Dec. 9, 1952 I. Z. SMOKER 2,620,934

PORTABLE ELEVATING CONVEYER

Filed Nov. 13, 1948 6 Sheets-Sheet 1

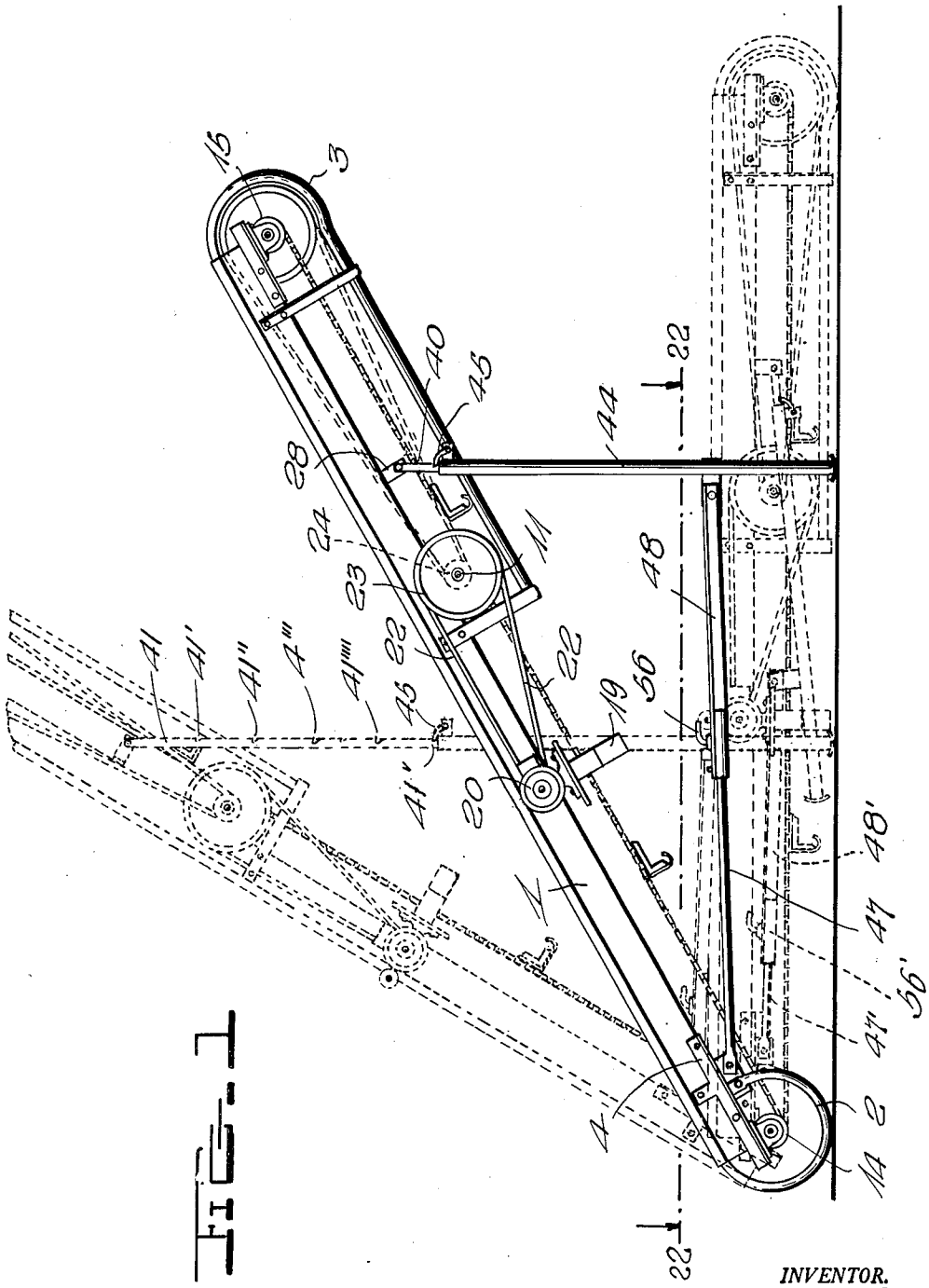


FIG. 1

INVENTOR.
ISAAC Z. SMOKER,
BY
John B. Brady
ATTORNEY

Dec. 9, 1952 I. Z. SMOKER 2,620,934

PORTABLE ELEVATING CONVEYER

Filed Nov. 13, 1948 6 Sheets-Sheet 2

