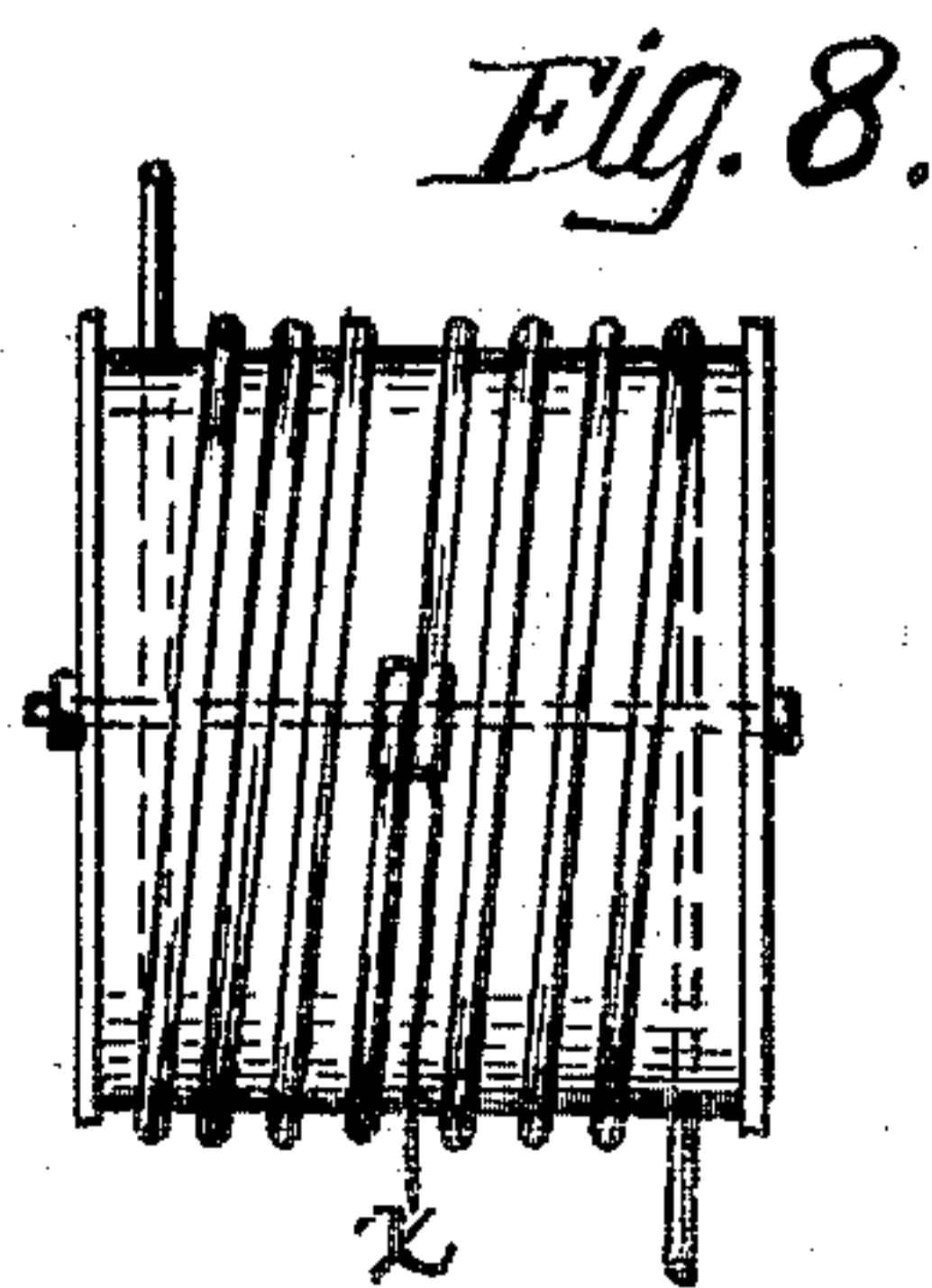
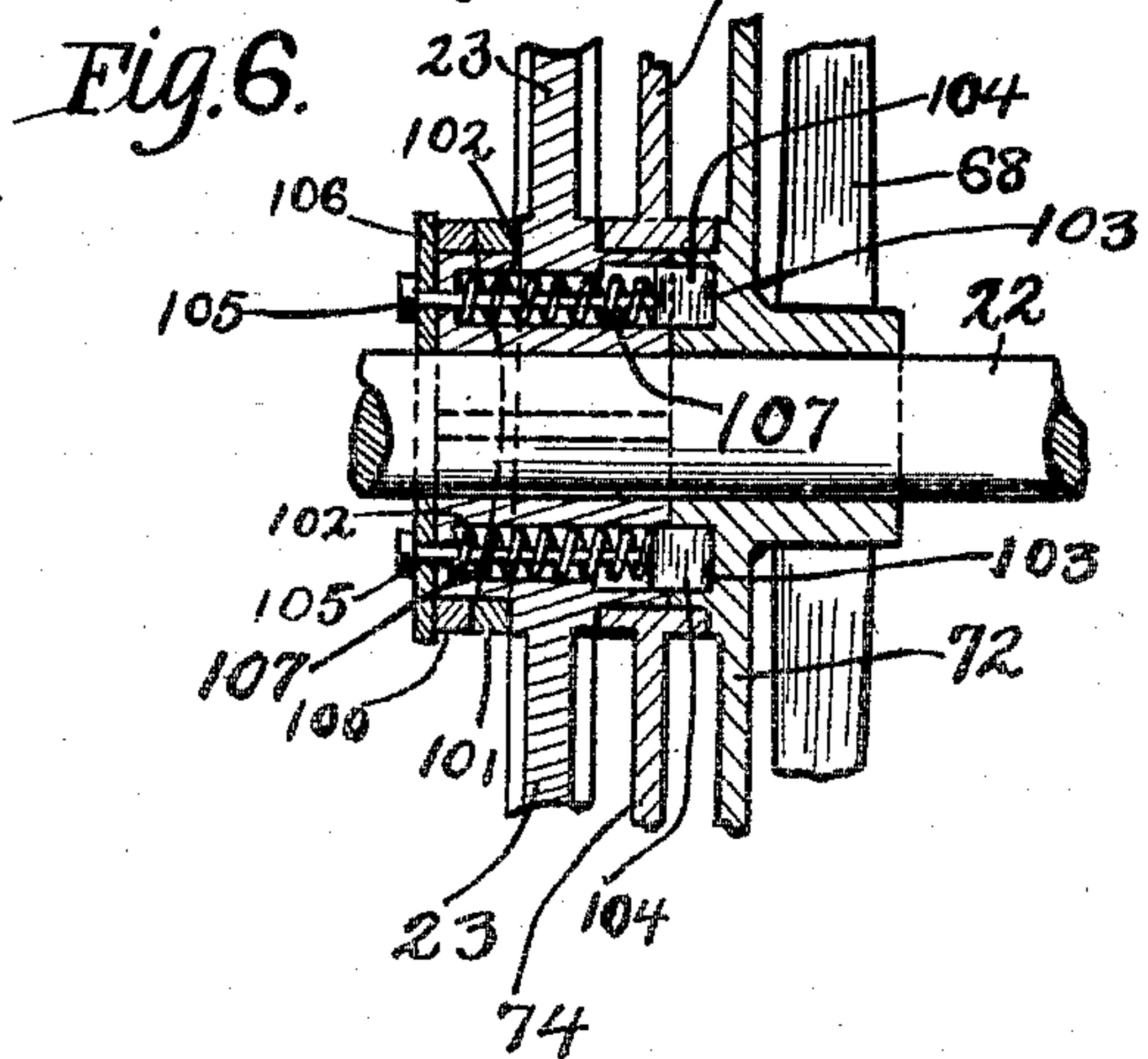
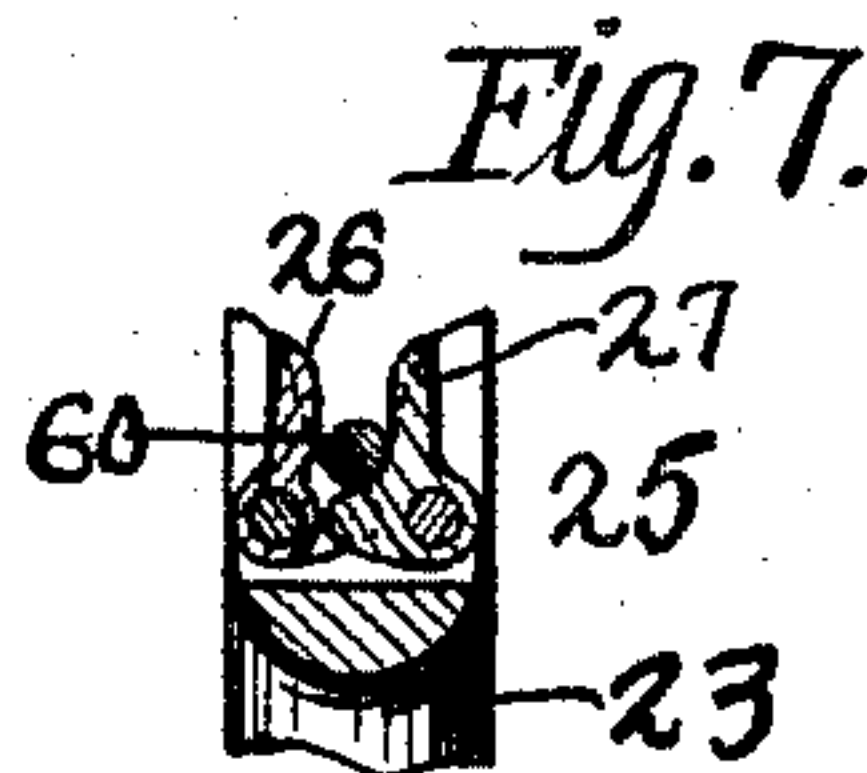
