No. 788,180. PATENTED APR. 25, 1905.

F. R. WILLSON, JR.

CONVEYER LOADING DEVICE.

APPLICATION FILED MAY 22, 1902.

4 SHEETS—SHEET 1.

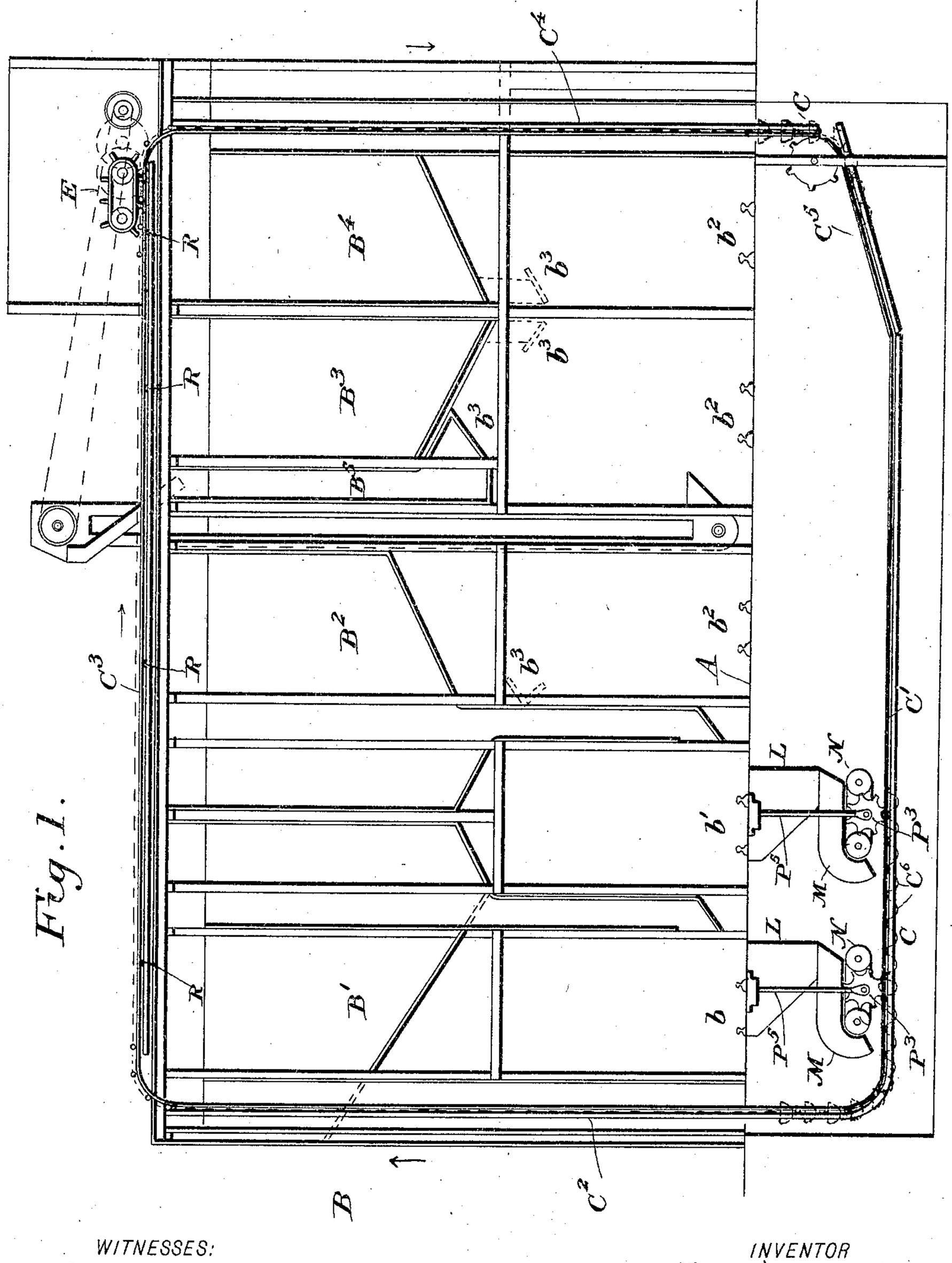


Fig. 1.

WITNESSES:

F. S. Elmore.

E. P. Alexander

INVENTOR

Freeman R. Willson, Jr.

BY

A. A. Ellis

ATTORNEY.

No. 788,180. PATENTED APR. 25, 1905.

F. R. WILLSON, Jr.

CONVEYER LOADING DEVICE.

APPLICATION FILED MAY 22, 1902.

4 SHEETS—SHEET 2.

Fig. 2.