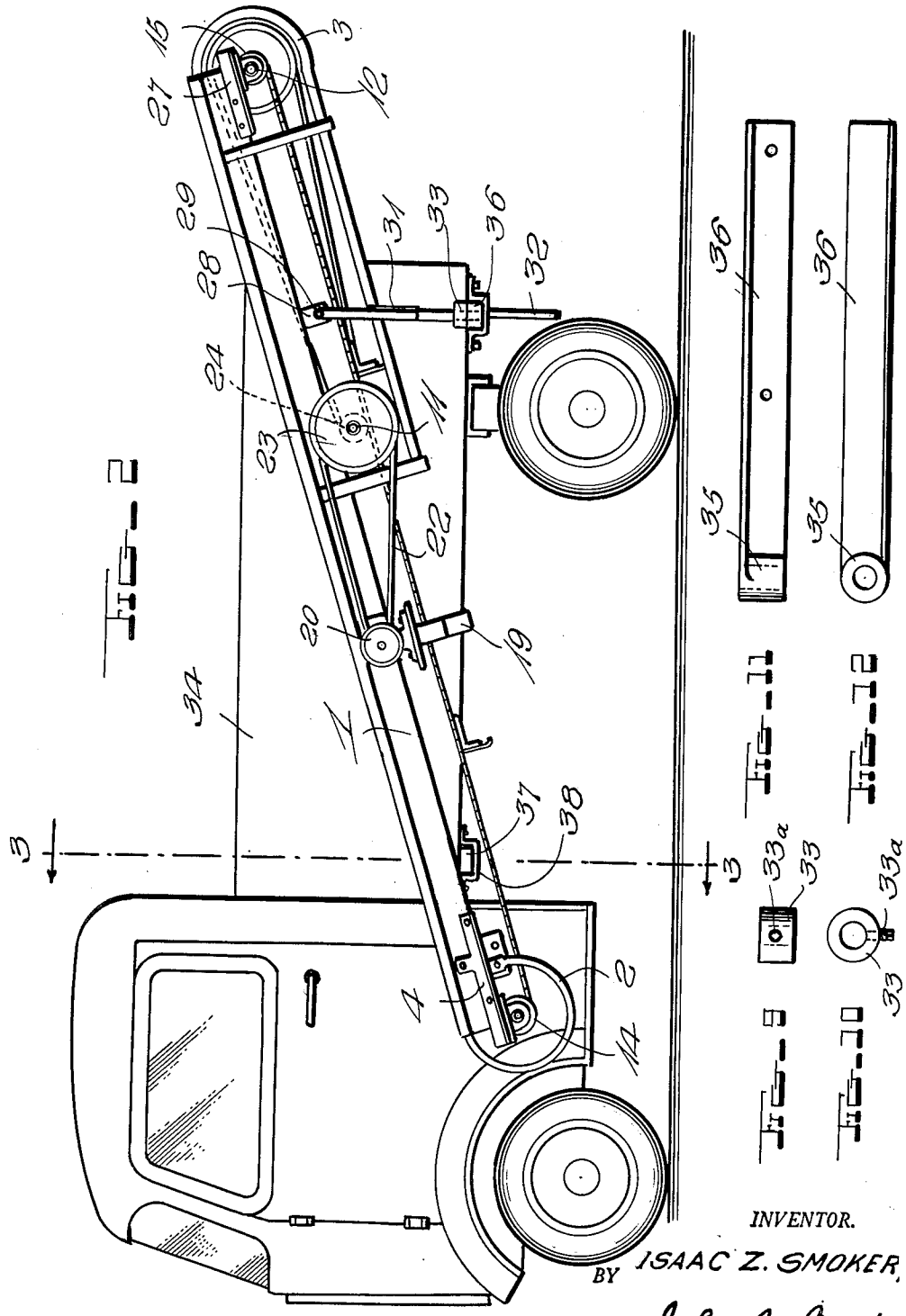


FIG. 2

FIG. 11

FIG. 12

FIG. 9

FIG. 10

INVENTOR.
ISAAC Z. SMOKER,
BY John B. Brady
ATTORNEY

Dec. 9, 1952 I. Z. SMOKER 2,620,934

PORTABLE ELEVATING CONVEYER

Filed Nov. 13, 1948 6 Sheets-Sheet 3

FIG. 3

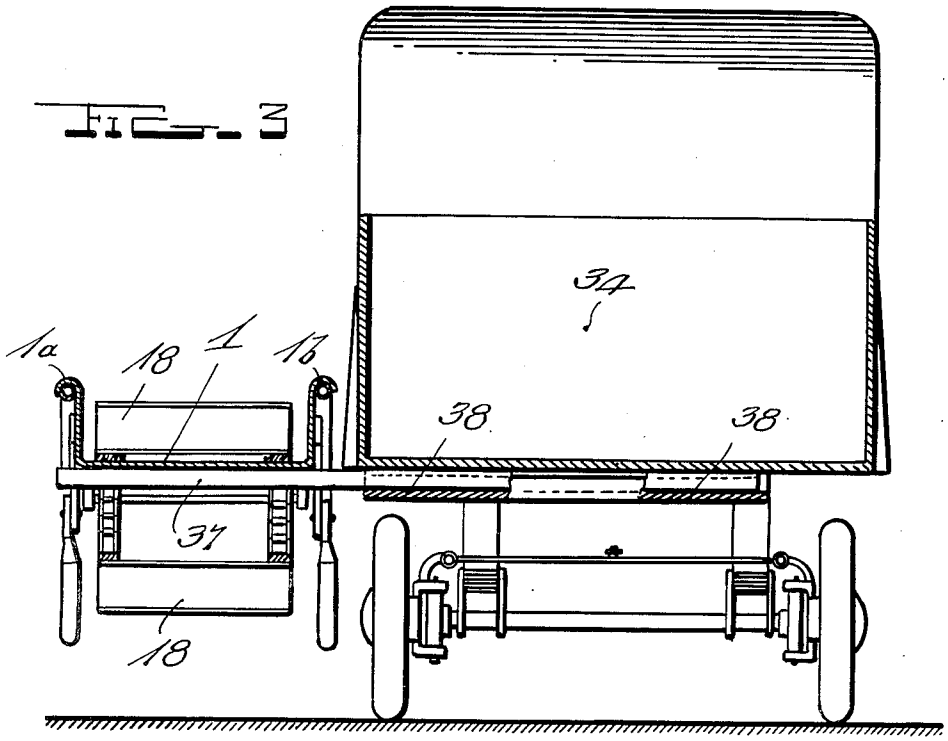
