

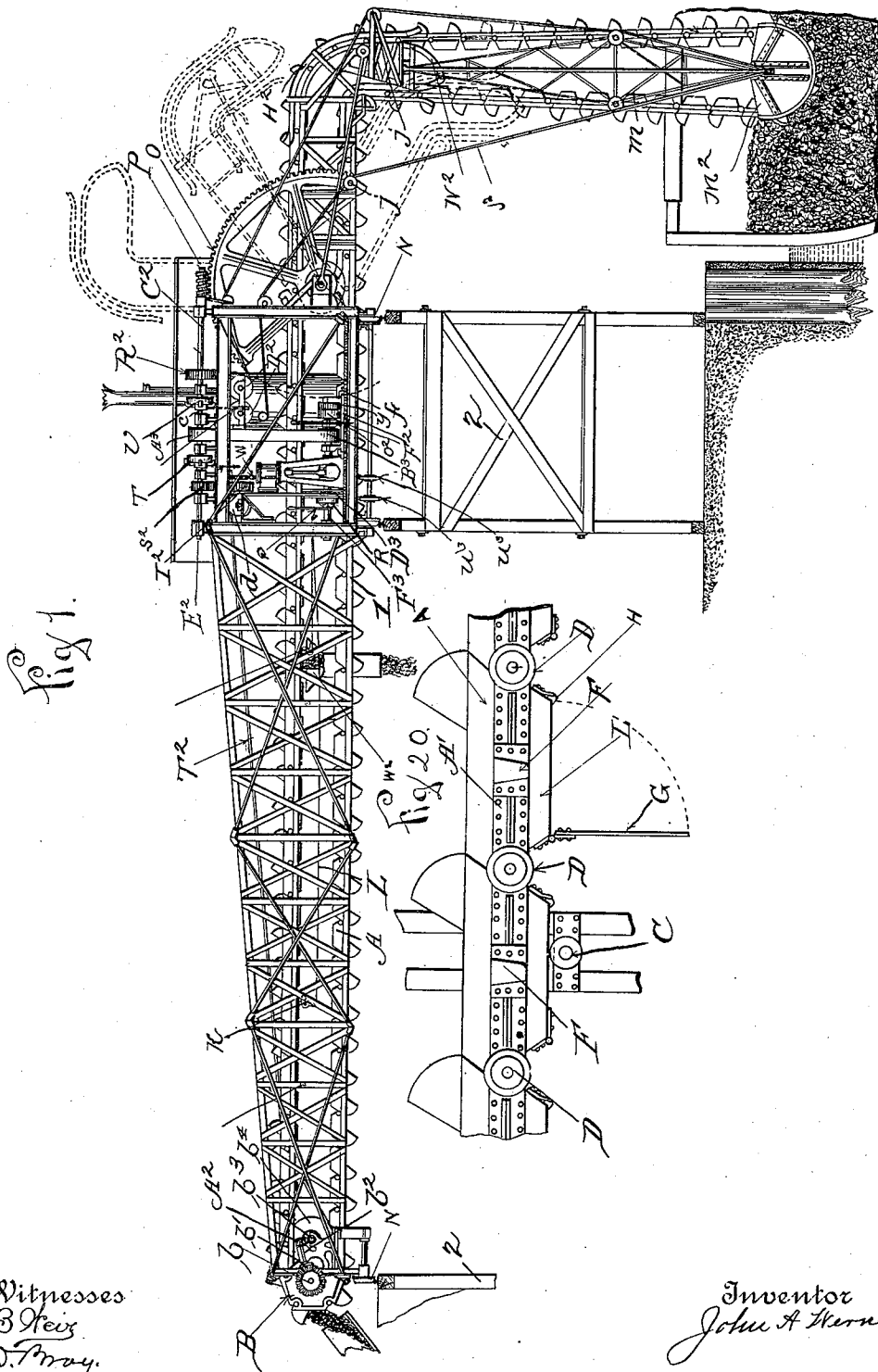
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8 Sheets—Sheet 1.

J. A. WERNER.
CONVEYER.

No. 578,177.

Patented Mar. 2, 1897.



Witnesses
J. B. Keir
J. D. May.