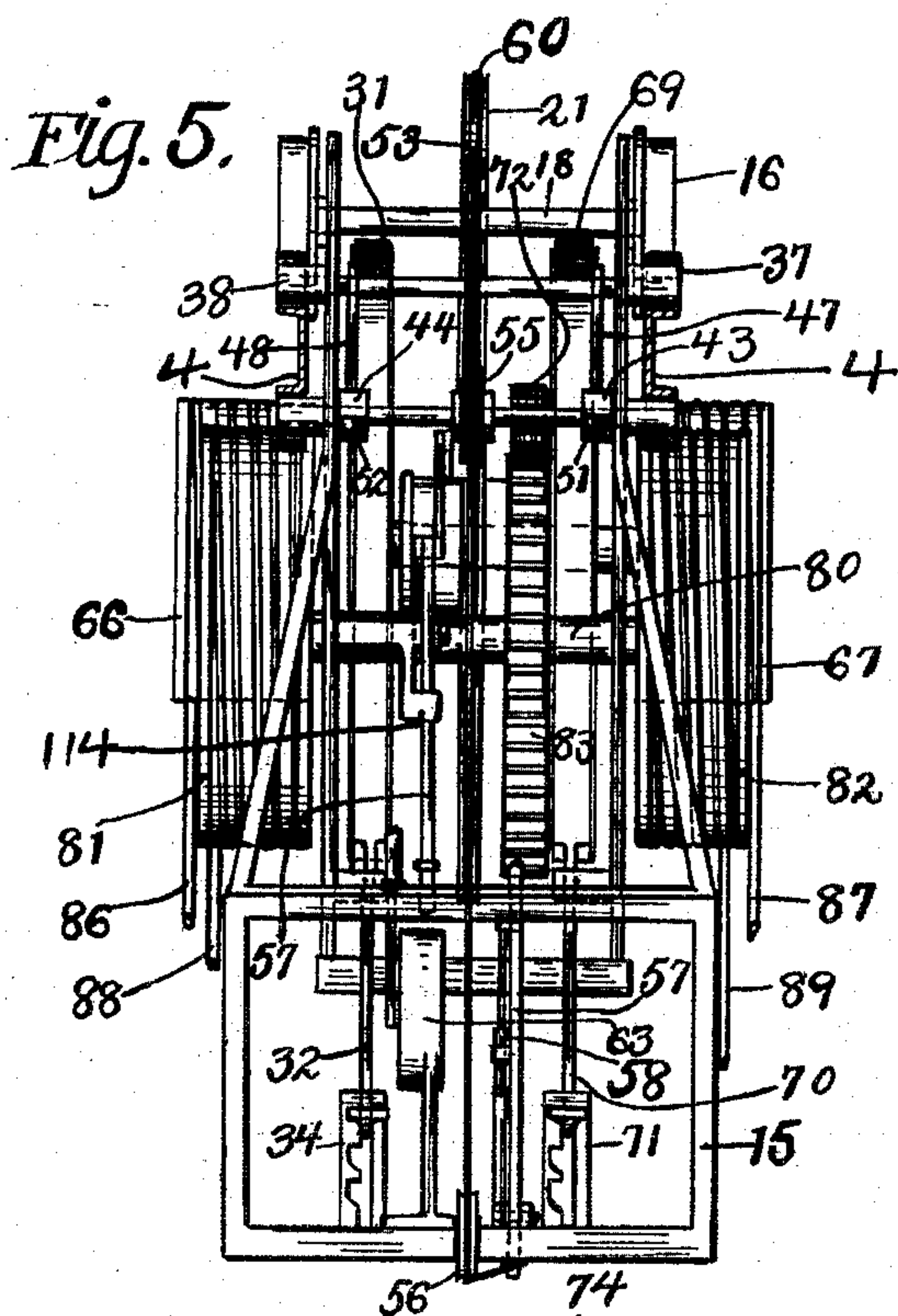
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5 SHEETS—SHEET 4.



