

No. 844,387.

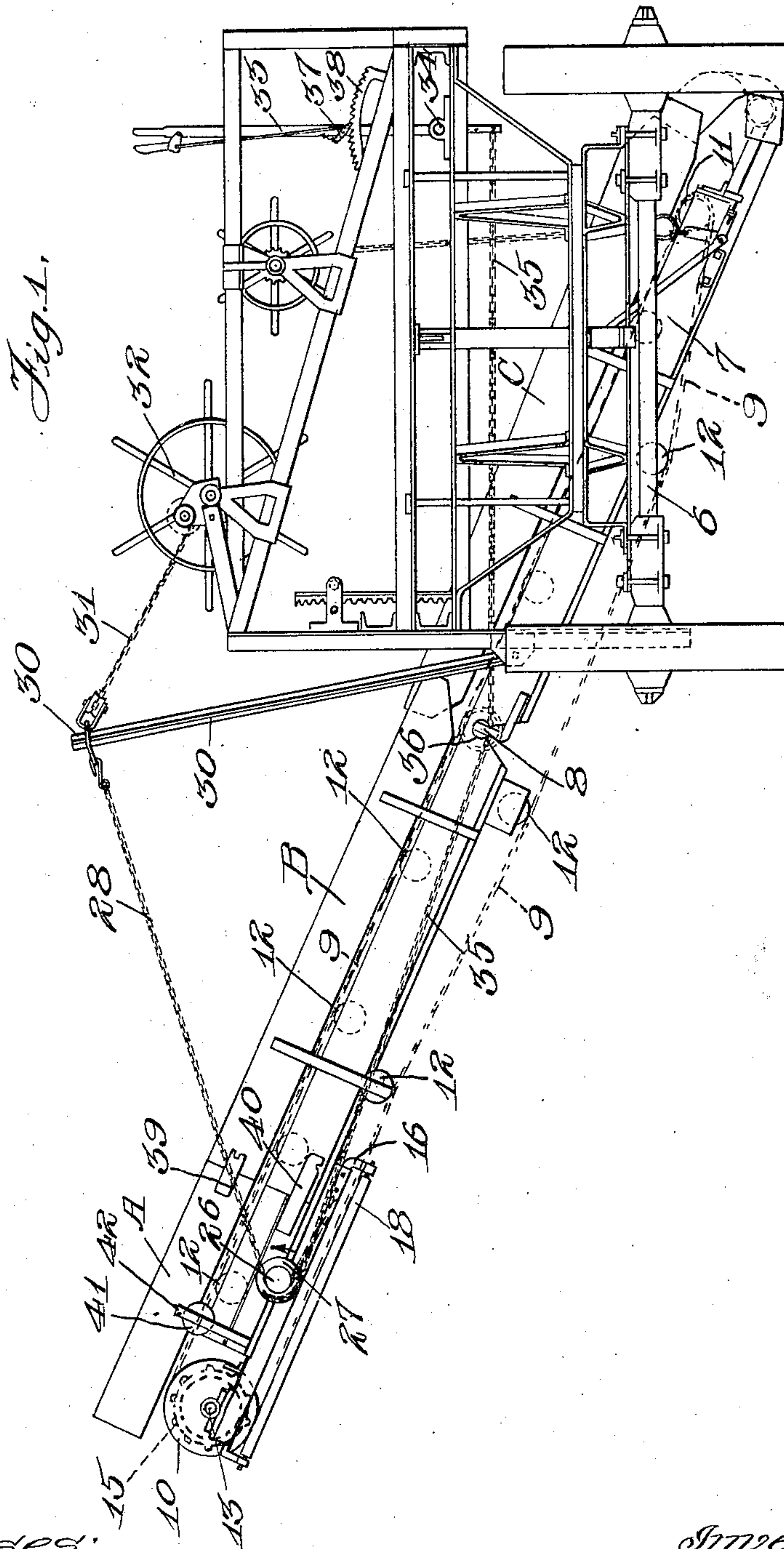
PATENTED FEB. 19, 1907.

T. R. McKNIGHT.

BELT TIGHTENING APPLIANCE FOR ELEVATING GRADERS.

APPLICATION FILED DEC. 29, 1905.

