No. 736,903. PATENTED AUG. 18, 1903.

F. R. WILLSON, JR.

CONVEYING APPARATUS.

APPLICATION FILED JAN. 31, 1901.

NO MODEL. 5 SHEETS—SHEET 1.

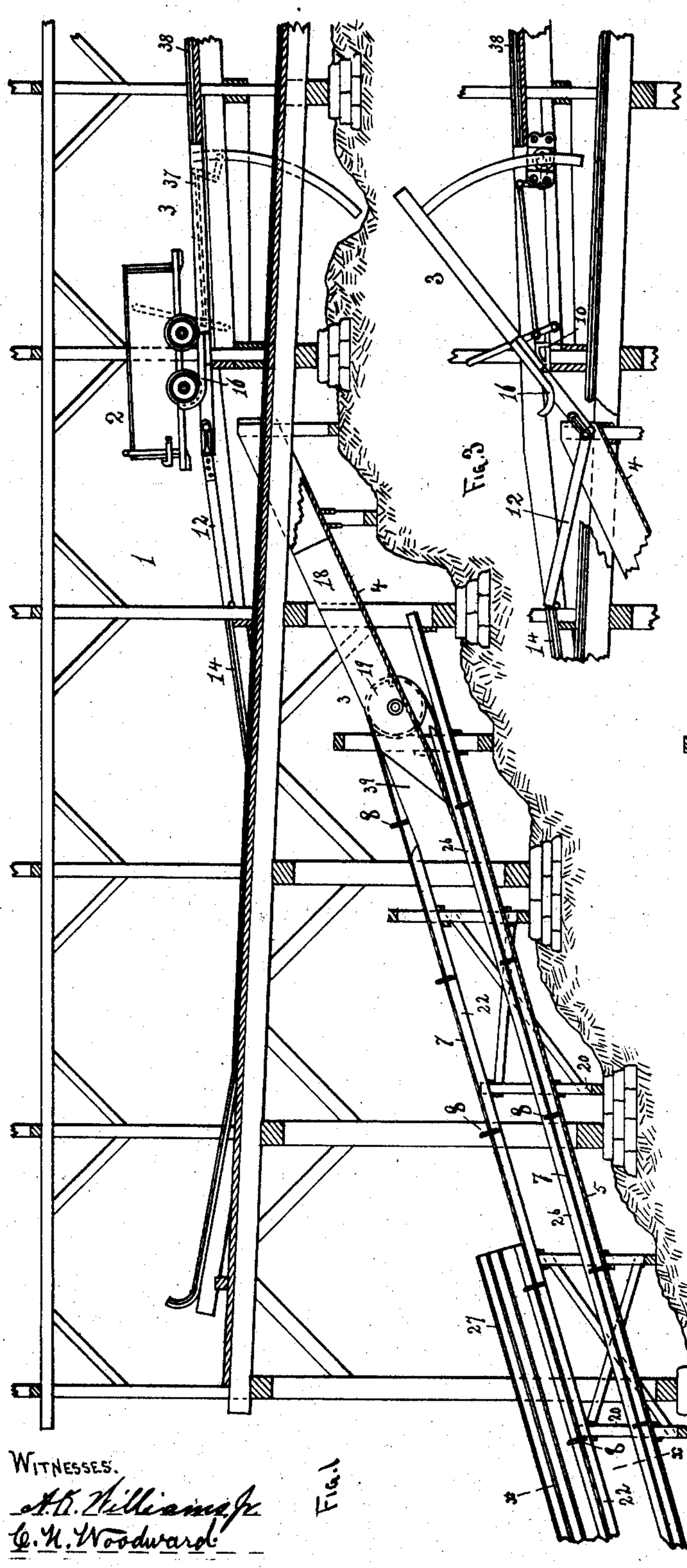

FIG. 1.