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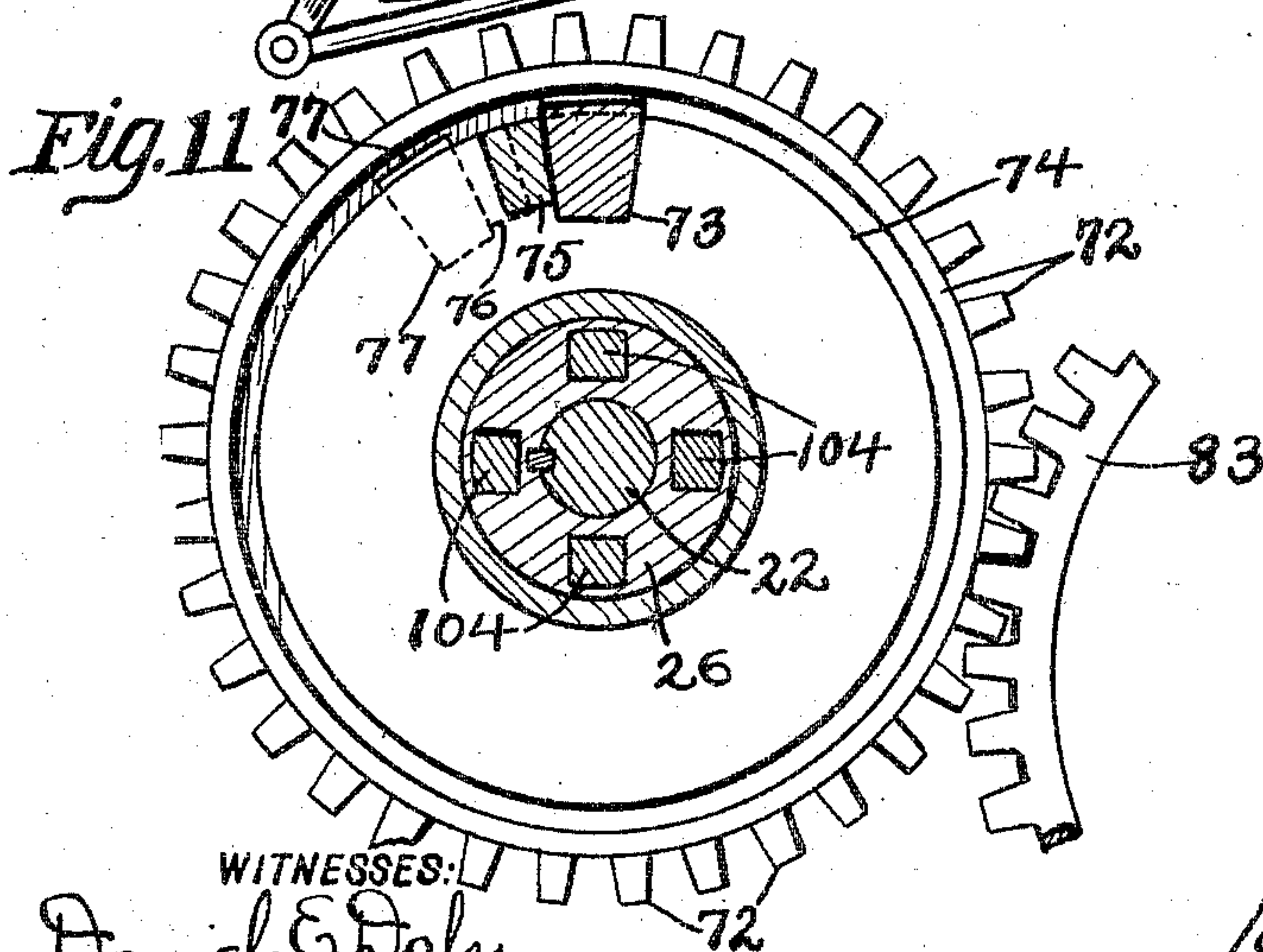
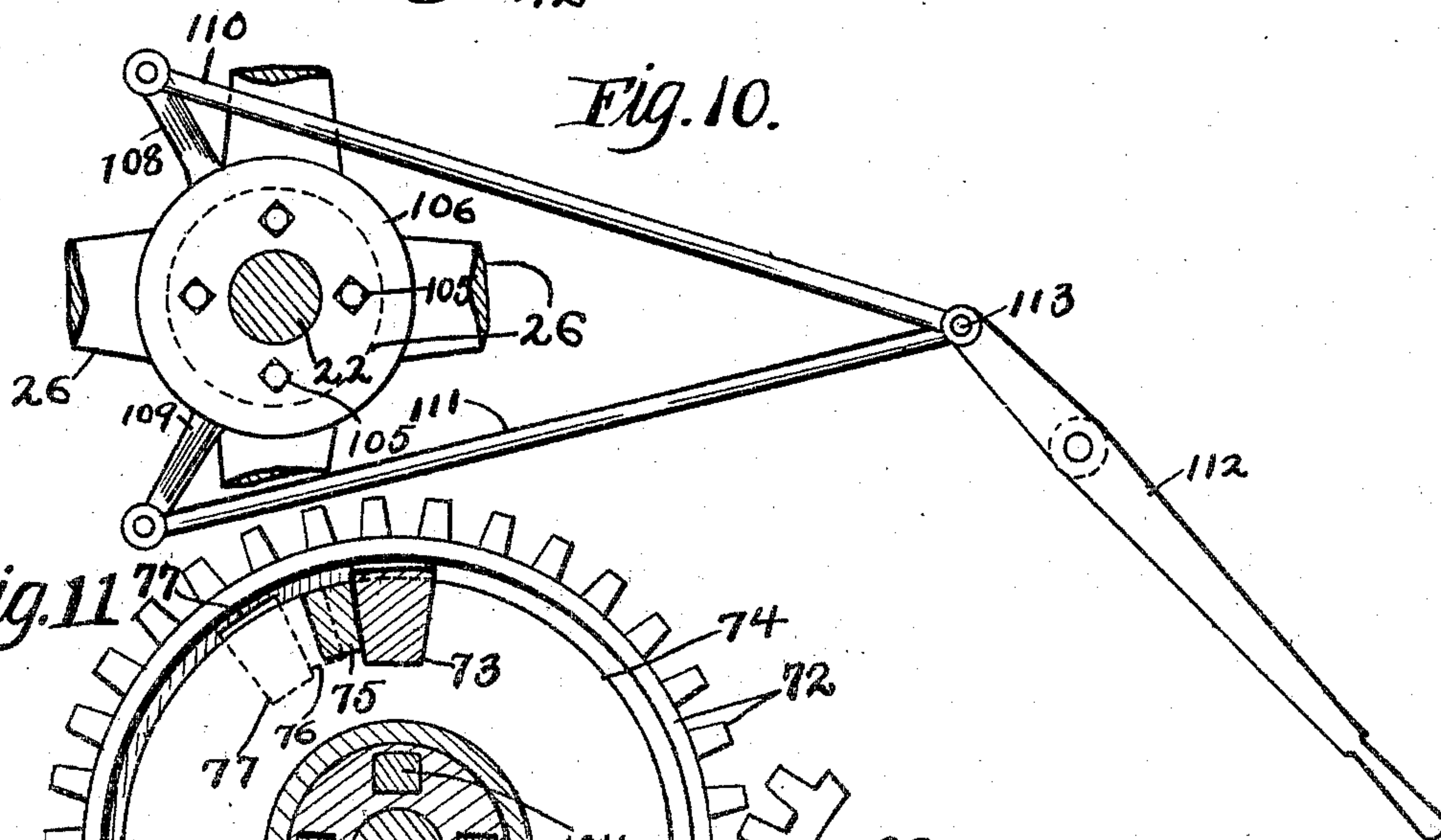