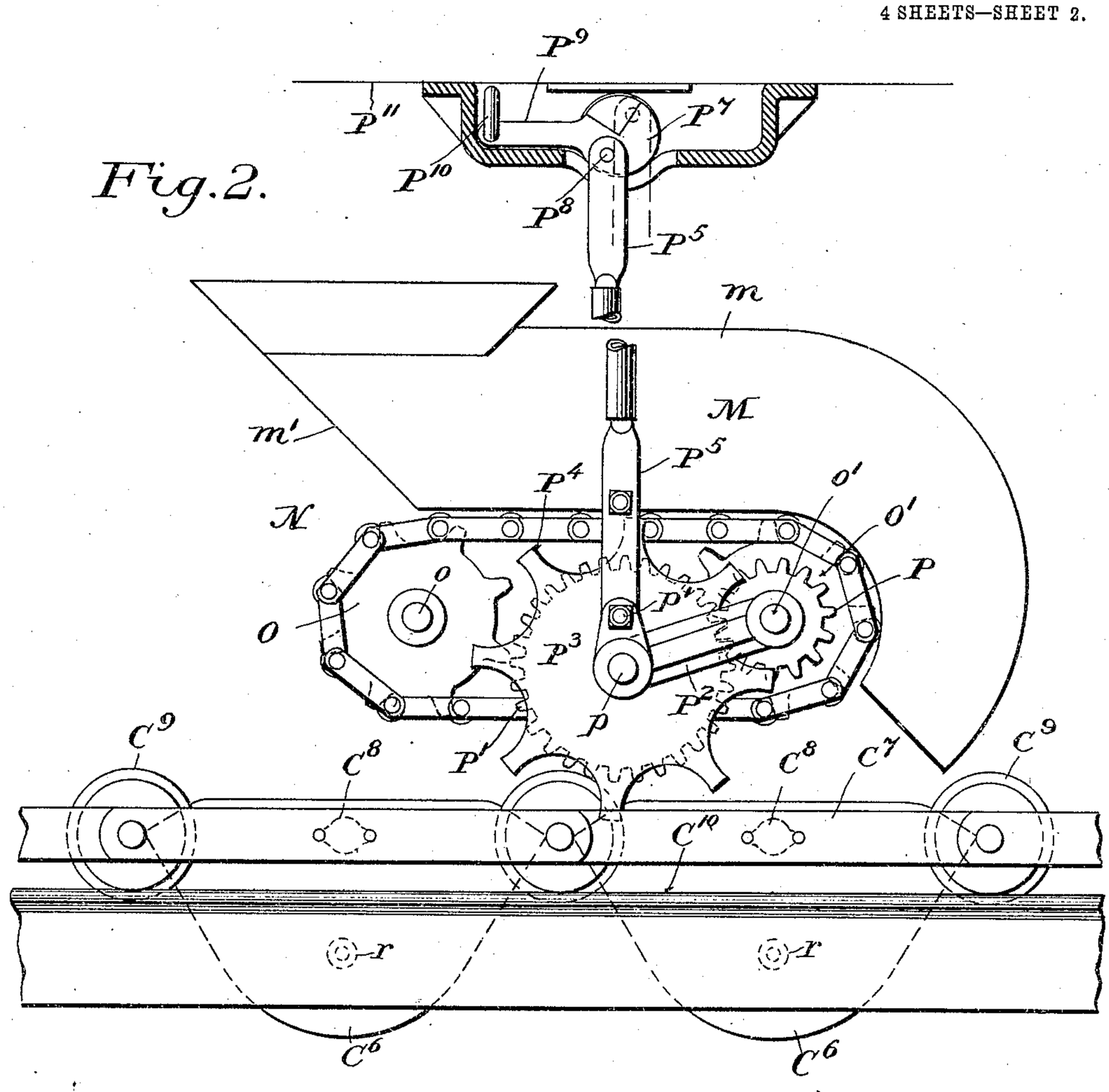
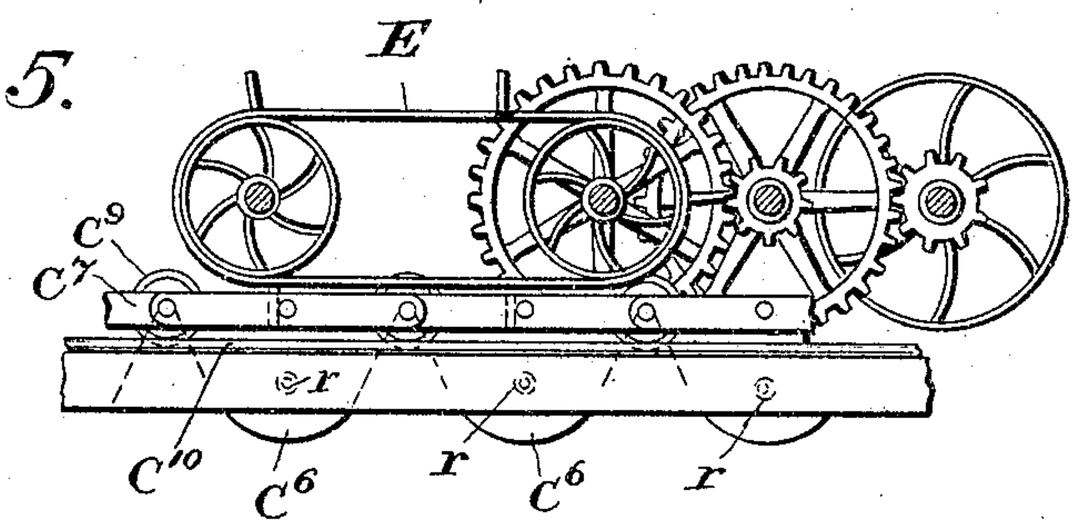