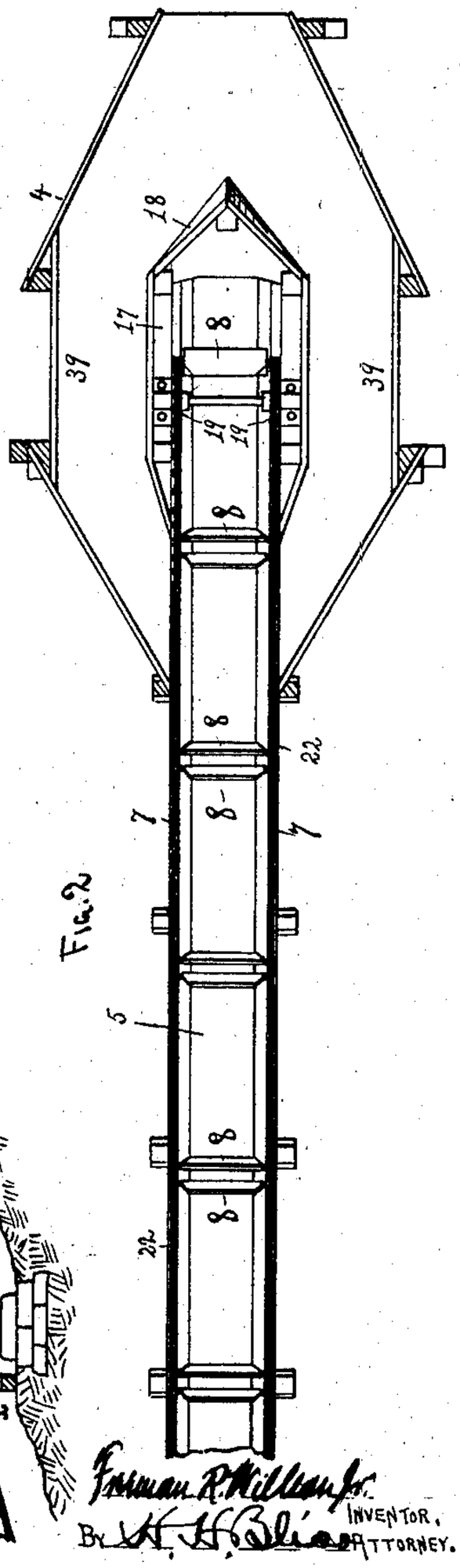

FIG. 2.

FIG. 3.

WITNESSES.

A. H. Williams Jr.

C. H. Woodward.

Freeman R. Willson Jr. INVENTOR.

By H. H. Bliss ATTORNEY.

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NO MODEL. 5 SHEETS—SHEET 2.

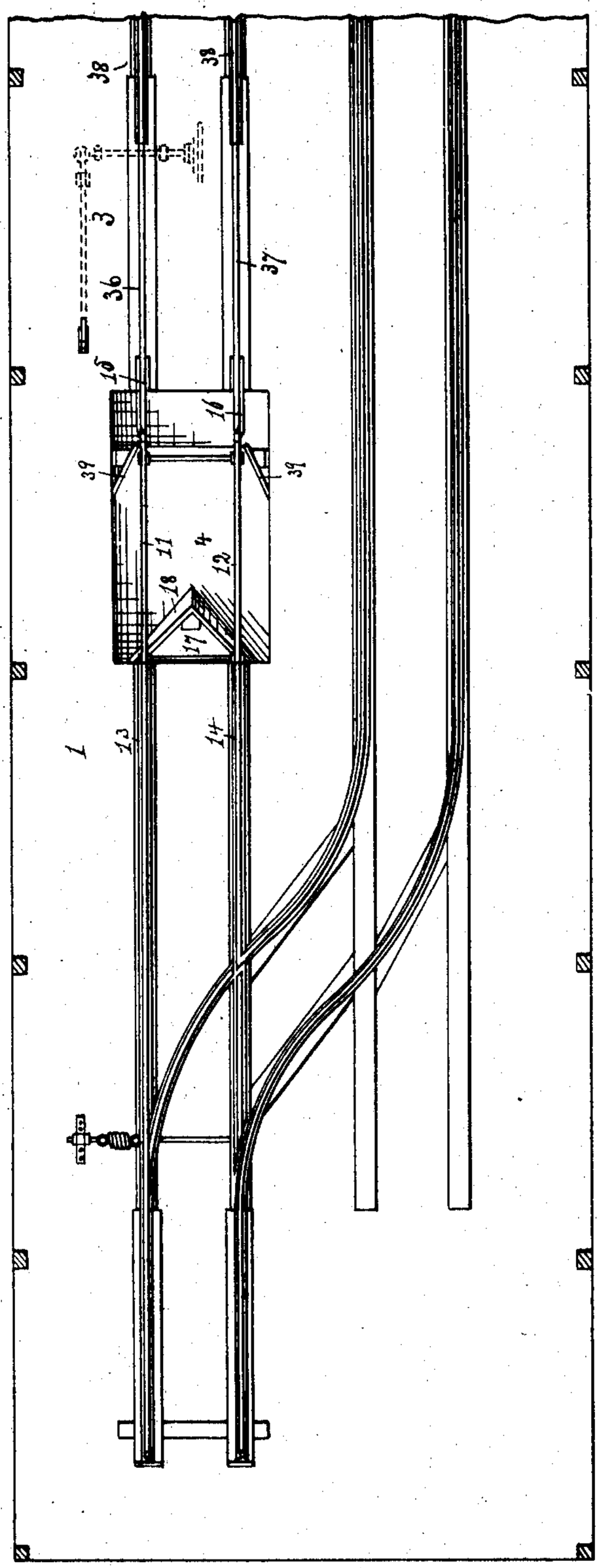

Fig. 4.