3 SHEETS—SHEET 1.



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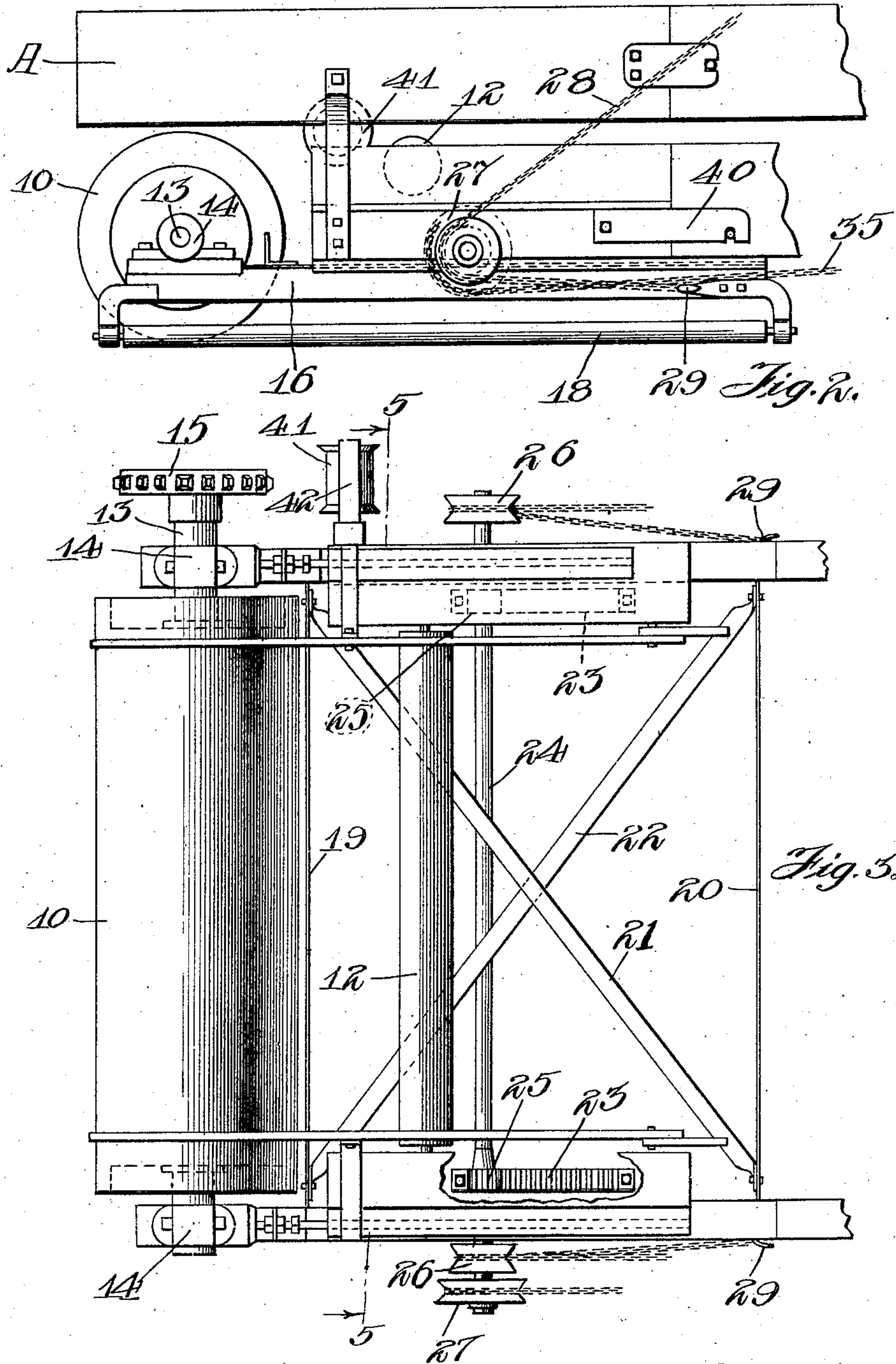
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3 SHEETS—SHEET 2.