Fig. 5.



WITNESSES:

F. D. Elmore

E. P. Alexander

INVENTOR

Freeman P. Willson Jr.

BY

A. W. Ellis

ATTORNEY.

No. 788,180. PATENTED APR. 25, 1905.

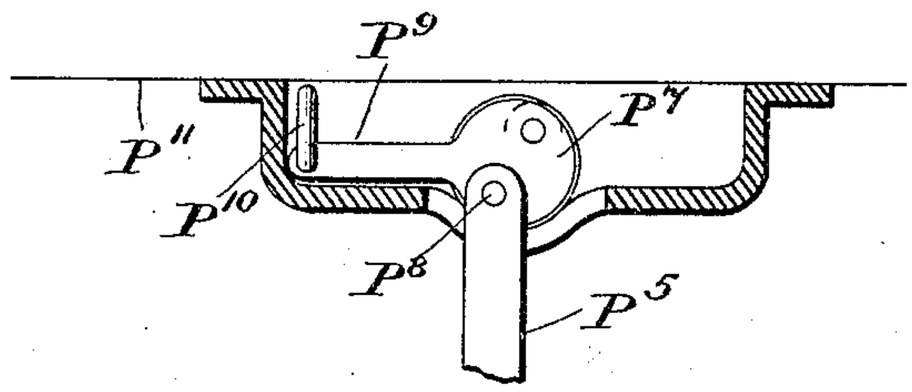
F. R. WILLSON, Jr.

CONVEYER LOADING DEVICE.

APPLICATION FILED MAY 22, 1902.

4 SHEETS—SHEET 3.

Fig. 3.