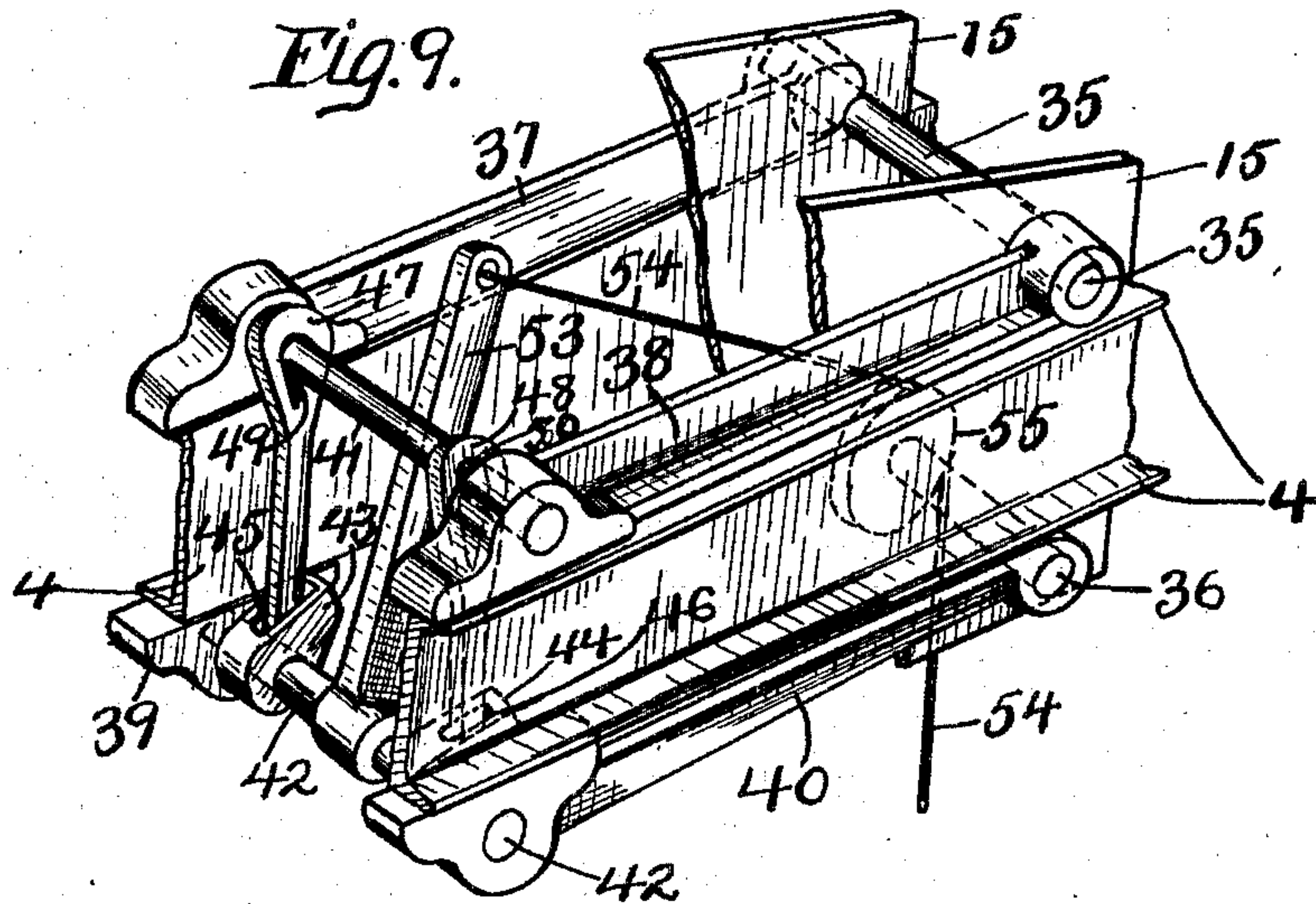
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APPLICATION FILED MAY 22, 1903.