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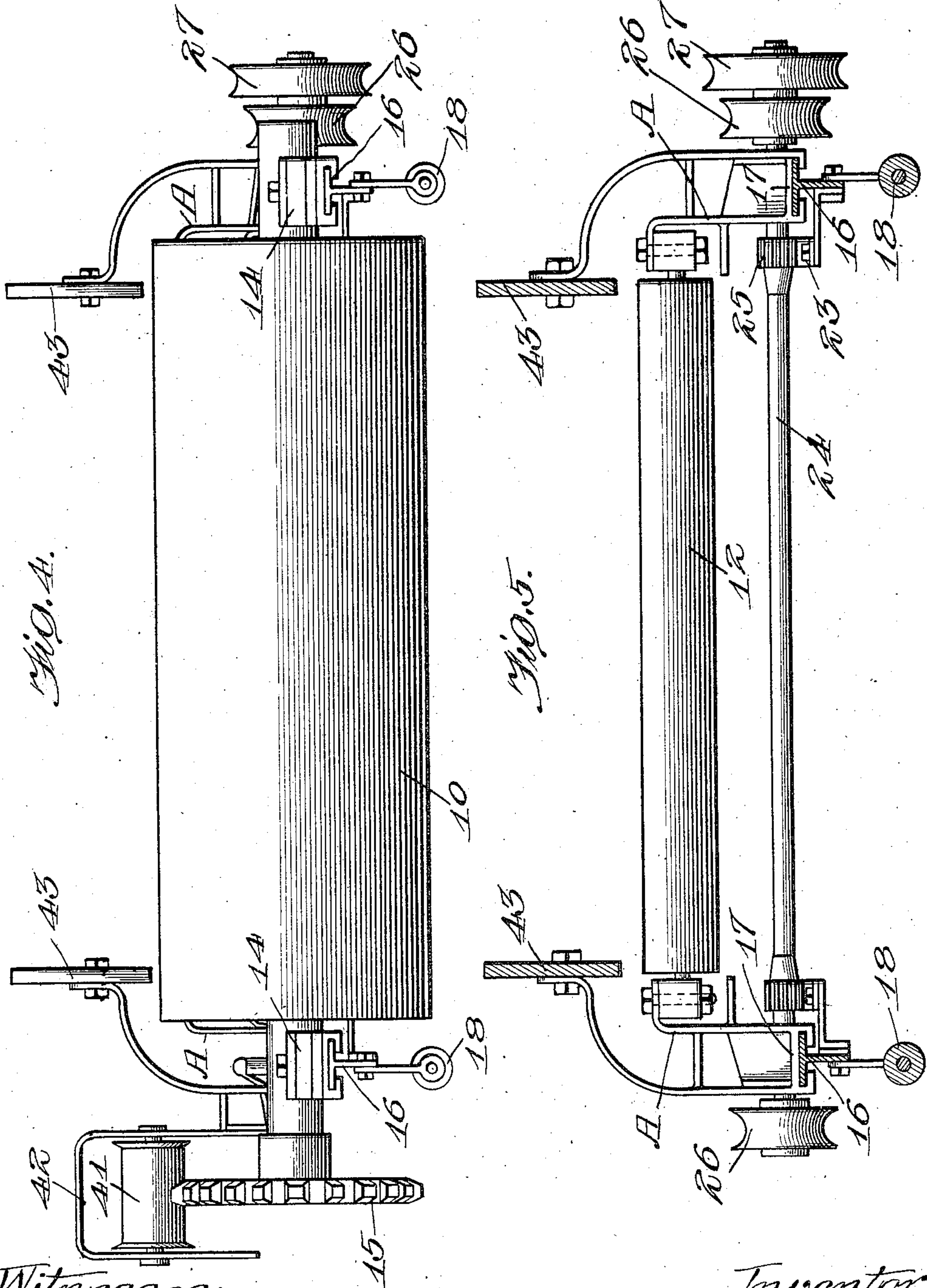
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UNITED STATES PATENT OFFICE.

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BELT-TIGHTENING APPLIANCE FOR ELEVATING-GRADERS.

No. 844,387.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed December 29, 1905. Serial No. 293,779.

To all whom it may concern:

Be it known that I, THOMAS R. McKNIGHT, a citizen of the United States, residing at Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Belt-Tightening Appliances for Elevating-Graders, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to elevating-graders and other machinery employing belt conveyers, and has for one of its objects to provide a new and improved construction for maintaining the conveyer-belt at the proper tension, by which the weight of the material on the belt is utilized for that purpose.