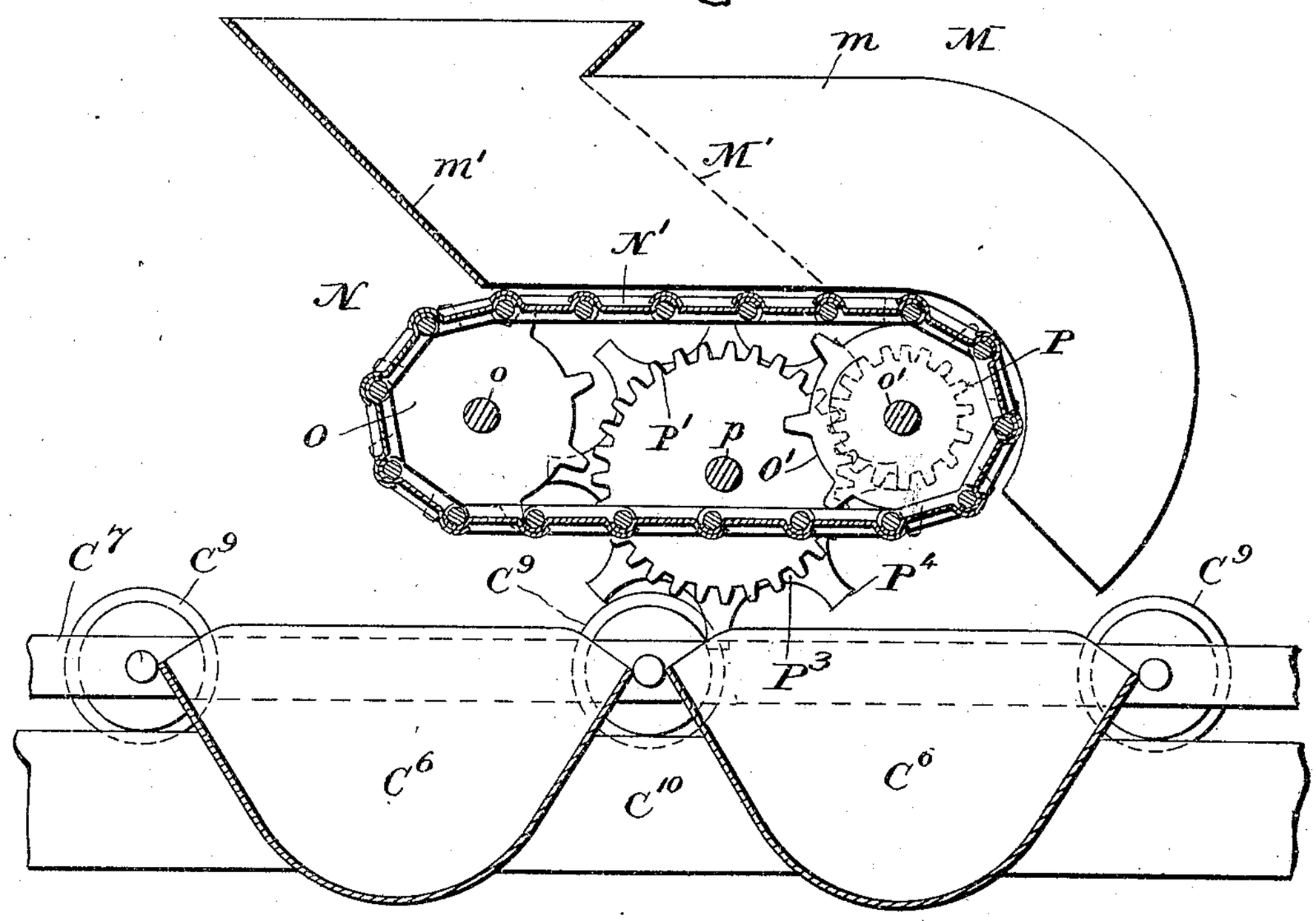


Fig. 6.

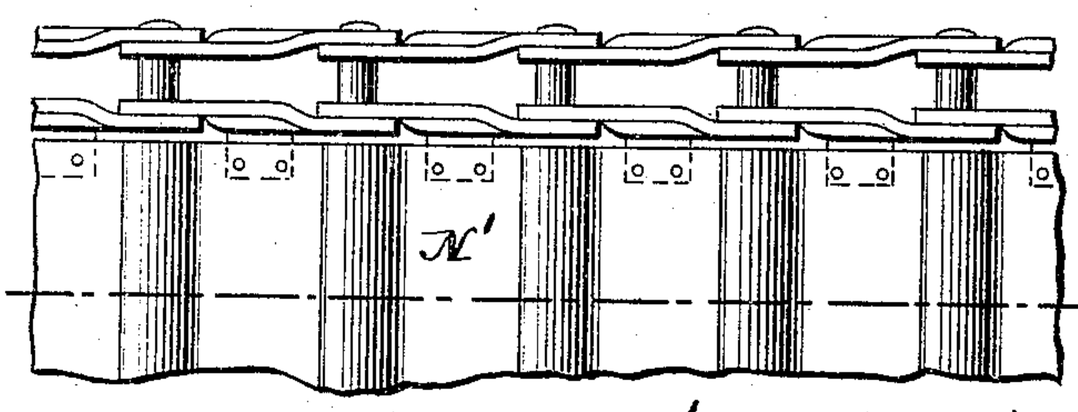
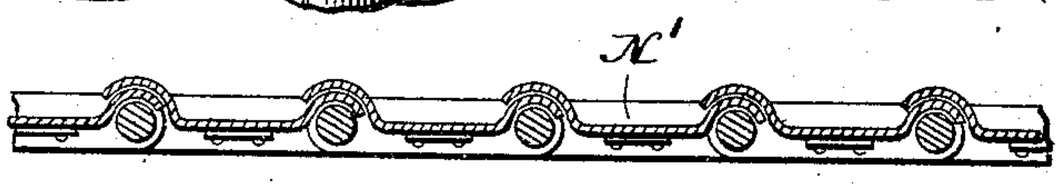


Fig. 7.



WITNESSES:

F. D. Elmore

E. P. Alexander

INVENTOR

Freeman R. Willson, Jr.

BY

H. H. Bliss

ATTORNEY.

No. 788,180. PATENTED APR. 25, 1905.

F. R. WILLSON, Jr.

CONVEYER LOADING DEVICE.

APPLICATION FILED MAY 22, 1902.

4 SHEETS—SHEET 4.

Fig. 4.

