

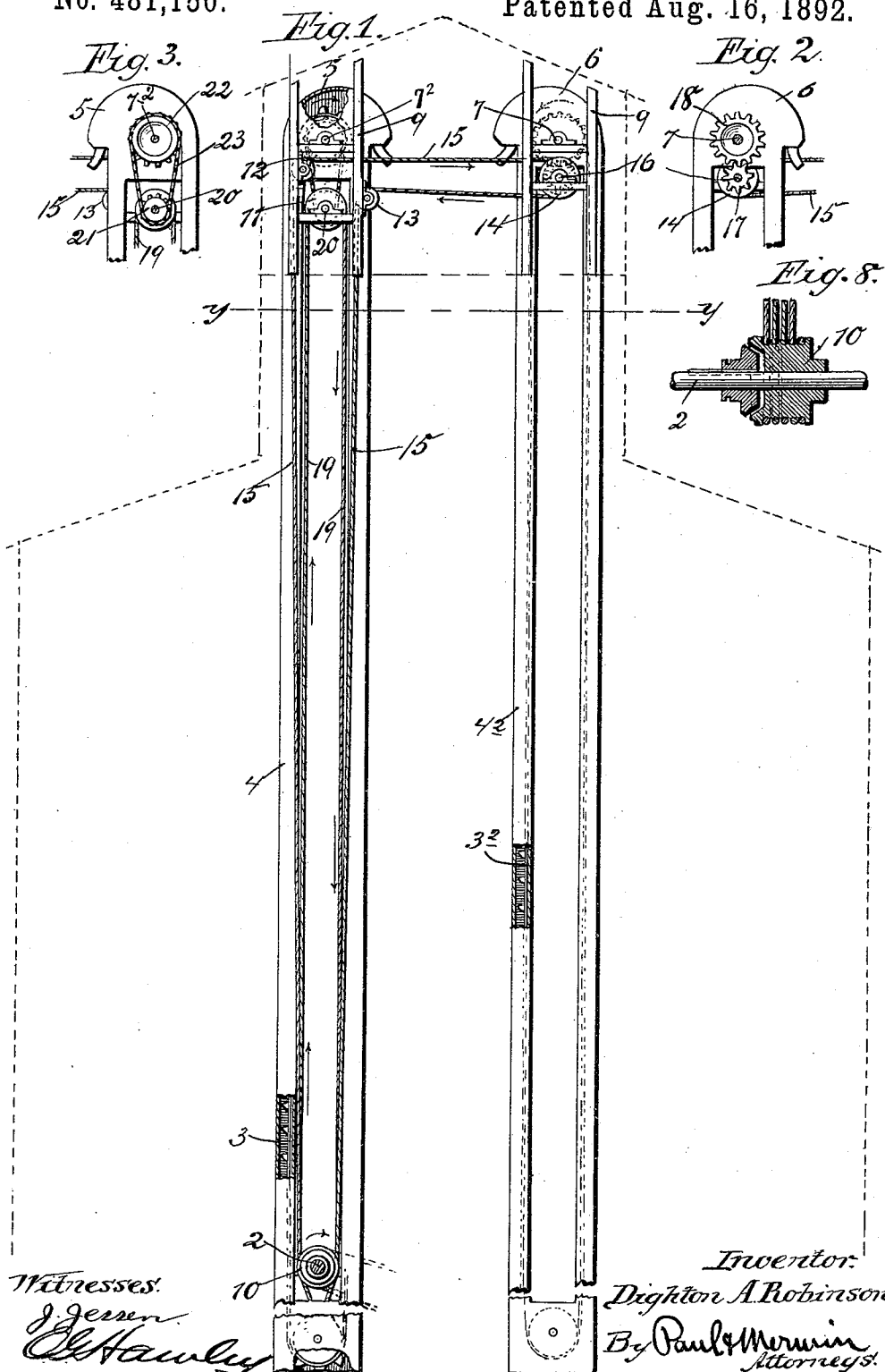
(No Model.)

2 Sheets—Sheet 1.

D. A. ROBINSON.
ELEVATOR BELT DRIVE.

No. 481,150.

Patented Aug. 16, 1892.