A further object is to provide hand-operated mechanism in connection with such automatic mechanism, so that the proper tension may be secured under extreme conditions, as where a very short elevator is used and the weight of the load alone is not sufficient to give the proper tension or, on the other hand, where a very long elevator is used and the weight is too great and causes too great tension.

I accomplish these objects as illustrated in the drawings and as hereinafter described.

What I claim as new is set forth in the claims.

In the accompanying drawings, Figure 1 is an end elevation illustrating some of the parts of an elevating-grader to which my improvements have been applied. Fig. 2 is an enlarged detail illustrating the outer end portion of the elevator. Fig. 3 is a plan view of the parts shown in Fig. 2. Fig. 4 is an end view of the outer end of the elevator, and Fig. 5 is a cross-section on line 5 5 of Fig. 3.

Referring to the drawings, Fig. 1 illustrates one form of an elevating-grader to which my improvements may be applied. It will be understood that such machines comprise a carriage which supports an elevator in the form of a belt conveyer arranged to receive dirt from a plowing device suitably disposed, suitable provision being made for operating the conveyer by the progressive movement of the machine. Such a machine is illustrated and described in Letters Patent No. 727,671, granted to me May 12, 1903. As much of the mechanism by which

the elevator is driven, as well as the mechanism by which the dirt is supplied to the elevator, form no part of my present invention, they are not illustrated in detail. Neither have I illustrated fully the mechanism for vertically adjusting the elevator or for accomplishing various other operations which have no special bearing on the subject-matter of this application. It will be understood that my improvements may be applied to machines of various types in which it is desirable to employ a belt conveyer or in which tension-adjusting devices are desirable.

Referring now to the drawings, 6 indicates the carriage, which may be a four-wheeled carriage of the usual type, and 7 indicates the elevator. In the form shown the elevator is composed of a number of sections, (marked, respectively, A, B, and C.) The sections B C are of the type illustrated in the patent above referred to and are connected by a hinge-joint at 8, as shown in Fig. 1. The outer section A contains the principal part of the mechanism by which the tension on the belt is regulated.

9 indicates the conveyer-belt, which, as indicated by dotted lines in Fig. 1, runs over end pulleys 10 11 and intermediate pulleys 12. The pulleys 11 12 are ordinary pulleys mounted in bearings of any suitable type provided in the various sections of the elevator. The pulley 10, however, is mounted so as to be adjustable toward and from the pulley 11, and thereby vary the tension upon the belt. Said pulley is mounted upon a shaft 13, which is mounted in suitable bearings 14, which will be hereinafter described. It carries a sprocket-wheel 15, by which it is connected with a suitable drive-shaft mounted on the carriage and driven from one of the wheels or wheel-axes, so that as the machine progresses the belt is caused to travel. As best shown in Figs. 2 and 4, the bearings 14 are carried at the outer end portions of slides 16, which are preferably T-shaped in cross-section, as shown in Fig. 4. Said slides are fitted to slide longitudinally on the elevator in bearings 17, carried by the frame A, as shown in Fig. 5. By this construction the pulley 10 may be moved inward and outward, the slides moving longitudinally in the bearings 17. Preferably the slides 16 carry

the longitudinally-disposed rollers 18, which are usually provided at the outer end of the elevator-frame.

As best shown in Fig. 3, the slides 16 at the opposite sides of the machine are connected by cross-bars 19 20 and diagonal braces 21 22, besides being connected by the shaft 13, as already described, so that said slides, together with the cross-bars and braces, form a sliding frame which is adapted to move longitudinally of the elevator. At opposite sides of said frame are provided racks 23, extending longitudinally of the frame, as shown in Fig. 3. 24 indicates a shaft mounted in the frame A in suitable bearings and extending transversely thereof, as shown in Fig. 3. Said shaft carries at its end portions pinions 25, which mesh with the racks 23, so that by rotating said shaft 24 the sliding frame may be moved longitudinally of the elevator in either direction.