Inventor
John A. Werner

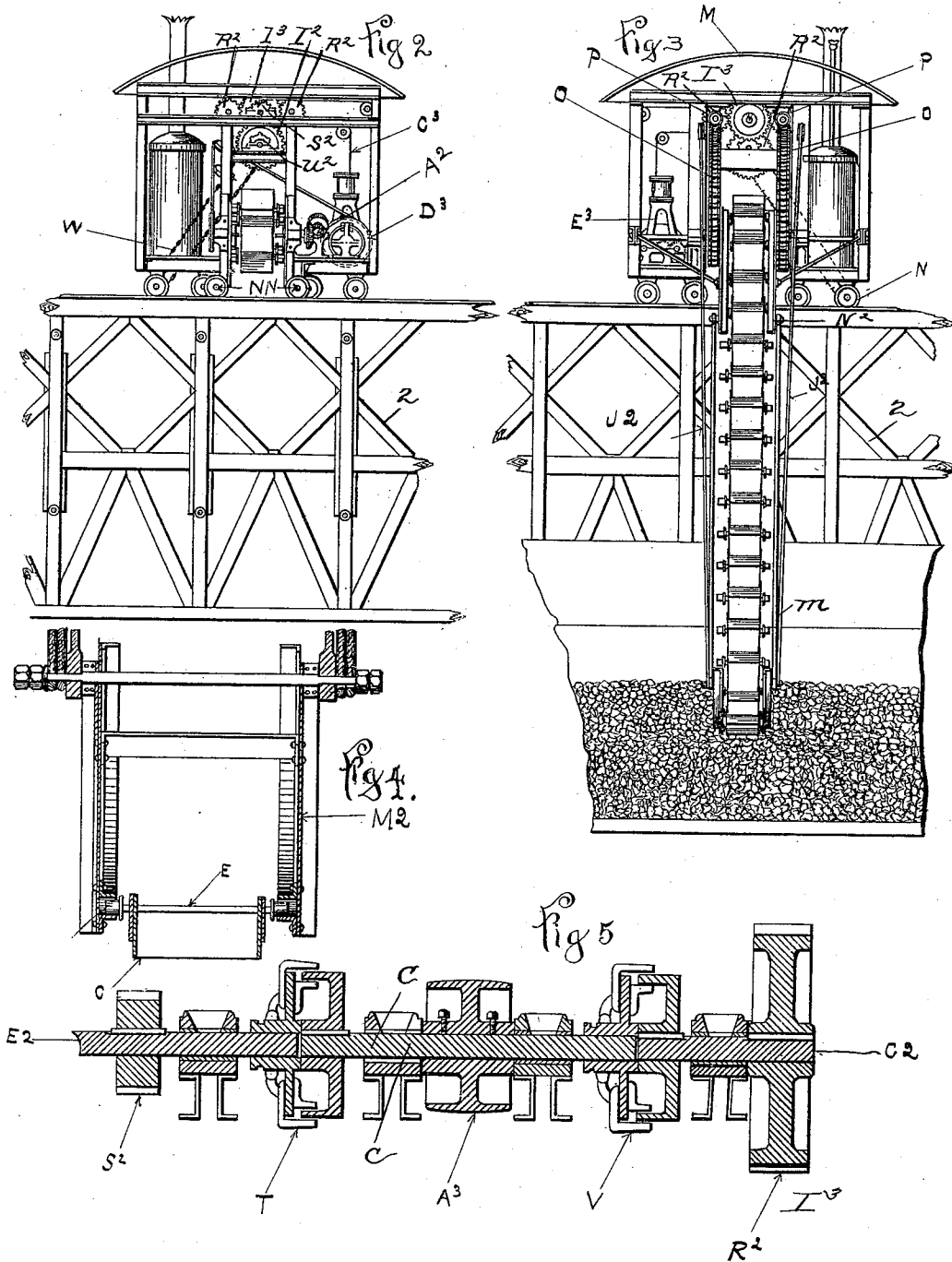
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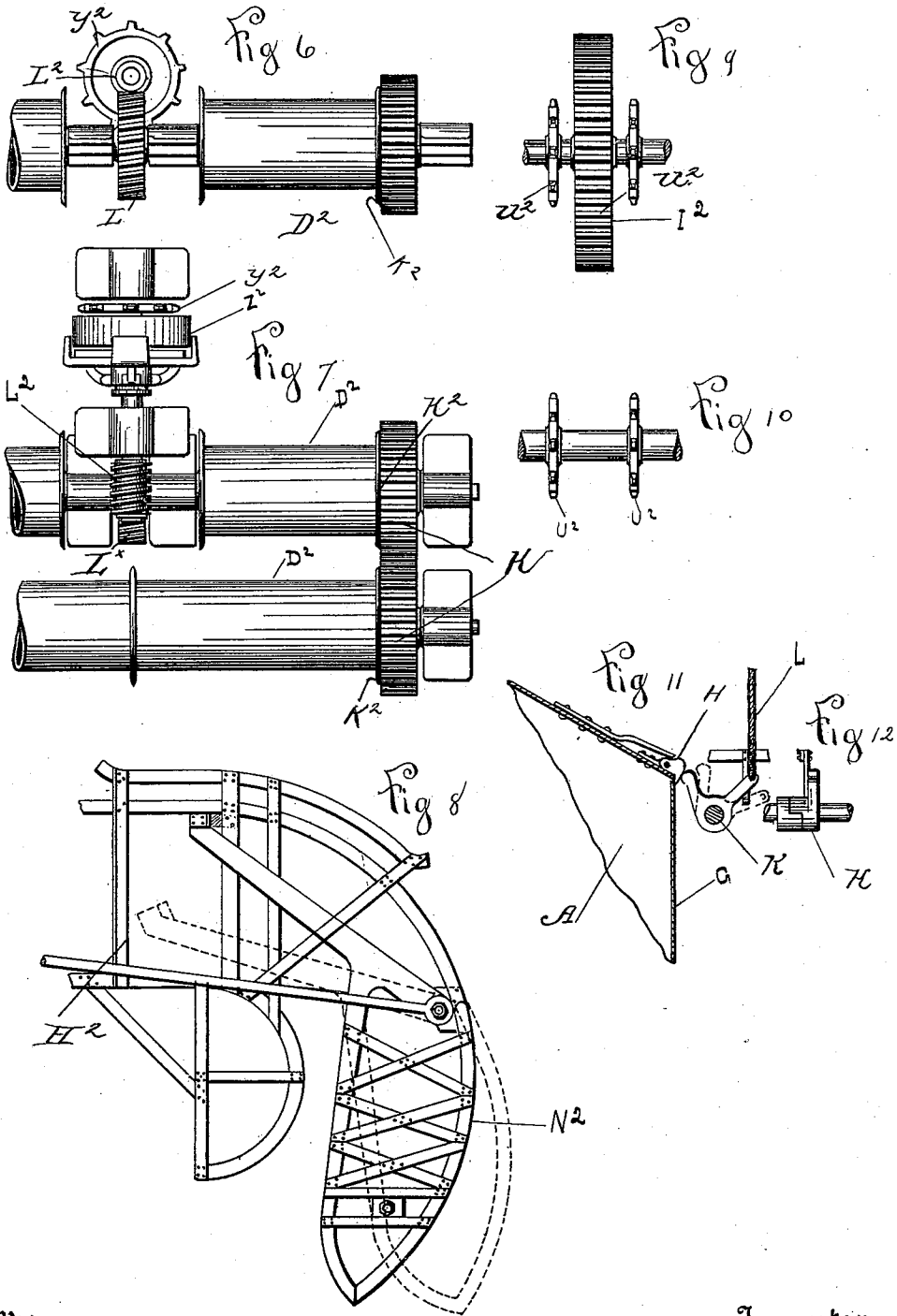
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