NO MODEL.

6 SHEETS—SHEET 5.



WITNESSES:
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UNITED STATES PATENT OFFICE.

HOWARD D. GA NUNG, OF CLEVELAND, OHIO.

HOISTING AND CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 776,230, dated November 29, 1904.

Application filed May 22, 1903. Serial No. 158,273. (No model.)

To all whom it may concern:

Be it known that I, HOWARD D. GA NUNG, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hoisting and Conveying Apparatus; and I 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 pertains to make and use the same.

This invention relates to hoisting and conveying apparatus, comprising in general an elevated track, a carriage arranged to travel thereon and provided with load-handling mechanism, and a rope system operatively connecting the carriage with a source of energy.

The object of this invention is to simplify the construction of apparatus of this character by providing a simpler rope-and-sheave system and a compact arrangement of mechanism, so as to reduce the size and weight of the carriage and thereby render the same especially adaptable for use on traveling trestles of the cantaliver type.

My invention therefore consists in providing a new and improved means for transmitting the power from the source of energy to the carriage and new and improved means for controlling and operating the load-handling mechanism.

My invention especially consists in providing a single-rope system by means of which the motive force is transmitted from the engine, motor, or other source to the carriage, so as to propel the carriage and positively operate the load-handling mechanism carried thereby.

My invention also consists in the features of construction and combination of parts, as illustrated in the drawings and hereinafter set forth in the specification and pointed out in the claims.

Referring to the drawings, Figure 1 shows the complete apparatus in elevation. Fig. 2 is a side elevation of the carriage with a bucket depending therefrom. Fig. 3 is a top plan of the carriage. Fig. 4 is a section on line 4 4, Fig. 2, on twice the scale. Fig. 5 is a rear end view of the carriage. Fig. 6 is an

enlarged detail view illustrating the clutch mechanism in its operative position. Fig. 7 is a section on line 7 7, Fig. 2, somewhat enlarged, showing the construction of the gripping devices. Fig. 8 shows a modified form of a cable-drum. Fig. 9 is an enlarged perspective view of the brake mechanism. Fig. 10 is an enlarged detail view illustrating the operating mechanism of the brake. Fig. 11 is a section on line 11 11, Fig. 4.