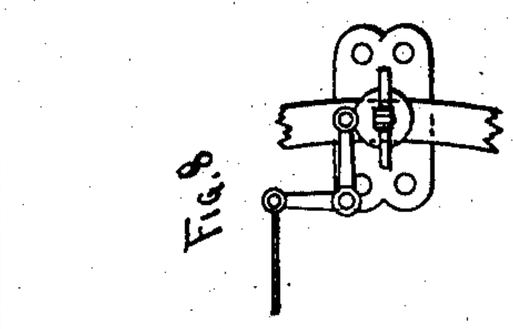

Fig. 6.

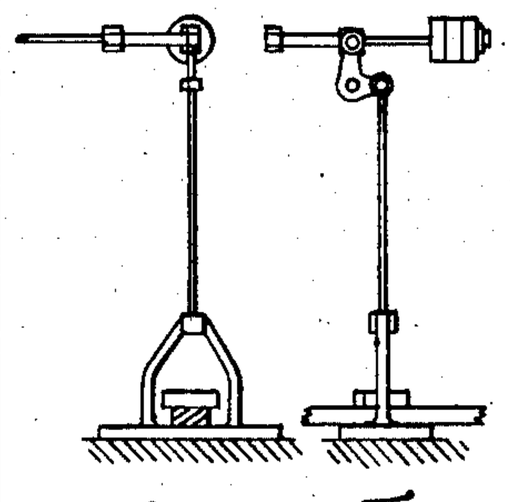

Fig. 7.

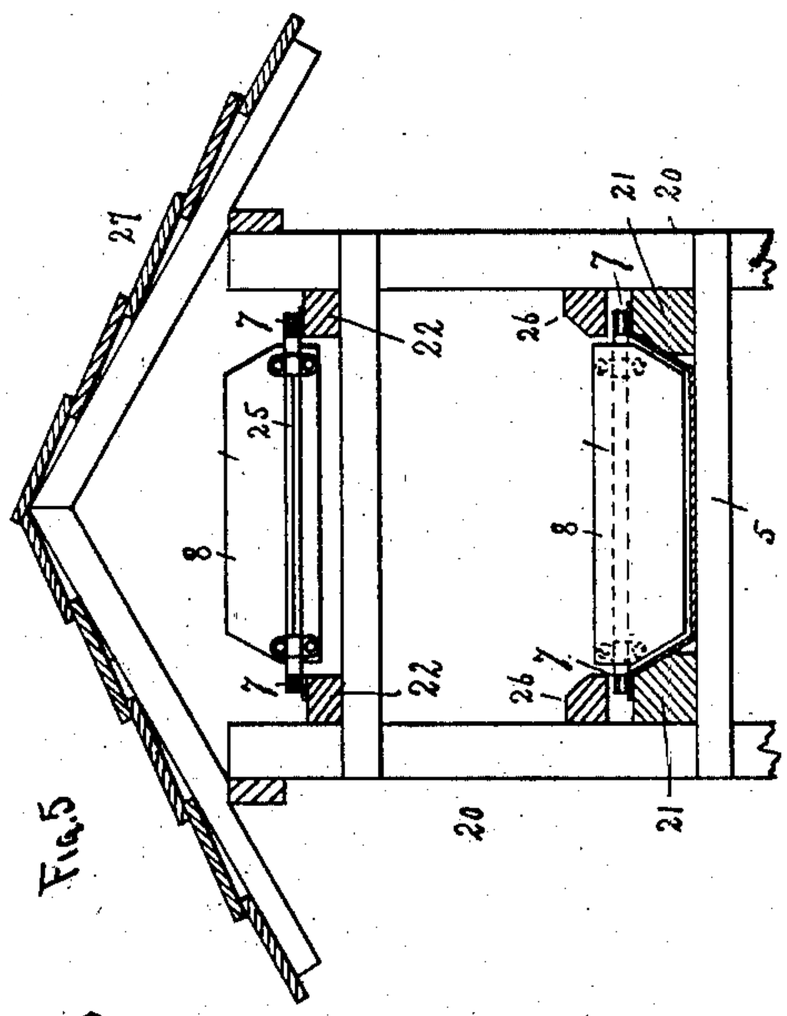

Fig. 5.

WITNESSES.