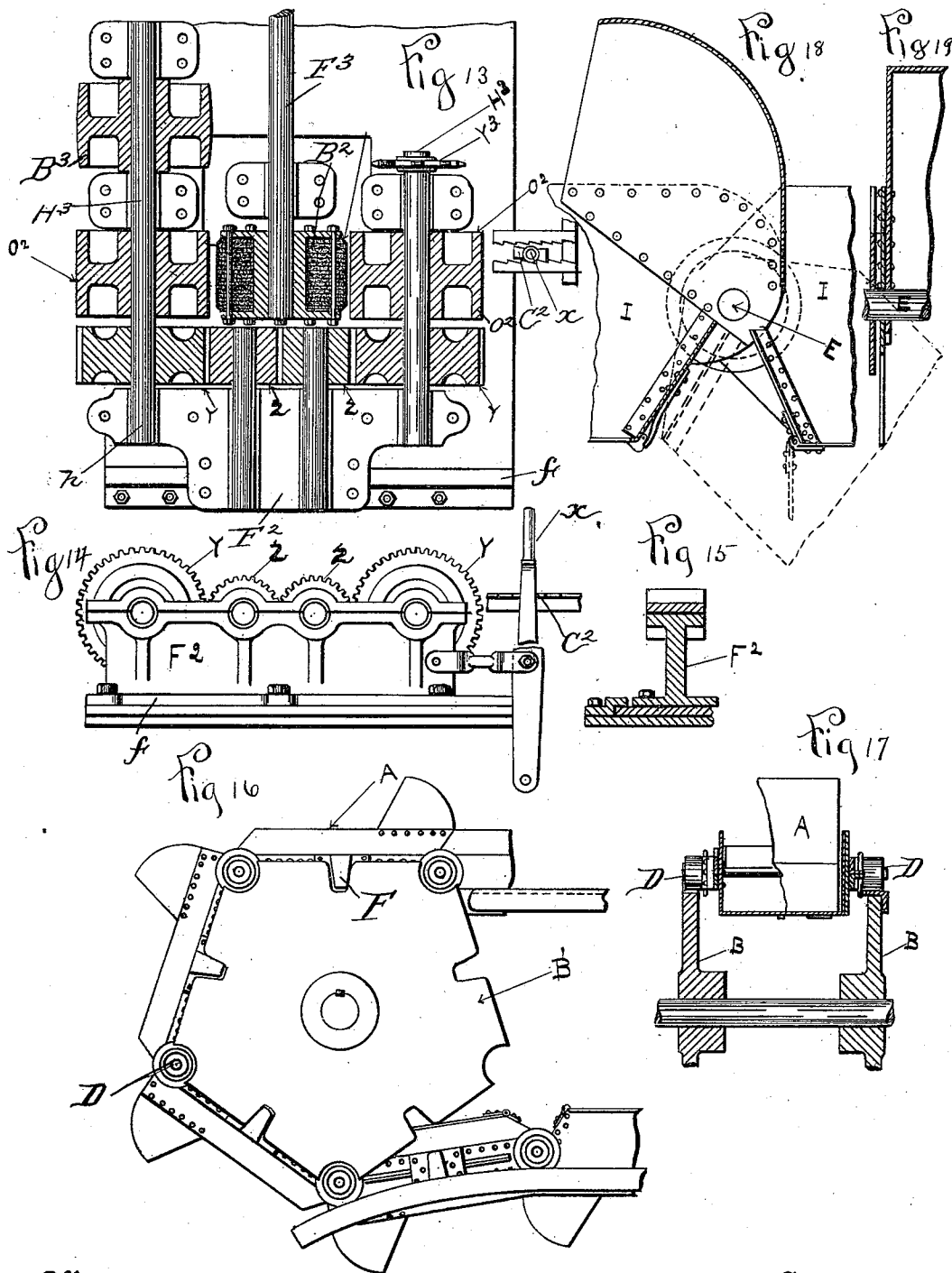
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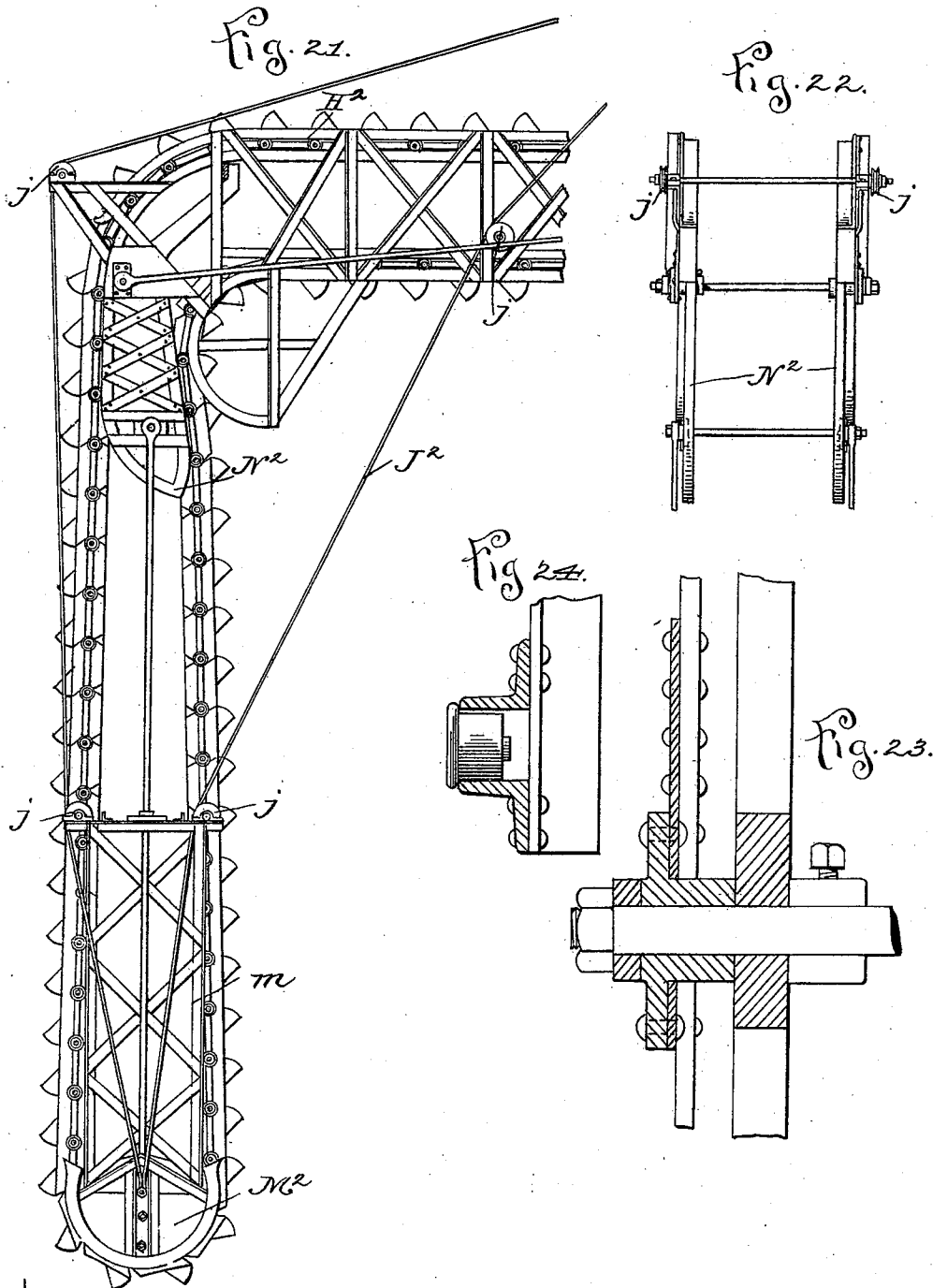
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Witnesses