Referring to the drawings, 1 represents a trestle which is mounted in the usual manner on wheels 2, which are arranged to travel on a track 3. Rails or stringers 4 are arranged on the trestle 1. In the lower part of the trestle 1 is mounted the means for generating the energy for operating all parts of the apparatus and preferably consists of an electric motor 5, which is provided with a driving-wheel 6. Pulleys 7, 8, 9, 10, 11, 12, 13, and 14 are arranged on the trestle above the rails 4. A carriage 15 is supported from the rails 4 by means of wheels 16, which are mounted on the ends of shafts 17 and 18, respectively, journaled in the upper part of said carriage. The carriage 15 is provided with a cab 19 for carrying the operator in charge of the apparatus.

On the shafts 17 and 18, in line with each other, are mounted loose pulleys 20 and 21, respectively. A shaft 22 is journaled in the carriage 15 between the shafts 17 and 18, and its ends project beyond the sides of the carriage. On the shaft 22 is keyed a cable-wheel 23, in the periphery of which is formed a rope-groove 24. In the rope-groove 24 are preferably arranged gripping devices 25, arranged to engage the rope and prevent it slipping through the groove, but which will not interfere with the free movement of the rope when the wheel is in motion.

Each gripping device comprises two jaws 26 and 27, which are pivotally secured in the rope-groove of the wheel 23 and are so arranged that the pressure of the rope on their inner ends causes them to bite tightly on the sides of the rope.

At one side of the wheel 23 on the shaft 22 is keyed a brake-wheel 30. This brake-wheel is provided with a brake-band 31, which is operatively connected in the usual manner with

a brake-lever 32, journaled on a shaft 33 in the lower part of the carriage. The lever 32 extends into the cab 19, where it is arranged to engage with a rack 34, mounted on the floor of the cab. It is of course understood that by depressing the lever 32 the brake-band 31 will engage the brake-wheel 30, and thereby prevent the rotation of the shaft 22 and the cable-wheel 23.

On the cab 19 is arranged a rail-brake (shown in detail in Fig. 7) which comprises two rods 35 and 36, arranged in the frame of the cab one above and the other below the rails 4. On the rod 35 are journaled two jaws 37 and 38, arranged to engage the top flanges of the respective rails 4, and on the rod 36 are mounted jaws 39 and 40, arranged to engage the bottom flanges of the respective rails 4. Rods 41 and 42 are provided for connecting the jaws 37 and 38 and 39 and 40, respectively. On the rod 42 are rigidly secured two arms 43 and 44, in which are formed sockets 45 and 46, respectively. Links 47 and 48, provided with eyes 49 and 50, are hung on the rod 41, and the ends thereof extend down through the sockets 45 and 46, respectively, in the arms 43 and 44 and are secured therein by nuts 51 and 52, respectively. On the rod 43 is keyed a lever-arm 53. A rope 54 is secured at one end to the lever-arm 53 and runs over pulleys 55 and 56, and its other end is secured to a lever 57, journaled at the bottom of the cab 19. The lever 57 is preferably provided with a latch 58, arranged to engage the teeth of a rack 59, secured to the floor of the cab 19, so as to lock the lever. The operator in charge by pulling the lever 57 toward himself can clamp the carriage to the rails at any point desired.

The rope system which transmits the motive power for performing the various functions of the apparatus comprises an endless rope 60, which runs over the driving-wheel 6 of the engine 5, then up over the pulleys 7, 8, 9, and 10, then over the pulley 20 in the carriage around the wheel 23, then up over the pulley 21 of the carriage, then over the pulleys 11, 12, and 13, and then down over the pulley 14.

A controller 63 is mounted on the floor of the cab 19 and is arranged in the circuit 64 of the electric motor 5, by means of which the motor can be controlled by the operator in the cab.

The operation of the portion of the apparatus so far described is as follows: When it is desired to cause the carriage to travel back or forth on the rails 4, the track-brake is loosened and the band-brake is caused to engage the brake-wheel 31, thereby locking the wheel 23 against rotation. The motor is then started by the operator in the cab and the carriage is caused to travel in either direction, according to the movement of the driving-wheel of the motor. The gripping devices 25

will prevent the rope from slipping on the wheel 23, and the effect is the same as though the rope was directly secured to the frame of the carriage. When it is desired to transmit the motive force from the motor to the load-handling machinery arranged in the carriage and operatively connected with the wheel 23, then the rail-brake is caused to grip the rails and hold the carriage stationary and the band-brake is released from the brake-wheel. Then when the engine is started the wheel 23 will revolve and actuate any mechanism which is operatively connected therewith.

The load-handling mechanism with which the carriage is provided is especially adapted for operating a grab-bucket and is arranged as follows: On the ends of the shaft 22 are rigidly secured cable-drums 66 and 67. On the shaft 22 is loosely mounted a brake-wheel 68, which is provided with a brake-band 69. This brake-band is operatively connected with a lever 70, journaled on the shaft 34. The end of the lever 70 extends into the cab and is arranged to engage with the teeth of a rack 71, mounted on the floor of the cab, so as to hold it in position. A gear-wheel 72 is preferably formed integral with the brake-wheel 68. On the body of the gear-wheel 72 is arranged a lug 73. On the hubs of the wheel 23 and the brake-wheel 68 is loosely mounted a disk 74. On one side of the disk 74 is formed a lug 75, located so as to come in contact with the lug 73 on the gear-wheel, and on the other side of the disk 74 is formed a lug 76, arranged to come into contact with a lug 77, formed on the wheel 23. A shaft 80 is journaled in the carriage parallel with the shaft 22, and on the respective ends thereof are rigidly mounted drums 81 and 82. On the shaft 80 is keyed a gear-wheel 83, arranged to mesh with the gear-wheel 72 on the shaft 22.