As shown in Fig. 3, the ends of the shaft 24 project beyond the sides of the elevator and carry pulleys 26, which are loose on the shaft. At one end portion is a pulley or sheave 27, which is fast on the shaft, so that by rotating said pulley the shaft may be rotated to adjust the position of the sliding frame. 28 indicates chains or other flexible connections which pass around the pulleys 26 and are connected to the inner portion of the sliding frame, preferably by hooks 29. (Shown in Figs. 2 and 3.) The upper ends of the chains are connected to the upper end portions of struts 30, which are connected by chains 31 with suitable hoisting mechanism 32. (Shown in Fig. 1.) By actuating the hoisting mechanism the inclination of the struts 30 may be varied. The hoisting mechanism is of course arranged so that it may be locked against rotation, thereby holding the struts 30 in any desired position of adjustment. By the construction above described the weight of the elevator-frame, together with the load carried by the elevator, acts to force the extensible or sliding frame outward, and thereby put the belt under tension, this action being automatic. In order to place the regulation of the tension under the control of the operator, however, I provide a tension-lever 33, fulcrumed at 34 upon the frame of the machine and connected by a chain 35 with the pulley 27, as shown in Figs. 1 and 2, said chain passing over one or more suitable guide-rollers 36, as shown in Fig. 1. The lever 33 is provided with the usual pawl 37 and segmental rack 38 or other suitable locking mechanism, by which it may be locked in different positions of adjustment. The arrangement is such that by operating the lever 33 the pulley 27, and consequently the shaft 24, may be rotated in the direction indicated by the arrow in Figs. 1 and 2, thereby moving the extensible frame and pulley 10 inward

to reduce the tension of the belt. By setting the lever 33 at any desired point the extent to which the tension is increased automatically by the load may be limited.

Where the load is insufficient to secure the requisite tension on the belt, the sliding frame may be forced outward positively by the operating-lever 33 after first slipping the chain 35 over the top of the sheave 27. Actuation of the lever 33 therefore acts to move the sliding frame outward instead of inward. In this manner I avoid the necessity of providing a separate lever and sheave for effecting the outward movement of the sliding frame.

By the construction above described provision is made by which the tension upon the conveyer-belt is automatically regulated to a certain extent by the weight of the elevator-frame and load without interfering with the separate adjustment thereof by the operator when desirable, so that the tension of the belt at all times may be accurately controlled.

The shaft 24 and pinions 25, in addition to providing for moving the sliding frame inward and outward, serve to equalize the strain on the sliding frame, so that one side of the frame may not be by undue strain moved outwardly ahead of the other side, thereby causing the belt to run toward one side or the other, due to an uneven load on the conveyer. The running of the belt true to center is insured by means of the shaft described.

In the construction shown the outer frame A is made in the form of a detachable extension applied to frame B and secured thereto by side plates 39 40. By this construction the sliding frame may be readily applied to or removed from the elevator-frame; but so far as the generic features of my invention are concerned they are not limited to so constructing the frame A.

41 indicates a guide-roller for the sprocket-chain, which is mounted in a suitable bracket 42, carried by the frame A.

43 indicates the side boards of the elevator-frame.

It will be understood that my invention is not restricted to the specific features of the construction illustrated and described except in so far as they are specifically claimed, but includes generically the subject-matter of the broader claims.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of an elevator-frame, an extensible frame coöperating therewith, a conveyer-belt carried by said elevator-frame and said extensible frame, and means operated by the load for positively forcing said extensible frame outward.

2. The combination of an elevator-frame, a conveyer-belt, and means positively actua-

ated by the weight of the load for automatically increasing the tension of the conveyer-belt.

3. The combination of an elevator-frame, an extensible frame cooperating therewith, a conveyer-belt carried by said frames, and means positively actuated by the weight of the load for automatically increasing the tension on the conveyer-belt.

4. The combination of an elevator-frame, an extensible frame cooperating therewith, a conveyer-belt carried by said frames, means controlled by the weight of the load for varying the tension on said belt, and means for limiting the tension applied to the belt.

5. The combination of a carriage, an elevator-frame, an extensible frame, a conveyer-belt carried by said frames, a lever mounted on the carriage, and means connected with said lever for moving said extensible frame inwardly.

6. The combination of a carriage, an elevator-frame, an extensible frame, a conveyer-belt carried by said frames, a lever mounted on the carriage, and means connected with said lever for moving said extensible frame either inwardly or outwardly at pleasure.

7. The combination of a carriage, an elevator-frame, an extensible frame cooperating therewith, a conveyer-belt carried by said frames, and means mounted on the carriage connected with the opposite sides of said extensible frame for moving it either inward or outward at pleasure.