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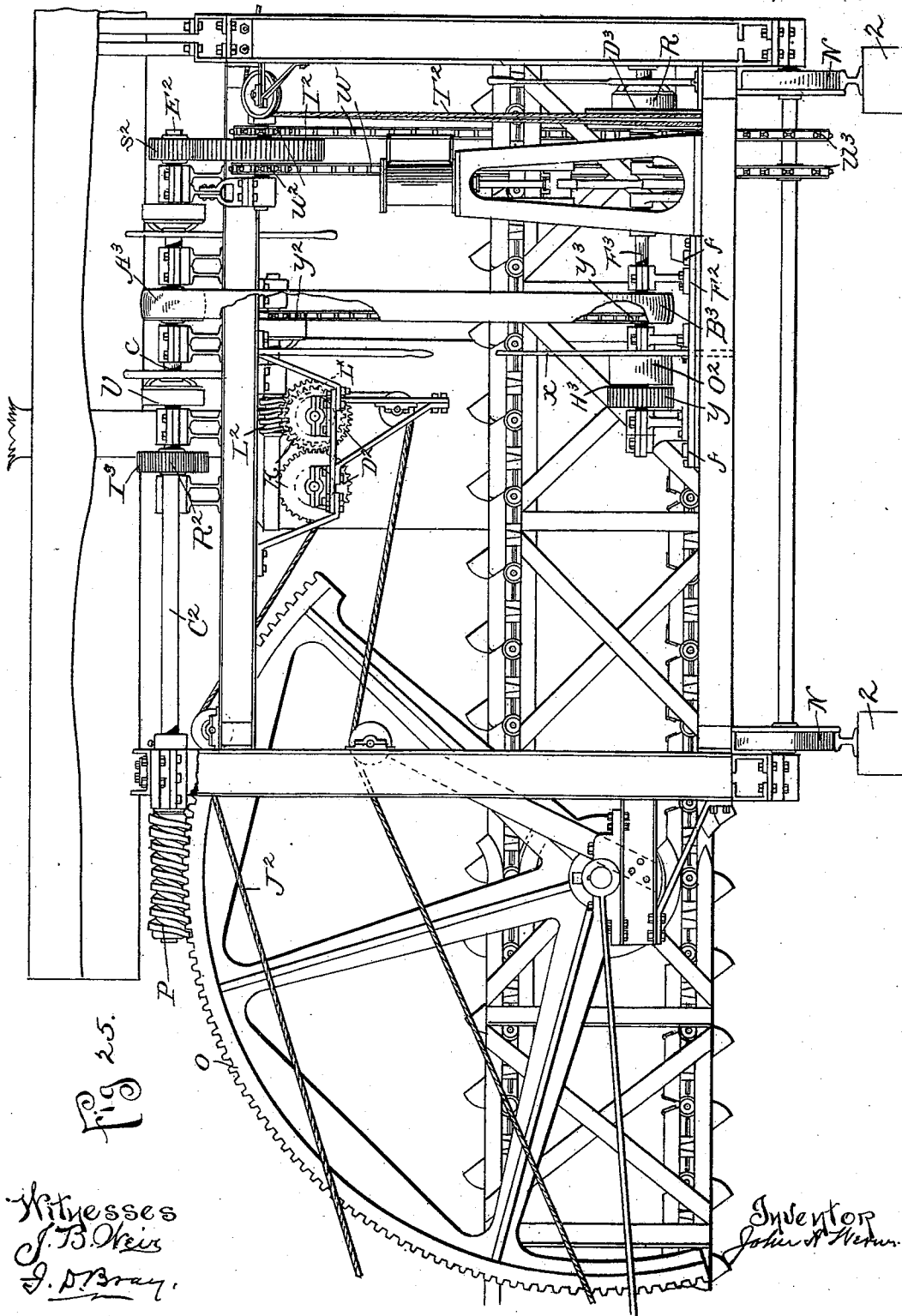
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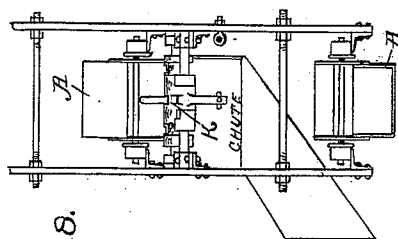