The grab-bucket 85 is of the usual construction and is suspended from the carriage by means of hoisting-ropes 86 and 87, which are secured to the drums 66 and 67, respectively, and sustaining or opening ropes 88 and 89, which are secured to the drums 81 and 82, respectively.

The operation of the load-handling mechanism is as follows: As the wheel 23 is revolved by the rope 60 the lug 77 thereon will come into contact with the lug 76 on the disk 74, and the disk will be turned till the lug 75 comes into contact with the lug 73 on the gear-wheel 72 and causes the said gear-wheel to revolve; but by this time the drums on the ends of the shaft 22 will have wound in sufficient rope to close the bucket. Now when the gear-wheel 72 begins to revolve it will revolve the gear-wheel 83, which in turn actuates the shaft 80 and the drums 81 and 82, keyed thereon, and the sustaining or opening rope will be wound in equally with the closing-rope. When it is desired to dump

the bucket, the brake is set on the brake-wheel 68, and the engine is then reversed, and as the wheel 22 starts to move back the lug 77 will leave the lug 76 and will not come into contact with it again until the wheel has made a complete rotation, and likewise the lug 75 on the disk 74 will not come into contact again with the lug 73 on the gear-wheel 72 until the disk 74 has made a rotation. In this way there will be two revolutions of the shaft 22 for unwinding the closing-rope and allowing the bucket to dump. When the lug 75 on the disk 74 comes into contact with the lug 73 on the gear-wheel 72, then the brake is released from the brake-wheel 68 and the opening-ropes will be paid out equally with the hoisting-ropes and the bucket will be lowered opened.

I have described and shown a construction employing a single disk provided with one lug on each side which allows two rotations of the hoisting-drum before the opening-drum begins to operate; but it will be seen that by adding another lug on each side of the disk the number of rotations can be lessened, or by putting on additional disks the number of rotations can be increased.

It is sometimes necessary or expedient to raise the bucket without closing it, and in order that this may be accomplished I have provided an auxiliary pedal device which is arranged as follows: Around the hub of the wheel 23 are arranged two collars 100 and 101, the adjacent rims of which are provided with cam-surfaces. In the hub of the wheel 23 are formed four bores 102, which extend through from side to side of the said hub; but the openings in the bore at the side of the hub near the collars are smaller than the openings at the opposite ends of the bores. In the body of the gear 72 are arranged four pockets 103, arranged to register with the bores 102 in the hub of the wheel 23. In each of the bores 102 is arranged a dog or latch 104, which is provided with a stem 105, the head of which is secured in a plate 106, mounted on the shaft 22 and arranged to abut against the collar 100. Around the stem of each latch is arranged a coil-spring 107. To the collars 100 and 101 are secured arms 108 and 109, respectively. To the arms 108 and 109 are hinged rods 110 and 111, respectively. The rods 110 and 111 are secured to the ends of a lever 112 by a pin 113. The lever 112 is fulcrumed near the top of the cab 19, so that it can be conveniently reached by the operator. The end of the lever 112 is arranged to engage with the teeth of a rack 114, mounted in the cab 19, so as to lock it in either of its extreme positions. By means of the lever 112 the collars 100 and 101 can be rotated on the hub of the wheel 23, and the latches 104 will be caused to enter or will be withdrawn from the pockets 103, according to the direction in which the

lever is moved, and in this way the brake-wheel 68 can be instantly locked to the wheel 23, thereby preventing any independent movement of the drums 88 and 89, and the bucket can be raised in exactly the condition it was when the clutch was operated.

In Fig. 8 I have shown a modified form of my cable-wheel having the operating-rope permanently secured thereto at the point *x* and having a quantity of rope coiled thereon approximately equal to the length of the bucket-ropes, for whichever way the operating-rope is driven as much rope will be wound on the cable-wheel as is paid off.

What I claim is—

1. In a hoisting and conveying apparatus, the combination of a trestle of the cantaliver type, a stationary engine, a carriage arranged to travel on said trestle, a cable-wheel journaled in said carriage, an endless rope passing over said cable-wheel and around the driving-wheel of said engine, gripping devices arranged on the periphery of said wheel and adapted to engage said rope and prevent said rope from passing around said wheel when said wheel is stationary, means for preventing the rotation of said cable-wheel, load-handling mechanism arranged in said carriage, and means for operatively connecting said load-handling mechanism with said cable-wheel.

2. In a hoisting and conveying apparatus, the combination of a trestle, an engine, a carriage arranged to travel on said trestle, a shaft journaled in said carriage, a cable-wheel keyed on said shaft, an endless rope passing around said wheel and the wheel of the engine, a brake-wheel keyed on said shaft, a brake-wheel loosely mounted on said shaft, a gear-wheel secured to said last-mentioned brake-wheel, means for forming an operative connection between said cable-wheel and said gear-wheel, a second shaft arranged parallel with said first-mentioned shaft, a gear-wheel mounted on said last-mentioned shaft and arranged to mesh with the gear-wheel on the first-mentioned shaft and cable-drums mounted on both of said shafts.