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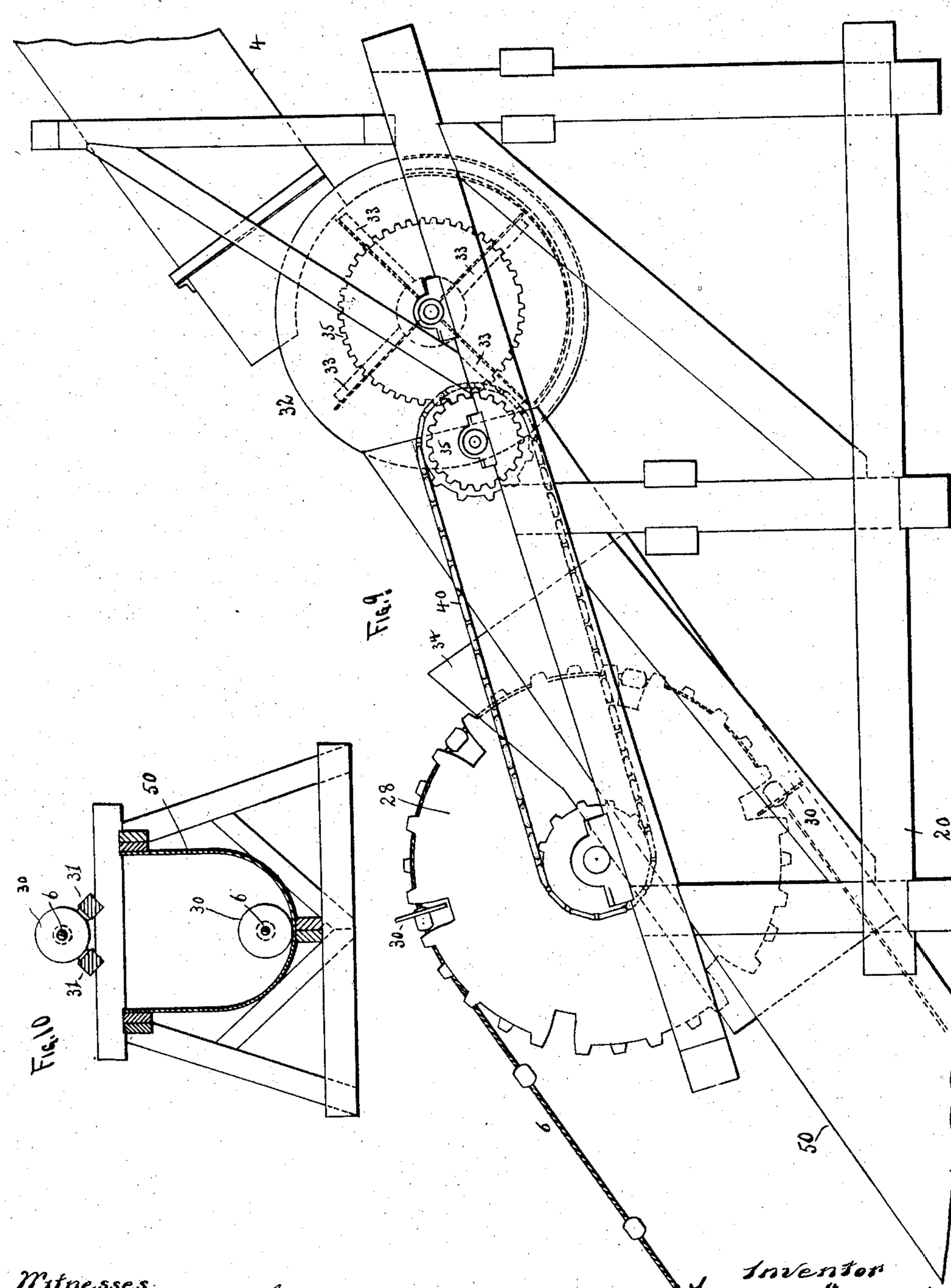
NO MODEL. 5 SHEETS—SHEET 3.



Witnesses
Albert H. Williams Jr.
C. M. Woodward

Inventor
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By H. A. Bliss Attorney.

No. 736,903. PATENTED AUG. 18, 1903.

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CONVEYING APPARATUS.

APPLICATION FILED JAN. 31, 1901.

NO MODEL. 5 SHEETS—SHEET 4.