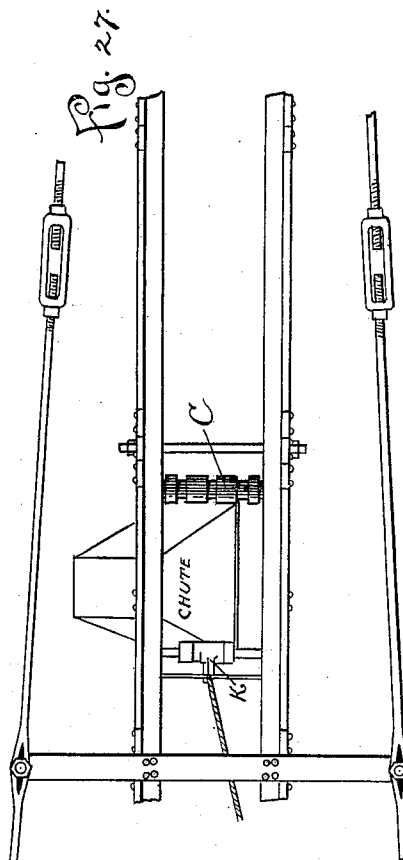
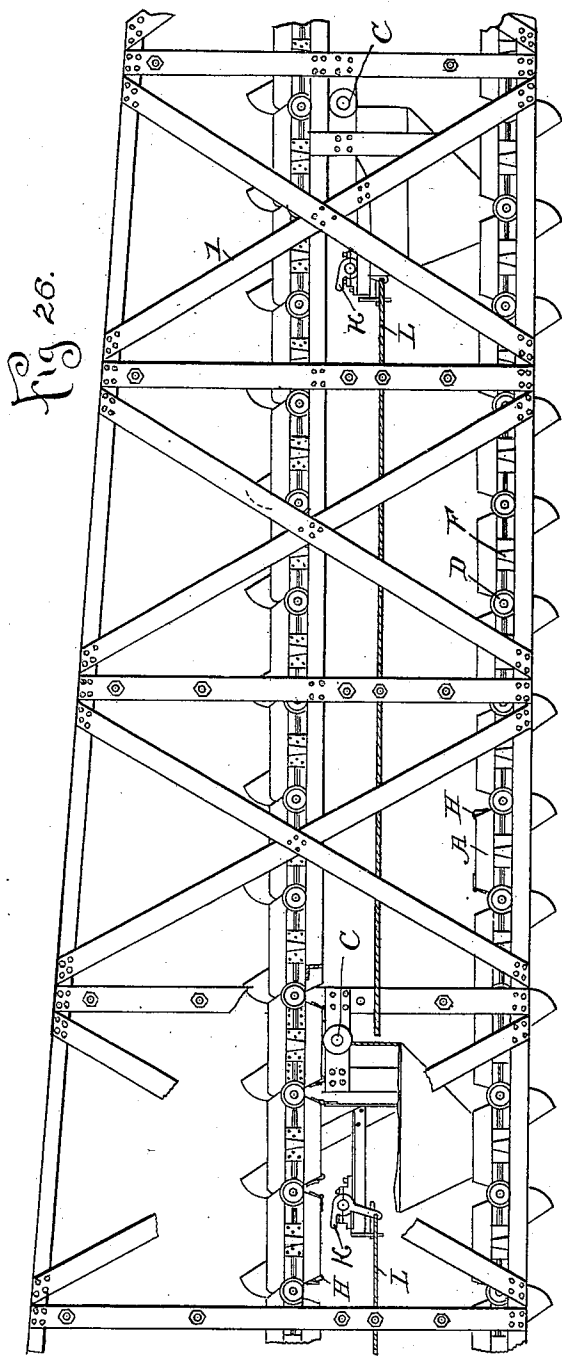
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Witnesses
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(No Model.)