8. The combination of a carriage, an elevator-frame, a sliding extensible frame cooperating therewith, a conveyer-belt carried by said frames, and means mounted on the carriage for moving said extensible frame either inward or outward at pleasure to vary the tension on the belt.

9. The combination of a carriage, an elevator-frame, a slidable extensible frame cooperating therewith, a conveyer-belt carried by said frames, a shaft, pinions carried by said shaft at opposite sides of said extensible frame, racks carried by said extensible frame and meshing with said pinions, and means mounted on the carriage for rotating said shaft in either direction.

10. The combination of a carriage, an elevator-frame, an extensible frame cooperating therewith, a conveyer-belt carried by said frame, and means mounted on the carriage for applying power to the opposite sides of said extensible frame for moving it either inward or outward at pleasure.

11. The combination of a carriage, an elevator-frame, an extensible frame cooperating with said elevator-frame, a conveyer-belt carried by said frames, and means connected with the carriage and positively actuated by the weight of the load for automatically varying the tension applied to the conveyer-belt.

12. The combination of a carriage, an elevator-frame, an extensible frame cooperating with said elevator-frame, a conveyer-belt carried by said frames, means connected with the carriage for automatically varying the tension applied to the conveyer-belt, and means mounted on the carriage for positively adjusting the position of the extensible frame.

13. The combination of a carriage, an elevator-frame, an extensible frame cooperating with said elevator-frame, a conveyer-belt carried by said frames, pulleys carried by the elevator-frame, and flexible connections running over said pulleys and connected at one end with the carriage and at the other end with the inner portions of said extensible frame for automatically varying the tension upon the belt.

14. The combination of a carriage, an elevator-frame, an extensible frame cooperating therewith, a conveyer-belt carried by said frames, a shaft carried by said elevator-frame, a sheave carried by said shaft, rack-and-pinion mechanism connecting said shaft with said extensible frame, a lever mounted on the carriage, and a flexible connection connecting said lever with said sheave whereby by operating said lever said shaft may be rotated to vary the tension on the belt.

15. The combination of a carriage, an elevator-frame, an extensible frame cooperating therewith, a conveyer-belt, sheaves carried by said elevator-frame, a strut mounted on the carriage, and flexible means running over said sheaves and strut, said flexible means being connected with the inner portion of said extensible frame and with the carriage.

16. The combination of a carriage, an elevator-frame, an extensible frame cooperating with said elevator-frame, a conveyer-belt carried by said frames, and means connected with the carriage for positively moving said extensible frame in either direction to vary the tension of the conveyer-belt.

17. The combination of a carriage, an elevator having a conveyer-belt, and positively-acting means connected with the carriage for either increasing or reducing the tension of said conveyer-belt at pleasure.

18. The combination of a carriage, an elevator-frame, an endless conveyer, lever mechanism mounted on the carriage, and means positively actuated by said lever mechanism for reducing the tension of said conveyer.

19. The combination of an elevator-frame, an endless conveyer, means controlled by the weight of the load for automatically varying the tension of said conveyer, and adjustable means for limiting the extent to which the tension may be automatically increased.

20. The combination of an elevator-frame, an endless conveyer, means positively actuated by the weight of the load for automati-

ically increasing the tension of said conveyer, and hand-operated means for varying the tension of the conveyer.

21. The combination of an elevator-frame, an extensible frame carried by said elevator-frame, a conveyer-belt carried by said frames, one of said frames being movable to vary the tension upon said belt, and means controlled by the weight of the load for positively actuating said extensible frame to increase the tension on the conveyer-belt.

22. The combination of an elevator-frame, an extensible frame carried by said elevator-frame, a conveyer-belt carried by said frames, one of said frames being movable inward and outward to vary the tension upon said belt, and means controlled by the weight of the load for positively moving said extensible

frame outward to increase the tension on the conveyer-belt.

23. The combination of a carriage, an elevator-frame, an extensible frame carried by said elevator-frame, a conveyer-belt carried by said frames, one of said frames being movable to vary the tension upon said belt, means controlled by the weight of the load for positively actuating said extensible frame to increase the tension on the conveyer-belt, a lever mounted on the carriage, and means connected with said lever for positively actuating said extensible frame to vary the tension on the conveyer-belt.

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Witnesses:

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