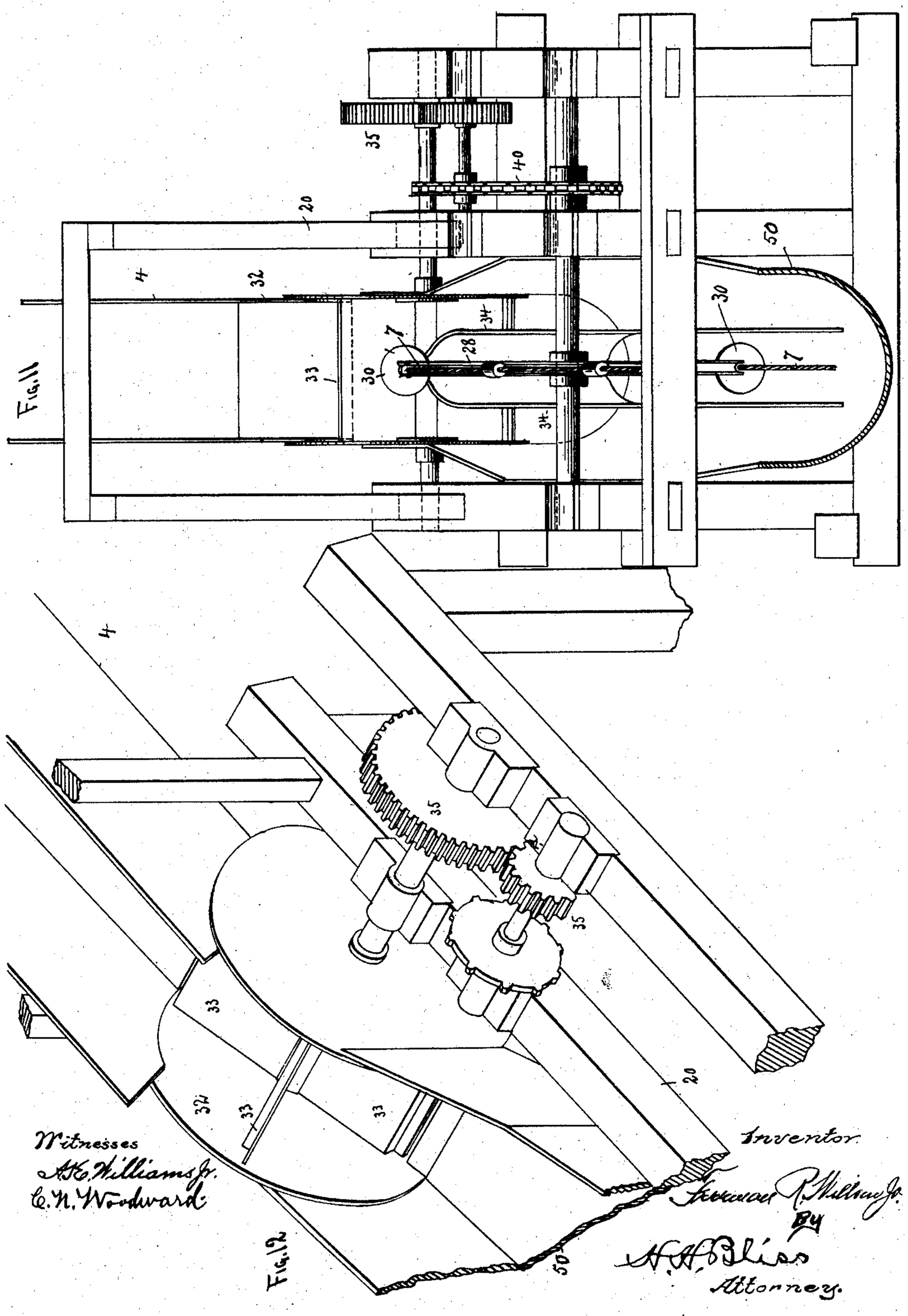

Fig. 1.

Fig. 2.

No. 736,903. PATENTED AUG. 18, 1903.

F. R. WILLSON, JR.

CONVEYING APPARATUS.

APPLICATION FILED JAN. 31, 1901.

NO MODEL. 5 SHEETS—SHEET 5.