8 Sheets—Sheet 8.

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Fig. 29.

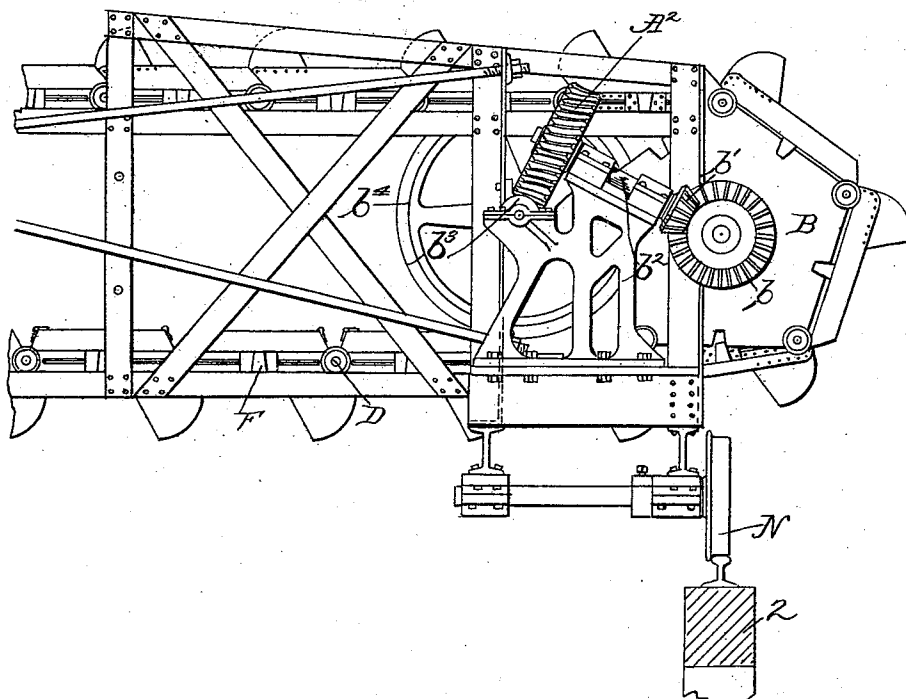
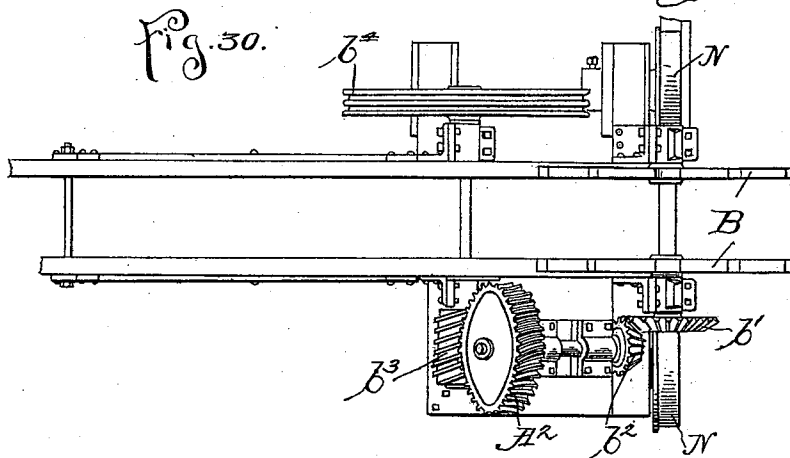


Fig. 30.