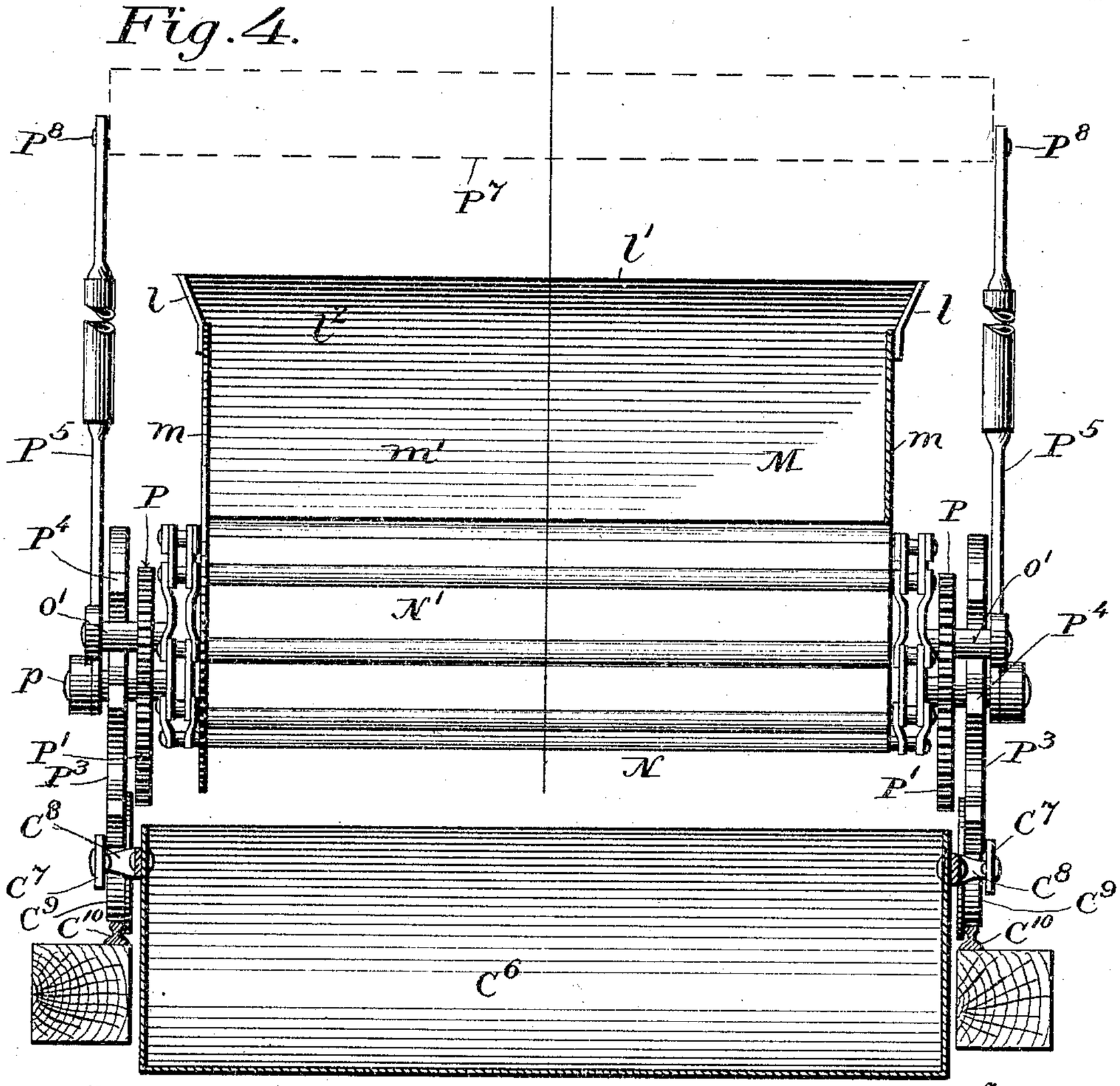


Fig. 9.