Fig. 15

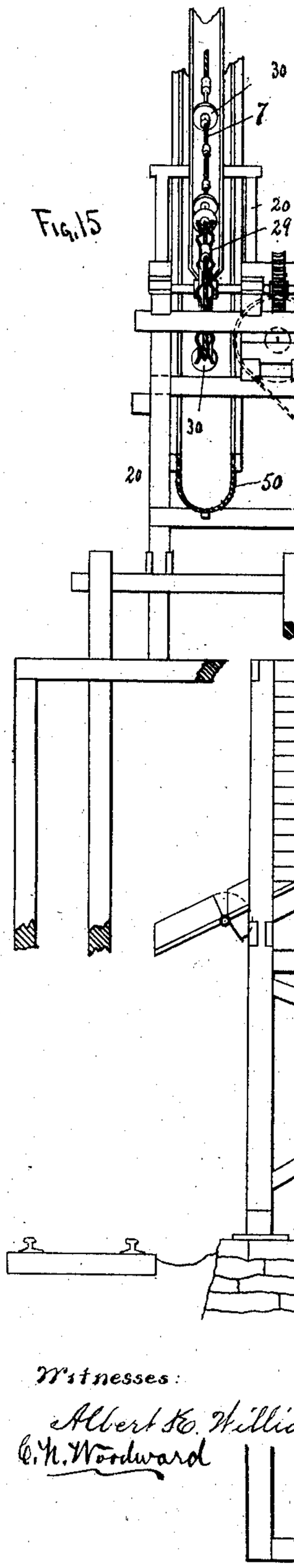

Fig. 13

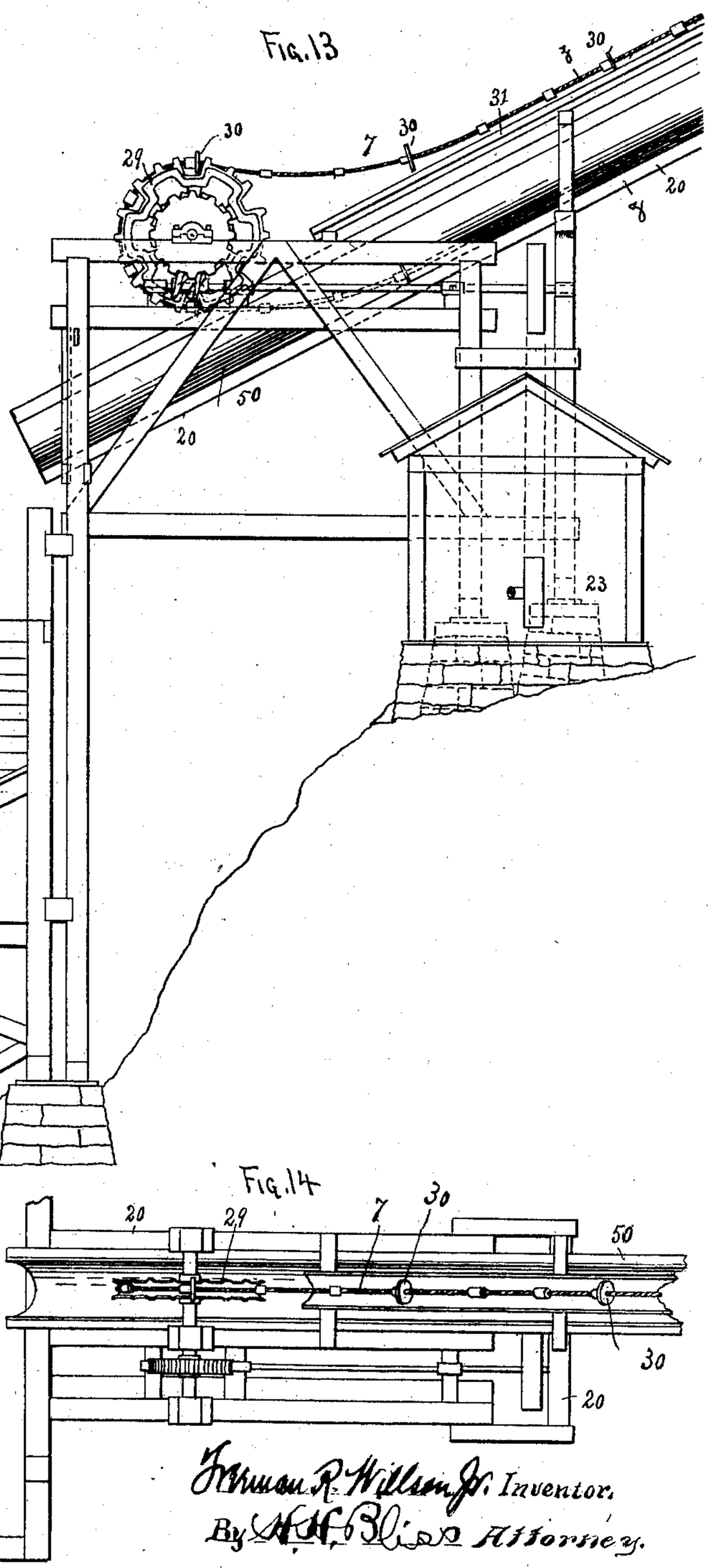

Fig. 14

Witnesses:

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C. H. Woodward

Inventor: Truman R. Willson Jr.

By H. H. Bliss Attorney.

No. 736,903. Patented August 18, 1903.

UNITED STATES PATENT OFFICE.

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

CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 736,903, dated August 18, 1903.

Application filed January 31, 1901. Serial No. 45,460. (No model.)

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 Conveying Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a sectional side elevation of the upper or feed end of the apparatus, illustrating the construction of the tilting or dumping mechanism and the loading hopper or chute. Fig. 2 is a plan view of the loading hopper or chute. Fig. 3 is a detached detail of the car-tilting mechanism. Fig. 4 is a plan view of the tilting or dumping platform. Fig. 5 is an enlarged cross-section of the retarding conveyer-trough about on the line *x x* of Fig. 1. Figs. 6, 7, and 8 are detached details of the brake mechanism of the tilt-table. Fig. 9 is a side elevation of the lower end of the loading-chute and the upper end of the retarding mechanism, illustrating a modification in the construction. Fig. 10 is a cross-section on the line *z z* of Fig. 13. Fig. 11 is a front elevation of the parts shown in Fig. 9. Fig. 12 is a perspective view of the mechanism shown in Fig. 11. Fig. 13 is a side elevation, on a reduced scale, of the lower end of the construction shown in Fig. 9. Fig. 14 is a plan view of the parts shown in Fig. 13. Fig. 15 is a front elevation of the parts shown in Fig. 13.