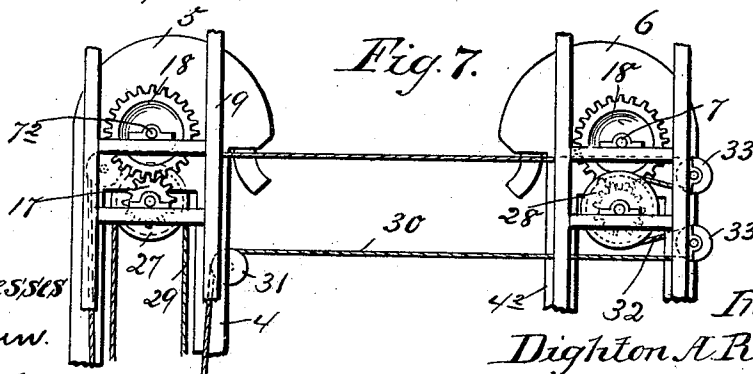
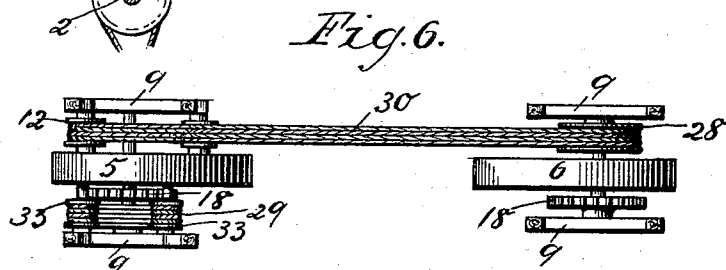
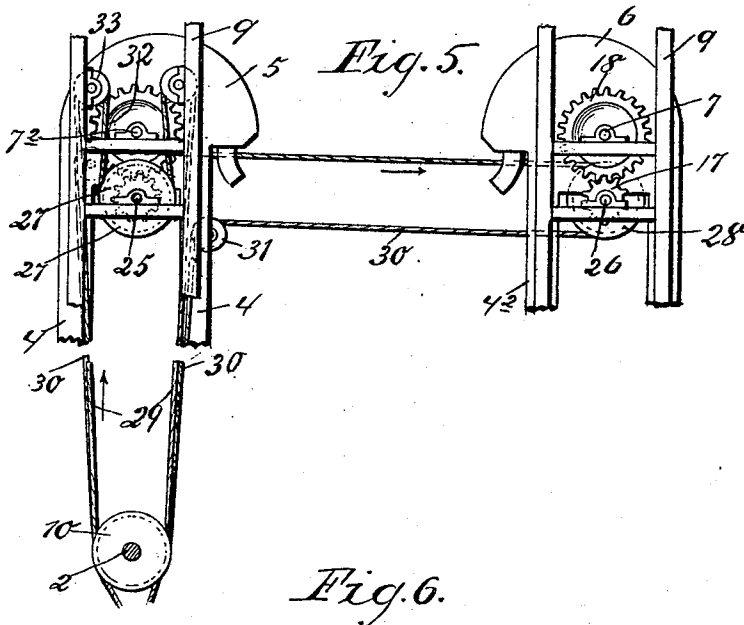
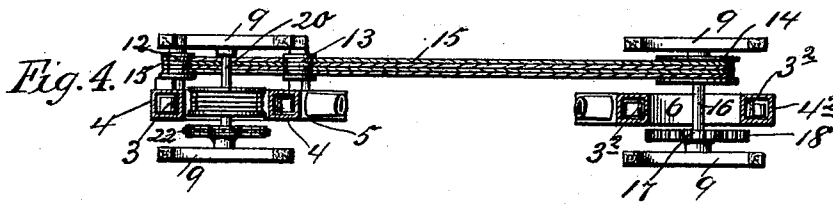
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2 Sheets—Sheet 2.

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ELEVATOR BELT DRIVE.

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Witnesses
J. J. Jernin.
O. Hawley.

Inventor.
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UNITED STATES PATENT OFFICE.

DIGHTON A. ROBINSON, OF MINNEAPOLIS, MINNESOTA.

ELEVATOR-BELT DRIVE.

SPECIFICATION forming part of Letters Patent No. 481,150, dated August 16, 1892.

Application filed June 26, 1891. Serial No. 397,624. (No model.)

To all whom it may concern:

Be it known that I, DIGHTON A. ROBINSON, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in Elevator-Belt Drives, (Case No. 2,) of which the following is a specification.