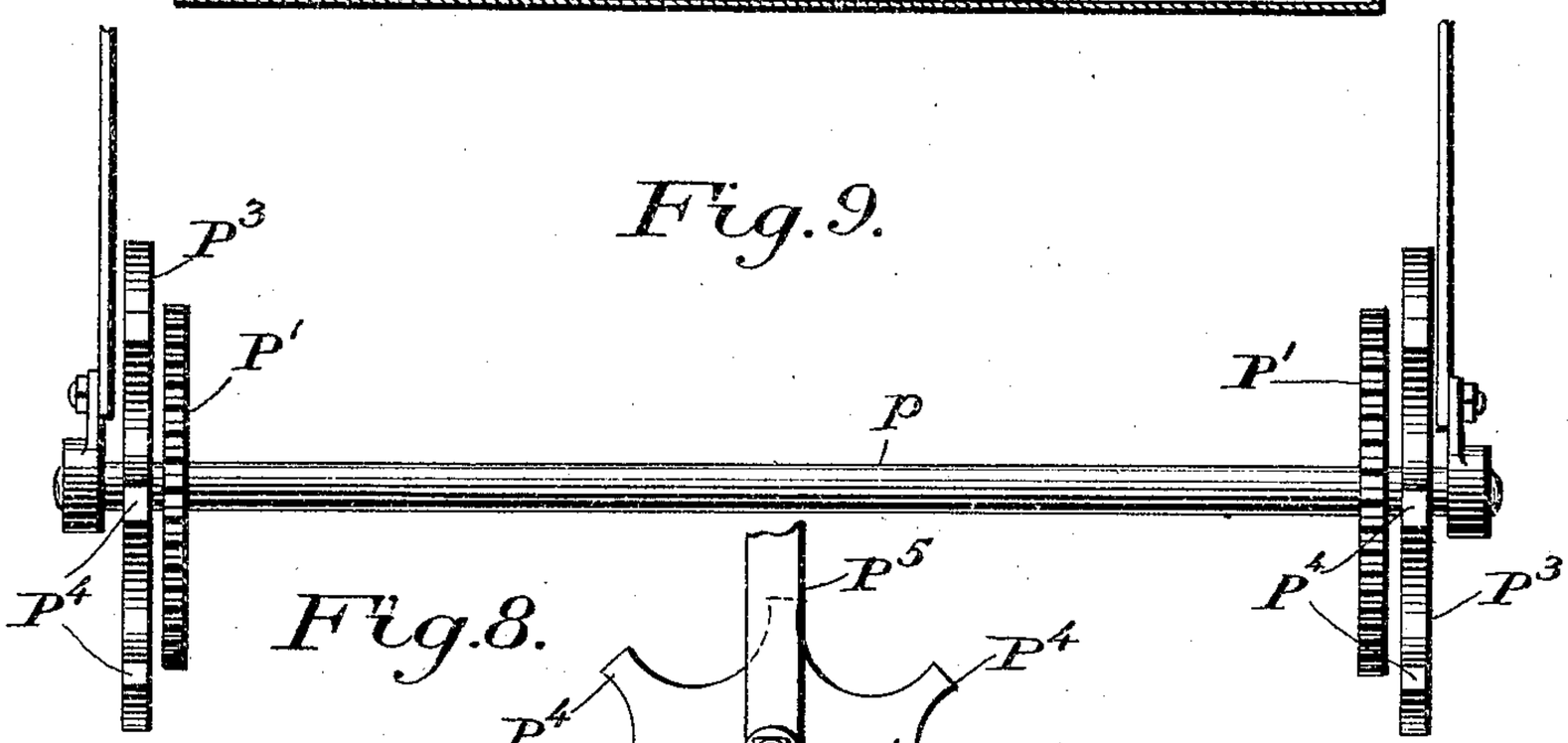
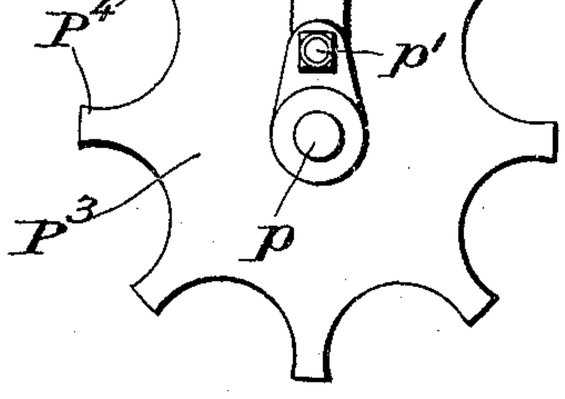


Fig. 8.



WITNESSES:

F. S. Elmore

E. P. Alexander

INVENTOR

Freeman P. Willson, Jr.

BY

ATTORNEY.

No. 788,180. Patented April 25, 1905.

UNITED STATES PATENT OFFICE.

FREEMAN R. WILLSON, JR., OF COLUMBUS, OHIO, ASSIGNOR TO JOSEPH A. JEFFREY, OF COLUMBUS, OHIO.

CONVEYER-LOADING DEVICE.

SPECIFICATION forming part of Letters Patent No. 788,180, dated April 25, 1905.

Application filed May 22, 1902. Serial No. 108,596.

To all whom it may concern:

Be it known that I, FREEMAN R. WILLSON, Jr., a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Conveyer-Loading Devices, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a diagrammatic side elevation illustrating the general features of a conveyer apparatus embodying my improvements. Fig. 2 is a side elevation of the bucket-loading devices. Fig. 3 is a longitudinal section of the bucket-loader and of part of the conveyer. Fig. 4 is a view, partly in front elevation, partly in section, of the bucket-loader. Fig. 5 is an enlarged detail view of the conveyer-actuating mechanism. Fig. 6 is an enlarged plan view of part of the feed-apron. Fig. 7 is a sectional view on the line $x\ x$ of Fig. 6. Fig. 8 is an elevation of the feeder-wheel detached. Fig. 9 shows in front elevation the driving-shaft for the feeder.