In this apparatus is comprised a platform provided with tracks upon which the loaded cars are adapted to be run and containing a tilting mechanism by which the contents of the cars may be discharged, a receiving-chute or loading-hopper, into which the contents of the cars are dumped and from which the material is conducted to another trough or chute leading to receiving-hoppers or pockets or other receptacles, the conductor-chute being provided with endless chains or cables suitably supported and having buckets or plates at intervals and traveling within the conductor-chute in the same direction as the flowing material, but at a slower speed than the natural flow of the material, whereby the material is retarded and fed to the receptacles at the discharge end of the conductor-chute in a uniform stream and only so fast as it can be disposed of to advantage. By this means the material may be conducted down a chute that is much steeper than could be otherwise employed, as by the use of the retarding mechanism the material may be fed down the chute at any required speed, the speed being regulated by the nature of the material or the conditions or incline of the slope down which it is required to be carried.

The apparatus is more particularly applicable to the conducting of coal and similar products down steep inclines, to accomplish which it has heretofore been necessary to erect expensive and cumbersome systems of inclined railways and similar structures. With my device, however, the troughs, with the chains or cables and their retarding buckets or plates, may be erected at comparatively small expense and without regard to the degree of inclination at which they are run and can be easily adapted to the varying nature and incline of the ground or the topography of the locality where it is to be erected.

The structure comprises generally a platform, which is represented as a whole at 1, upon which the loaded cars 2 are run; a tilting mechanism 3, by which the loaded cars may be tilted to discharge their loads; a receiving-chute or loading-hopper 4, into which the contents of the cars are dumped; a conducting-chute 5, down which the material will flow from the loading-chute; a receptacle 6 at the discharge end of the conducting-chute, and the chains or cables 7, having the retarding buckets or plates 8 and traveling slowly down the conductor-chute.

Instead of the tilting platform the loading-chute 4 may lead directly from the storage bins or pockets, and instead of the receptacle 6 the material may be arranged to discharge directly into cars or boats or other receptacles or to picking or screening tables, as may be required.

In Figs. 1, 3, and 4 the tilting mechanism is shown, which is of the ordinary construction, and consists in side rails 36 and 37, conforming to and registering with the railroad-rails 38, preferably inclined and leading from

the mine or other source of the supply of the material. These side rails 36 and 37 are suitably united and are supported near their forward ends by curved bars or tilting rockers 10 and hinged to connecting-rails 11 12, which are in turn hinged by their other ends to the rails 13 14, by which the cars are removed after being unloaded. The side rails 36 37 have the removable curved stops 15 16, by which cars are supported while being dumped.

The loading hopper or chute 4 is constructed with diverging sides 39 and with a central opening 17, protected by a shield 18, the opening affording means for mounting chain-sheaves 19, over which the chains 7 are conducted, and the shield 18 dividing the material and conducting it around the opening.

Leading downward from the converging lower end of the loading-chute 4 is the inclined open conductor-chute 5, formed, preferably, of metal, with a flat bottom and outwardly-inclined sides, as shown in Fig. 5, and supported in a framework 20, resting upon the surface of the ground or upon a suitable supporting-framework, as may be required by the nature of the ground over which the trough leads. The trough 5 will end at the point where the material is to be discharged, either into storage-bins 6, as in Figs. 13 and 14, or to picking and screening tables, or otherwise, as may be required. The framework 20 is formed with stringers 21, whose upper surfaces are even with the upper edges of the sides of the conductor-trough 5, and afford supports for the downwardly-moving sides of the endless chains 7, as shown, to keep them in parallel relations to the bottom of the conductor-trough, while the upper or returning sections of the chains are supported by similar stringers 22. Motion will be imparted to the chains 7 in any suitable manner, as by a separate engine 23, as indicated in Fig. 13. The transverse plates or buckets conform in outline to the conductor-trough 5 and, as before stated, travel slowly down the trough. These plates 8 are each supported in positions at right angles to the trough and are strengthened by transverse angle-bars 25 on their rear sides. The incline of the conductor-chute may be of any required degree and much steeper than the material could with safety be permitted to flow down it; but by employing this retarding device the material can be slowly conducted down even a very steep incline with perfect safety. The side guide-frames 21 22 thus support the chains 7 at all times in parallel relations to the bottom of the trough, and thus prevent the lower edges of the buckets 8 from dragging on the bottom of the trough on the down side and also prevent the up side from sagging downward and interfering with the oppositely-moving down side.

26 represents guard-stringers arranged above the lower sides of the chains 7 and parallel to the stringers 21 to serve as guards to the down side of the chains to prevent them from being lifted when the strains are brought to bear upon the chains, and thus insure the down series of buckets acting at all times in proper relations to the trough 5.

The conductor-chute may be covered and protected, as by a roof 27, as shown in Figs. 1 and 5, if required.