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UNITED STATES PATENT OFFICE.

JOHN ANDREW WERNER, OF CHICAGO, ILLINOIS.

CONVEYER.

SPECIFICATION forming part of Letters Patent No. 578,177, dated March 2, 1897.

Application filed August 10, 1895. Serial No. 558,925. (No model.)

To all whom it may concern:

Be it known that I, JOHN ANDREW WERNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Conveyers, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to combined elevators and conveyers, such as are employed in the unloading of coal and analogous ores from ships or barges into storage-pockets arranged along shipping-docks, or vice versa.

The object of the present invention is to lessen the breakage due to the repeated handling of the ore, and thereby effect a considerable saving, more especially in the handling of coal.

To this end my invention includes a conveyer comprising a chain of self-loading buckets with automatic means for dumping the same at any point along the route traveled by the same.

It also includes an adjustable elevator-leg that is adapted to enter the hatch of a vessel and a movable frame carrying said conveyer and the elevator-leg.

It also includes the mechanism for operating the several parts of the machine, said mechanism being arranged to be instantaneously started, stopped entirely, or reversed.

It further includes the clutch mechanism whereby the mechanism for running one part of the machine may be cut off and the power applied for running another portion.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 shows rear end elevation. Fig. 3 shows front end elevation. Fig. 4 shows section of elevator-foot and bucket. Fig. 5 shows counter-shaft with driving-machine, pulley-gears, friction-clutches, &c. Fig. 6 shows elevation of winding-drums and drive-gear. Fig. 7 shows plan of winding-drums and drive-gear. Fig. 8 shows section of boom end with pivoted adjustable corner-frame. Fig. 9 shows spur-gear and sprocket-wheels for driving or locomotive power. Fig. 10 shows sprocket-wheels on axle of cab-wheels. Fig. 11 shows section of bucket, showing method of fastening the hinged bottom. Fig. 12 shows trip for open-

ing the bottom. Fig. 13 shows plan reversible driving mechanism and engine-shaft with friction-roller. Fig. 14 shows side elevation of engine-shaft with friction-roller. Fig. 15 shows transverse section of journal-frame and slide. Fig. 16 shows drive-wheel and buckets, side elevation. Fig. 17 shows drive-wheel and buckets, transverse section. Fig. 18 shows side elevation of method of attaching the buckets together. Fig. 19 shows transverse section with axle for flanged wheels. Fig. 20 is a detail. Fig. 21 is a detail view of the elevator-leg on an enlarged scale. Fig. 22 is a detail front elevation of the upper portion of the leg. Fig. 23 is a detail showing in section a portion of the plate N^2 and contiguous parts. Fig. 24 is a detail of the guide for the bracket around the bend where the leg and boom are connected to each other. Fig. 25 is a detached view of the forward portion of the frame contiguous to the elevator-leg. Fig. 26 is a detached view of an intermediate portion of the frame, showing the position and arrangement of the car-dumping devices. Fig. 27 is a detail plan view of a portion of the same. Fig. 28 is an end elevation showing the position of the chute. Fig. 29 is a view of the end of the frame. Fig. 30 is a plan view of the same.

The frame of the machine is shown at 1, supported upon wheel N, running upon suitable tracks attached to the trestles 2, arranged along the docks. In the forward part of this frame the engine and cab are arranged, the engine converting motion to the driving-shaft F^3 , which is constantly rotating, to which is connected by a suitable clutching device R the pulley D^3 for driving a cable for operating a chain of buckets A. These buckets are provided with a rectangular bottom portion and are partly covered by a combined hood and scoop. The buckets are connected to each other by the side plates, which carry the projecting studs F, and rollers D, which are adapted to enter recesses formed in the pentagonal wheel B, journaled in the end of the frame 1, for guiding the said buckets around the end of the frame and thereby emptying them of their contents. The chain of buckets are driven by the wheel B, carrying the gear b , meshing with the gear b' , carried on the end of the shaft b^2 , which also carries the gear A^2 ,

meshing with the worm b^3 , carried by the shaft of the pulley b^4 , over which the cable T^2 passes, said cable being driven by the pulley D^3 .

To guide the buckets into the hatch of a vessel, I have provided the leg m , carried by the frame N^2 , freely pivoted to the boom H^2 , which is in turn pivoted to the forward part of the frame 1. This leg is raised and lowered into and out of a vessel's hatch by lifting the boom H^2 , this being accomplished by means of the quadrants O , carried thereby, in which mesh the worms P , operated by the gears R^2 , which mesh with the large gear I^3 , which is arranged intermediately of the gears R^2 and is carried on the end of the shaft C^2 , forming a section of the shaft c , to which it is connected and disconnected by the clutch V . The shaft F^3 carries the paper friction-wheel B^3 , which is engaged alternately by the friction-wheels O^2 , journaled upon the shafts $h H^3$, supported in the frame or floor-stand F^2 , which is adapted to be moved along the ways f by means of the lever x , a ratchet device C^2 being provided to hold said lever in adjusted position. Each of the shafts $h H^3$ carry gear y , which transmit motion to each other through the idlers 2, which are journaled upon shafts also carried by the frame F^2 and move therewith.