To illustrate one method of employing an apparatus containing my improvements, I have selected a locomotive-coaling station and in Fig. 1 have shown it conventionally and have also shown a conveyer in connection therewith. Referring to that figure, A indicates the general plane of the surface of the ground and from it there rises upward the structure, (indicated as a whole by B,) while below this line there is sunk a pit to contain parts of the conveying apparatus and the loaders therefor. The structure B in its upper part supports a series of coal-bins B' B^2 B^3 B^4 and a sand-bin B^5. Railway-tracks are shown at b b' b^2, those at b b' being illustrated as adapted to bring to the conveyer and elevator the coal or sand which it is desired to elevate and store in the aforesaid bins and those at b^2 being shown as adapted for locomotives which are to receive their charges of coal or sand from the said bins, there being spouts or movable chutes at b^3 for this purpose.

The conveyer is indicated by C, the parts thereof to be referred to more specifically below. It is arranged to travel on a lower horizontal run C', a vertical run C^2, an upper horizontal run C^3, and a down vertical run C^4, there being at C^5 a section of the conveyer and of its support which is adapted to be adjusted to provide for regulating the tension of this mechanism for taking up slack, &c.

The conveyer proper comprises a series of buckets C^6 C^6, supporting-chains C^7 at the sides, hinges C^8, which unite the buckets to the chains, and antifriction-rollers C^9, which are mounted at the sides of the chain-links and are fitted to the tracks or rails C^{10}. The wheels C^9 support the conveyer upon the track. The conveyer at no point rests upon drive-wheels, the only wheels with which it or its chains come in contact being the wheels at the tension-take-up device to be described. At the two upper and one of the lower corners of the rectangular path around which the conveyer moves the track-rails are merely curved, and the downward stress and weight of the conveyer are at all points taken by these track-rails.

Motion is imparted to the conveyer by means of an endless driving device, (indicated by E,) it comprising chains and a sprocket-driving mechanism, together with arms or projections, which engage with the main conveyer and impart motion to the latter.

At L is located the initial hopper, which receives the coal or other material in the first instance and which is to be loaded to the conveyer above described.

M is an intermediate guide or chute between the hopper and the conveyer.

N indicates as an entirety the apparatus for controlling the delivery of the material from the chute M to the buckets.

As shown, the hopper L has the side walls l l and the end walls l', these preferably converging to guide the material to a reduced area of escape at l^2. The chute or guide M has the side walls m m and the back wall m'.

The material coming downward from the hopper L into the guide or chute M is checked by the horizontal wall-like part of the controlling device, (indicated as a whole by N,) and as it thus descends under the influence of gravity and the pressure from the upper part

of the mass it seeks reaches and stops at a plane indicated by the line M'. Various devices have been used or proposed for controlling the passage of such a mass of material, including a short endless series of hoppers carried by chains and successively registering with the buckets below, also rotary measuring-cylinders divided into compartments and also reciprocating floors or valves. Having had experience with each of a number of such devices, I have found serious disadvantages to be incident to them. The loading mechanism having the reciprocating valve or plate has been the least disadvantageous of these devices; but nevertheless there are disadvantages incident to it, and particularly this, that it requires twice the power to move it that I have found to be necessary if a mechanism such as that herein be employed. The entire weight of the mass of material in the hopper and in the chute or guide rests upon the valve or plate, and if it is reciprocated it is necessary to first drag it back under the load of the said superincumbent weight and then push it forward again under the same, it being resisted in both directions by the friction of the material which rests upon it, and even when the valve is supported upon rollers or wheels it still has this friction of the superincumbent mass to overcome. This trouble I have obviated by substituting a flat floor-like carrier adapted to move continuously in one direction, though moving step by step, the essential parts of which I will describe.