In Figs. 9 to 15 some modifications are shown in the structure. In this structure the endless cable 7, carrying the retarding-flights, is mounted to travel over the vertical sheaves 28 29 at the ends. In this modification the retarding-buckets are in the form of circular disks or flights 30, and the trough 50 is in U shape in cross-section, as shown in Fig. 10, the return side of the chain and its flights 30 being borne by the supporting-stringers 31, as shown in Figs. 10, 13, and 14. To prevent the material from clogging the retarding-flights 30, a retarding-wheel 32 is arranged between the upper end of the conductor-chute 50 and the lower end of the loading-chute 4, the wheel 32 consisting of a number of blades 33, and thereby forming a series of pockets between the blades adapted to receive the material as it flows down the loading-chute and deliver it intermittently to the conductor-chute between the flights 30, so that at no time will large masses of the material be deposited in the conductor-chute where the downwardly-moving return-flights 30 can strike it. The wheel 32 thus delivers the material in comparatively small quantities at regular intervals and so timed as to deliver these masses only between each pair of the flights 30 and retain the next mass until the next flight has passed the point of delivery to the chute. The upper cable-sheave 28 is protected within the upper end of the chute by a guard-plate 34, while the sides of the chute opposite this guard diverge, whereby two passages are formed for the material one on each side of the cable-sheave, with a combined area equal to the total area of the body of the chute. The material is thus conducted past the cable-sheave and delivered to the chute on each side below the cable-sheave and without danger of clogging the cable or flights, as before stated. Motion is imparted to the bucket-wheel 32 by a chain 40 and gearing 35, so that it will revolve slowly, and thus serve to hold back the material and deliver it only at intervals corresponding to the spaces between the flights 30 on the cable 7. In Fig. 12 the mechanism of the retarding-wheel 32 is shown more clearly in perspective.

The loading-chute 4, it will be noted, is set at a steeper incline than the conductor-chute, whereby a positive feeding of the material is insured at the commencement of the operation to prevent the possibility of any clogging taking place in the loading-chute.

What I claim is—

1. In an apparatus for transporting material of the character described, the combina-

tion of an inclined initial loading-receptacle having a central opening and laterally-extended sides and with a shield around the upper end and sides of said central opening, a conductor trough or guideway receiving the material from the said loading-receptacle below said shield, cable-sheaves supported within said opening in said loading-receptacle, endless cables supported to run over said sheaves and to travel parallel to said conductor-trough, retarding devices connected to said cables and running within said trough, and means for causing said endless cables and retarding devices to travel downward within said trough at a speed less than that normally attainable by the material under the action of gravity, substantially as set forth.

2. In an apparatus for transporting material of the character described, the combination of an inclined initial loading-receptacle having laterally-extended sides, a conductor trough or guideway arranged at a relatively steep inclination and with its upper end extended beneath said loading-receptacle, a central guard or apron within said loading-receptacle and adapted to divide the material into two substantially equal parts and deliver it to said conductor-trough at opposite sides below its upper end, a series of traveling flights in the said trough or guideway, and means for moving the said flights downward therein at a speed less than that normally attainable by the material under the action of gravity when it is supported on said trough, substantially as set forth.

3. In an apparatus for transporting material the combination of a conduit along which the material is transported, an endless moving device for controlling the transporting of the material, a sheave around which the endless moving device passes, an inclined chute which delivers the material to the said conduit having an opening in its bottom in which the sheave is mounted, and a shield around the upper end and sides of the said opening arranged to keep the material passing through the chute away from the sheave, substantially as set forth.

4. In an apparatus for transporting material of the character described, the combination of a conductor trough or guideway arranged at a relatively steep incline, an initial loading-receptacle set at a steeper incline than the conductor-trough, a series of traveling flights within said conductor trough or guideway, and means for moving the said flights downward therein at a speed less than that normally attainable by the material under the action of gravity when it is supported in said trough or guideway, substantially as set forth.

5. In an apparatus for transporting material of the character described, the combination of an inclined initial loading-receptacle, a conductor-trough with its reception end adjacent to the discharge end of said loading-receptacle, a cable-sheave supported vertically above the upper end of said conductor-trough, a similar cable-sheave supported vertically above the lower end of said conductor-trough, an endless cable engaging said sheaves and with its lower part traveling within said conductor-trough, flights at intervals upon said cable, a wheel between said conductor-trough and loading-receptacle, and formed with a series of compartments adapted to receive the material from said loading-receptacle, means for slowly revolving said wheel, whereby the material may be delivered intermittently in predetermined quantities to said conductor-trough, and a guard within said conductor-trough, around said upper chain-sheave, whereby the material as it is discharged from a feed-wheel is divided and conducted around said cable-sheave and delivered to said conductor-trough from opposite sides, substantially as set forth.

6. The combination of the trough rigidly fixed at an angle both to the vertical and the horizontal, whereby it can give support to material moving down therein, an endless carrier having flights in, and resting on the trough, power devices engaging with the lower end of the carrier, and means for preventing a displacement of the carrier when subjected to strain from the power devices, substantially as set forth.

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

FREEMAN R. WILLSON, JR.

Witnesses:
P. W. HOLSTEIN,
M. W. SHERWOOD.