All parts of the machine with the exception of the chain of buckets are driven from either one or the other of the shafts $h H^3$, and by first throwing one into connection with the main driving-shaft and then the other the motion of the parts of the machine in connection with the same are alternately impelled in one direction and then reversed. By moving the lever between its two extreme positions both pulleys O^2 are disconnected from the pulley B^3 and the machine stopped, with the exception of the buckets, which may also be stopped by disconnecting the pulley D^3 from the shaft F^3 by operating the clutch R . From the pulley B^3 a belt extends around the pulley A^3 to drive the shaft c . The shaft E^2 also forms a section of the shaft c , being connected thereto by the clutch T , and this shaft carries the gear S^2 , which meshes with the gear I^2 , upon the shaft of which the sprocket-wheel u^2 is carried, a chain W connecting these sprockets with the sprockets U^2 , carried on the shaft of the wheel N . The wheels are thus rotated and the conveyer moved along the supporting-trestle when the shaft c is rotating and the shaft E^2 connected therewith.

The leg m is adjusted laterally in the vessel's hatch—that is, to and from the main frame—by means of the cable J^2 , the ends of which are connected to the drums D^2 , journaled in the frame 1 and carrying gears K , which mesh with each other, flanges K^2 being provided to prevent the cables coming into engagement with the teeth of said gears. The cable J^2 from one drum passes around the lower end of the leg m around the guiding-pulleys j , carried by the boom, and back to the other drum. Thus when one drum is

rotated to wind the cable the other will be rotated in an opposite direction and unwind sufficient slack to permit of the adjustment of the leg. The shaft of one of the drums carries a gear L^x , which meshes with a worm L^2 , carried on the end of a horizontal shaft supported by the frame 1, and this shaft is driven by the sprocket-wheel y^2 , connected to a corresponding wheel y^3 , fixed to the shaft H^3 , a clutch device z^2 being interposed between the worm L^2 and the sprocket y^2 . It will be understood from the foregoing description that by operating the different clutch devices provided all the power may be transferred from one part of the device to operate another part and that this can be done instantaneously and that the motion of all the parts, with the exception of the bucket, can be reversed by operating a single lever.

The buckets themselves are provided with a hinged bottom held closed by spring-catches H , which are disengaged by the trips K , provided with operating ropes or wires L , which extend in easy reach of the engineer. These trips are arranged at intervals along the frame 1 and are adapted to be operated to open the bottom of the bucket in order that they may dump their contents at intermediate points along the dock covered by the conveyer. The rollers C are journaled directly back of each strip just below the plane traversed by the bucket, and these rollers close the bottom of said buckets as said buckets pass over the same, the catch again springing into position and holding the bottom closed. The boom is provided with the segmental guideway, around which the buckets pass and are kept separated thereby. The lower end of the leg is also provided with the guard-plates M^2 , which protect the scoop of the buckets from injury by preventing the ores from interfering with the free movement of said buckets.

I claim—

1. In combination, a trestle or frame adapted to be placed parallel to a dock, a track supported thereon, a second trestle or frame arranged parallel to the first and a distance therefrom, a conveyer extending across between said trestles and supported at each end thereby, said conveyer being shiftable along said trestle longitudinally of the same and the elevator-leg overhanging the side of the first trestle, substantially as described.

2. In combination, the horizontal frame, the boom pivoted to the end thereof, the elevator-leg freely suspended and depending from said boom, and the guide-rope attached to the end of said leg and guided around said boom, said rope being wound around drums carried in said frame whereby the end of said leg may be adjustable toward and from said frame independently of said boom, substantially as described.

3. In combination, the frame, the buckets, the pivoted boom carrying the quadrant, the worm meshing therewith with means for op-

erating the same to raise the boom, a leg hung from said boom and an independent pivoted frame, interposed between and connecting the leg and boom, substantially as described.

5 4. In combination in a conveyer, the main shaft, the chain of buckets, the means for driving the same operated through said shaft, the clutch R for disconnecting said shaft from said means, the three-part shaft E², c, and
10 C², the conveyer movable along its support through the shaft E², the leg operated through the shaft C², the clutches T' and V for connecting and disconnecting the shafts E² and C² from the shaft c, the shaft h carrying a
15 driving-pulley, the belt connection between said pulley and shaft c for rotating said shaft,

the elevator-leg, the drums D², the cables connected to said leg and drums, the connection between said drum and the shaft H² for rotating the drums, the clutch Z² for disconnecting said drums from said connections, the friction-pulley B² carried by the main shaft, the pulley O² adapted to engage therewith to operate said conveyer, and the means for disengaging the pulley O² from the pulley B², substantially as described. 20 25

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

JOHN ANDREW WERNER.

Witnesses:

JAMES C. HOPKINS,
M. H. LONGHRIN.