My invention relates to cheap, simple, and efficient means for operating the grain-elevating belts of elevators; and it relates especially to improvements in the devices set forth and claimed in my prior application, numbered 386,535, upon which Letters Patent No. 460,661 were issued October 6, 1891, entitled "power transmission for grain-elevators;" and its object is to simplify such systems of drives or power transmission and at the same time to arrange the parts of the system with a view to easy access and with a view to safety in regard to fire risks.

To this end my invention consists in the hereinafter-described system of power transmission and in constructions and combinations hereinafter described, and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a vertical elevation showing two pairs of elevator-belt casings and the drives therefor. Figs. 2 and 3 show the reverse sides of the elevator-heads and the gearing provided in connection therewith. Fig. 4 is a plan view from beneath on the line *yy* of Fig. 1. Figs. 5 and 6 are respectively side elevations and plan views of a similar drive with a modified form of gearing for securing an opposite direction of rotation for the two elevator head-pulleys. Fig. 7 is a similar arrangement, the reversing device being on the other side of the building.

The preferable form of my system is embodied in Figs. 1, 2, 3, and 4, and the idea in view is the driving of the head-pulleys of two elevator-belts located in opposite sides of the building, driving the same in opposite directions, and from a single line or main shaft located in the lower part of the building, and, further, to maintain the absolute control of

each elevator-belt from the lower part of the building. The line-shaft 2 is arranged in bearings secured on the framework of the lower story of the building, and is driven in any convenient manner. The elevator-belts 3 and 3² pass up through the vertical casings 4 and 4², one pair of which is shown, and embrace the line-shaft 2. These casings pass up through the bins and at their upper ends merge into the heads 5 and 6 containing the head-pulleys for the elevator-belts, the shafts 7 and 7² of which extend out on each side and are secured in bearings provided on the framework 9. The shaft 2 extends throughout the length of the building, and as many pair of elevator-belts as desired may be arranged in connection therewith.

Each elevator-head is represented in the lower part of the building by a drive-pulley 10, secured on the shaft 2 by permanent fastenings or by friction-clutches. In practice the latter are employed, thereby giving perfect control of every part of the elevator from the lower story of the building. Further, this arrangement dispenses with the use of friction-clutches in the upper part or cupola of the building, thereby decreasing the expense of maintenance and repairs, and further avoiding all danger of fire in a part of the building not readily accessible. The drive-belts which I employ each consist of a number of strands of rope and pass over grooved pulleys 10, 11, 12, 13, and 14, arranged on the line-shaft and in the cupola of the building. The relative longitudinal positions of these parts are shown most clearly in Fig. 4, which is a plan view looking up toward the bottoms of the heads, hence showing the legs of the elevator-casings 4 and the upright posts of the frame 9 in cross-section. From a pulley 10 on the line-shaft the rope drive-belt passes up along the sides of the casing and over the idler-pulleys 12 and 13, as shown in Fig. 1. From thence the drive-belt extends in a loop across the building and around the drive-pulley 14, arranged on the short counter-shaft 16, provided directly beneath the head 6. A pinion 17 is arranged on this shaft 16 and meshes with the large gear-wheel

18, secured on the shaft 7, which shaft bears the head-pulley of the elevator-belt on that side of the building. The other elevator-belt is driven by the drive 19, which passes up
 5 between the legs of the casing 4, and over the drive-pulley 11, arranged between the same and upon the shaft 20, provided at a sufficient distance below the head 5 to allow the free admittance of the large drive-pulley 11. In
 10 order to communicate the movement of this pulley to the head-pulley in the head 5, and also secured the rotation of the same in a direction opposite to the pulley in the head 6, I provide a sprocket-wheel-and-chain device.
 15 (Shown clearly in Fig. 3.) The small sprocket 21 is secured on the shaft 20 and the large one 22 on the shaft 7². The relative sizes of the sprockets 21 and 22 are the same as of the gears 17 and 18, and hence two elevator-belts
 20 will move at the same speed. The sprocket or linked belt-chain 23 passes over the two wheels, secured on their shafts and at one side of the head 5. Assuming that the shaft 10 revolves in the direction of the arrow in
 25 Fig. 1, it will be seen that though both belts 15 and 19 run in the same direction, the gear-and-pinion device reverses the direction of the drive on the elevator-belt 3² with respect to the other elevator-belt, which moves in the
 30 same direction as the belt 19, owing to the use of the direct sprocket-drive.