3. In a hoisting and conveying apparatus, the combination of a trestle, an engine, a carriage arranged to travel on said trestle, a shaft journaled in said carriage, hoisting-drums arranged on said shaft, a cable-wheel keyed on said shaft, gripping devices arranged on the periphery of said wheel, an endless rope passing around said wheel, and the wheel of the stationary engine, a brake-wheel keyed on said shaft, at one side of said cable-wheel, a brake-wheel loosely mounted on said shaft at the other side of said cable-wheel, a gear-wheel secured to said last-mentioned brake-wheel, means for forming an operative connection between said cable-wheel and said gear-wheel, a second shaft arranged parallel with the first-mentioned shaft, drums mounted on the end of said last-mentioned shaft, and a gear-wheel

keyed on said last-mentioned shaft and arranged to mesh with the gear-wheel on the first-mentioned shaft, substantially as described and for the purpose set forth.

5 4. In a hoisting and conveying apparatus, the combination of a trestle, an engine, a carriage arranged to travel on said trestle, a shaft journaled in said carriage, hoisting-drums arranged on said shaft, a cable-wheel keyed on
10 said shaft, an endless rope passing around said wheel and the wheel of the engine, means for braking said cable-wheel, a gear-wheel loosely mounted on said shaft, means for preventing the rotation of the said gear-wheel, a
15 disk arranged between said cable-wheel and said gear-wheel, a lug formed on said cable-wheel, a lug formed on said gear-wheel, lugs arranged on each side of said disk and adapted to engage with the respective lugs on the
20 said cable-wheel and the said gear-wheel, a second shaft arranged parallel with the first-mentioned shaft, closing-drums mounted on the ends of said shaft, and a gear-wheel keyed on said shaft and arranged to mesh with the
25 gear-wheel of the first-mentioned shaft.

5 5. In a hoisting and conveying apparatus, the combination of a trestle, an engine, a carriage arranged to travel on said trestle, a shaft arranged in said carriage, hoisting - drums
30 keyed on said shaft, a cable-wheel keyed on said shaft, an endless rope passing around said wheel and the driving-wheel of the engine, means for braking said cable-wheel, a gear-wheel loosely mounted on said shaft, means
35 for preventing the rotation of said gear-wheel, bores formed in the hub of said cable-wheel, pockets formed in said gear-wheel and arranged to register with the bores in the hub of said cable-wheel, latches arranged in the
40 bore of said hub, means for causing the said latches to enter the pockets in said gear-wheel, means for withdrawing said latches from said pocket, a second shaft mounted in said carriage, drums keyed on the ends of said shaft,
45 and a gear-wheel keyed on the said last-mentioned shaft and arranged to mesh with the first-mentioned gear-wheel, and a lug formed on the cable-wheel and gear-wheel, substantially as described.

50 6. In a hoisting and conveying apparatus, a carriage, a shaft arranged in said carriage, drums keyed on said shaft, a cable-wheel keyed on said shaft, means for braking said cable-wheel, a gear-wheel loosely mounted on said
55 shaft, bores formed in the hub of said cable-wheel, pockets formed in said gear-wheel and arranged to register with the bores in the hub of said cable-wheel, spring-controlled latches mounted in said bores and arranged to enter
60 said pockets, collars mounted on said shaft, said collars being provided with opposing cam-surfaces, and means for operatively connecting said collars and said latches so that the rotation of said collars will withdraw the latches
65 from the pockets in the gear-wheel.

7. In a hoisting and conveying apparatus, a carriage, a shaft journaled in said carriage, hoisting-drums keyed on said shaft, a cable-wheel keyed on said shaft, means for braking
70 said cable-wheel, a gear-wheel loosely mounted on said shaft, means for preventing the rotation of said gear-wheel, a disk journaled on the hub of said cable-wheel and said gear-wheel, and arranged to form an operative connection between the said cable-wheel
75 and the said gear-wheel, bores formed in the hub of said cable-wheel, pockets formed in said gear-wheel and arranged to register with the bores in the hub of said cable-wheel, spring - controlled latches mounted in said
80 bores and arranged to enter said pockets, collars mounted on the hub of said cable-wheel, said collars being provided with opposing cam-surfaces, and means for operatively connecting said collars and said latches so that the rotation
85 of the said collars will withdraw the latches from the pockets in the gear-wheel, substantially as described and for the purpose set forth.

8. In a hoisting and conveying apparatus, a carriage, a shaft arranged in said carriage, drums keyed on said shaft, a cable-wheel keyed on said shaft, means for braking said cable-wheel, a gear-wheel loosely mounted on said
90 shaft, bores formed in the hub of said cable-wheel, pockets formed in said gear-wheel and arranged to register with the bores in the hub of said cable-wheel, spring-controlled latches mounted in said bores and arranged
95 to enter said pockets, collars mounted on the hub of said cable-wheel, said collars being provided with opposing cam-surfaces, means for operatively connecting said collars and said latches so that the rotation of said collars
100 will withdraw the latches from the pockets in the gear-wheel, an arm secured to each of the said collars, a lever fulcrumed in said carriage and links operatively connecting said arms with said lever, substantially as described and for the purpose set forth.
110

9. In a hoisting and conveying apparatus, a carriage, a shaft journaled in said carriage, drums keyed on said shaft, a cable-wheel keyed on said shaft, collars mounted on the hub of said cable-wheel, said collars being
115 provided with opposing cam-surfaces, a plate mounted on said shaft, bores formed in the hub of said cable-wheel, spring - controlled latches arranged in said bores and secured to said plate, a gear-wheel loosely mounted on
120 said shaft, pockets formed in said gear-wheel, and means for rotating said collars.

In testimony whereof I sign the foregoing specification, in the presence of two witnesses, this 11th day of May, 1903, at Cleveland, Ohio.
125

HOWARD D. GA NUNG.

Witnesses:

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