N' indicates an apron-carrier formed of chains and sheets of flight or plate material secured to the tops of the chains and extending from one to the other, so as to make a tight imperforate floor. This carrier is mounted upon the wheels O O on the shaft *o* in the rear of the wall *m'* and upon the wheels O' O' on the shaft *o'*, situated in a transverse plane somewhat forward of the above-described line M, which indicates the inclined plane at which the material naturally comes to rest. When the parts are thus arranged, the apron serves at all times as a complete cut-off for the material (so far as concerns its tendency to be crowded or forced downward by the weight of the mass in the hopper) and at the same time is ready to deliver a small amount of the material resting upon it to each of the buckets passing below it. For this latter purpose the carrier is moved as follows: P is a gear-wheel on the shaft *o'*, which meshes with a gear-wheel P' on a shaft *p*, mounted transversely of the conveyer. The shaft *p* is mounted in an arm P^2, which in turn is mounted upon and adapted to swing around the shaft *o'*, whereby shaft *p* can be moved up or down, as desired, without varying the meshed relations of the wheels P and P'. This shaft *p* also carries a toothed wheel or disk P^3, the teeth of which are indicated by P^4. These teeth lie in the path of the conveyer-rollers C^9, and as the latter advance they successively impinge on the teeth P^4 and impart step-by-step movement to the wheel P^3 and the wheels P' and P. The arm P^2 and its shaft *p* are supported by means of suspending bars, rods, or links P^5, which extend upward to a suitable point—as, for instance, to the framework or floor at P^{11} above the conveyer. The suspending devices are preferably pivoted at *p'* to lugs or ears formed on the arms P^2 and the bearings of the shaft *p*. At the upper end of the suspending rod or link there is an adjusting mechanism, herein shown as consisting of an eccentric carrier P^7, to which the rod or link is pivoted at P^8. By means of the arm P^9 and the operating device at P^{10} the adjusting mechanism can be thrown from one position to another, so as to elevate or lower the suspending devices together with the wheels P^3 and P'. When the latter are put in their lower positions, they can be acted on by the conveyer and the feeding belt or conveyer will be caused to deliver intermittent charges to the buckets. When the suspending devices are drawn up, the wheel P^3 will be taken out of the lines of the rollers or other parts of the conveyer and will not be acted upon thereby.

In order to prevent torsion and lateral strains or twistings of the conveyer carrying the buckets or of the loading-carrier or of the parts which actuate the latter, I prefer to employ a duplicate set of driving parts, one upon the right-hand side of the conveyer and the other upon the left.

It will be seen that there is no backward motion of any of the parts upon which rests the load of material, there being, on the contrary, only step-by-step advance movements of the conveyer, and as there is a tendency for this load to naturally crowd forward the movement of the carrier is accomplished with little, if any, rubbing or dragging of the conveyer-surface under the mass. At the same time it will be seen that that part of the material which is in advance of the aforesaid line M' has no tendency to crowd or squeeze forward, the force which causes such crowding being lost at the line M', and consequently when the conveyer ceases in its movement there is no material tendency of the material to spill over the front end of the carrier.

The loaded buckets travel along the path of the conveyer until they reach the upper run, and as they move along the latter they are automatically emptied successively into one or another of the bins B' B^2, &c. The tilting of the buckets to empty them may be accomplished in any preferred manner—as, for instance, by means of lugs R with antifriction-rollers *r* on the ends of the buckets adapted to engage with suitable cams, tracks, or the like capable of adjustment to and from the path of said lugs, one of the tripping devices being properly arranged directly above each of the bins or hoppers.

What I claim is—

1. The combination with the hopper or chute, and the series of conveyer buckets or receptacles of the endless carrier interposed between the buckets and the chute and arranged to have its plates form a cut-off floor for the chute upon which rests the material therein, and automatically-acting devices movable to and from an operative position for imparting a step-by-step movement to said carrier, its said movements being always in one direction, substantially as set forth.

2. The combination with the hopper or chute, and the series of conveyer buckets or receptacles of the endless carrier interposed between the buckets and the chute and arranged to have its plates form a cut-off floor for the chute upon which rests the material therein, and an intermittently-moving wheel rotating continuously in one direction and engaging with the conveyer for imparting a step-by-step movement to said carrier, its said movements being always in one direction, substantially as set forth.

3. The combination with the hopper or chute, and the series of conveyer buckets or receptacles of the endless carrier interposed between the buckets and the chute and arranged to have its plates form a cut-off floor for the chute upon which rests the material therein, and an intermittently-moving wheel rotating continuously in one direction and movable from and to an operative position for imparting a step-by-step movement to said carrier, its said movements being always in one direction, substantially as set forth.

4. The combination with a hopper or chute and the series of conveyer buckets or receptacles, of the endless carrier interposed between the buckets and the chute and arranged to have its plates form a cut-off floor for the chute upon which rests the material therein, automatically-acting devices engaging with the conveyer for imparting a step-by-step movement to said carrier, and means for moving said automatically-acting devices into and out of working relation with the conveyer, substantially as set forth.

5. The combination with a hopper or chute and the series of conveyer buckets or receptacles, of the endless carrier interposed between the buckets and the chute and arranged to have its plates form a cut-off floor for the chute upon which rests the material therein, automatically-acting devices engaging with the conveyer for imparting a step-by-step movement to said carrier, and means for locking said automatically-acting devices in and out of working relation with said conveyer, substantially as set forth.

6. The combination with the hopper or chute, and a series of conveyer buckets or receptacles, of the endless carrier interposed between the buckets and the chute and arranged to have its plates form a cut-off floor for the chute upon which rests the material therein, and an intermittently-moving toothed wheel engaging with the conveyer for imparting a step-by-step movement to said carrier, its movement being always in one direction, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREEMAN R. WILLSON, JR.

Witnesses:
J. E. MCDONALD,
J. F. DANIELL.