In places where it is not convenient to make use of the sprocket-and-chain arrangement I may employ a pinion and gear upon each head
 35 by providing other means for reversing the action of one of the drive-belts. Such means I have shown in Figs. 5, 6, and 7. Where the gears are employed, it is necessary to place the shafts 25 and 26 so close to the bottoms
 40 of the head that it is impossible to get the drive-pulleys 27 and 28 into the positions shown in Fig. 1, and they are located at one side of their respective heads. The main shaft 2 and the pulleys 10 thereon are identical with those shown in Fig. 1, except that
 45 the pulleys 10 are necessarily placed farther apart, so that a drive-belt may pass up each side of the elevator-casing. One drive-belt 29 extends up and is passed over the drive-pulley 27, while the other belt 30 passes over
 50 the idlers 31 and thence across to the pulley 28. As shown in Figs. 5 and 7, I may reverse on either side of the building by means of a return-loop 32, formed in the drive-belt, by the use of the extra idler-pulleys 33 33. One
 55 head-pulley and its elevator-belt are driven positively, therefore, while the other is reversed with respect to the same, as the belt, passing from the idler 33 back over the drive-pulley, obviously runs the same in a direction
 60 opposite to that of the other counter-shaft pulley. It is obvious that the idlers 12 and 13 and 31 31 might with a similar effect be located in the lower floor of the building and a
 65 long drive-belt extended up by the side of the casings 42. For reasons of economy in cost

and in space, however, the construction shown is preferred.

In practice I arrange suitable devices in connection with each drive-belt for taking up the slack therein; but such devices being well known in the art I have deemed it unnecessary to either illustrate or describe them.

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

1. The combination, with elevator-belts occupying transversely-opposite positions one to the other, of head and boot pulleys therefor, said boot-pulleys for said belts arranged
 80 in the lower part of the building, a main longitudinal shaft arranged in the lower part of the building, means for driving the same, short counter-shafts arranged in connection with said head-pulleys, drive-pulleys arranged on each counter-shaft, corresponding
 85 drive-pulleys arranged on said main shaft, said boot and drive pulleys being secured on separate shafts, separate drive-belts passing from the latter to each counter-shaft drive-pulley, and means for reversing the operating
 90 direction of one of said belts, whereby said elevator-belts are caused to run in opposite directions, substantially as described.

2. The combination, with elevator-belts, of head and boot pulleys therefor, counter-shafts in connection with said head-pulleys, a main shaft located in the lower part of the building and in closer proximity to one of said belts than to the other, drive-pulleys on said shafts,
 100 drive-belts passing over the same, one of said belts operating over idlers adapting the same to be carried across the building at an angle to the main portion of the belt, and means for reversing the direction of rotation of one of
 105 said belts with respect to its elevator-belt, whereby said elevator-belts are operated in opposite directions, substantially as described.

3. The combination, with two elevator-belts arranged transversely opposite one another, head and boot pulleys therefor, a main shaft passing between the legs of one of said elevator-belts, counter-shafts arranged between the same and in proximity to said head-pulleys, drive-pulleys on said counter-shafts and
 115 said main shafts, drive-belts passing over corresponding sets of said pulleys, one of said drive-belts passing up between the legs of the elevator-belt, embracing said main shaft and connected to the head-pulley of said elevator
 120 by a sprocket-wheel and chain-belt device, and a gear-and-pinion connection with the other elevator-belt head-pulley for the other drive-pulley, substantially as described.

4. The combination, with the elevator-belts, of head and boot pulleys therefor, counter-shafts in connection with said head-pulleys, a main-line shaft arranged in the lower story of the building and embraced between the sides or legs of one of said elevator-belts,
 130 idlers arranged in the top of the building, and rope drive-belts passing over the same

and grooved pulleys arranged on said main and counter shafts, substantially as and for the purpose specified.

5 5. The combination, with the main shaft, of drive-pulleys thereon, clutches for connecting the same, elevator-belts, head and boot pulleys therefor, the pulleys 11 and 14, arranged on the shafts 20 and 16, the idlers 12 and 13, the sprockets 21 and 22, the sprocket-chain
10 23, passing over the same, the pinion 17 and

gear-wheel 18, arranged as described, and the rope drive-belts 15 and 19, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 16th day of June, 1891.

DIGHTON A. ROBINSON.

In presence of—

PAUL GORES,
FRED SCHAEFFER.