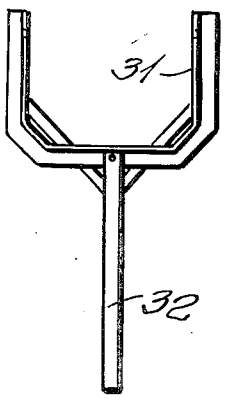


FIG. 7



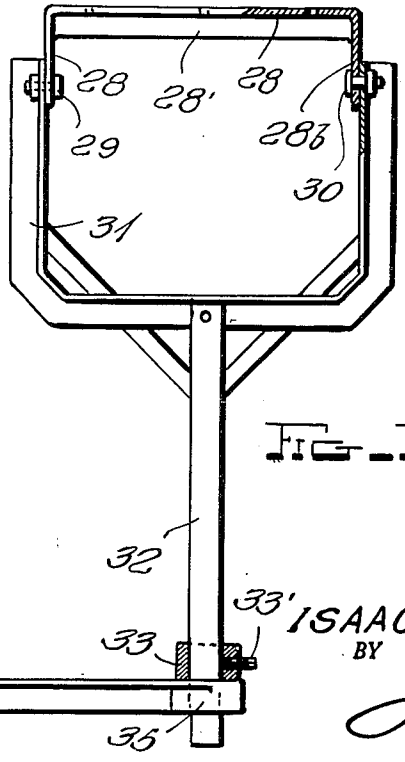
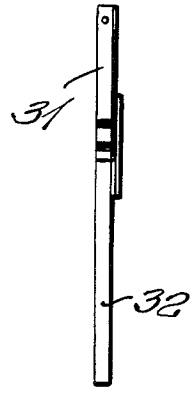


FIG. 13

FIG. 8



INVENTOR.
ISAAC Z. SMOKER,
BY
John B. Brady
ATTORNEY

Dec. 9, 1952 I. Z. SMOKER 2,620,934

PORTABLE ELEVATING CONVEYER

Filed Nov. 13, 1948 6 Sheets-Sheet 4

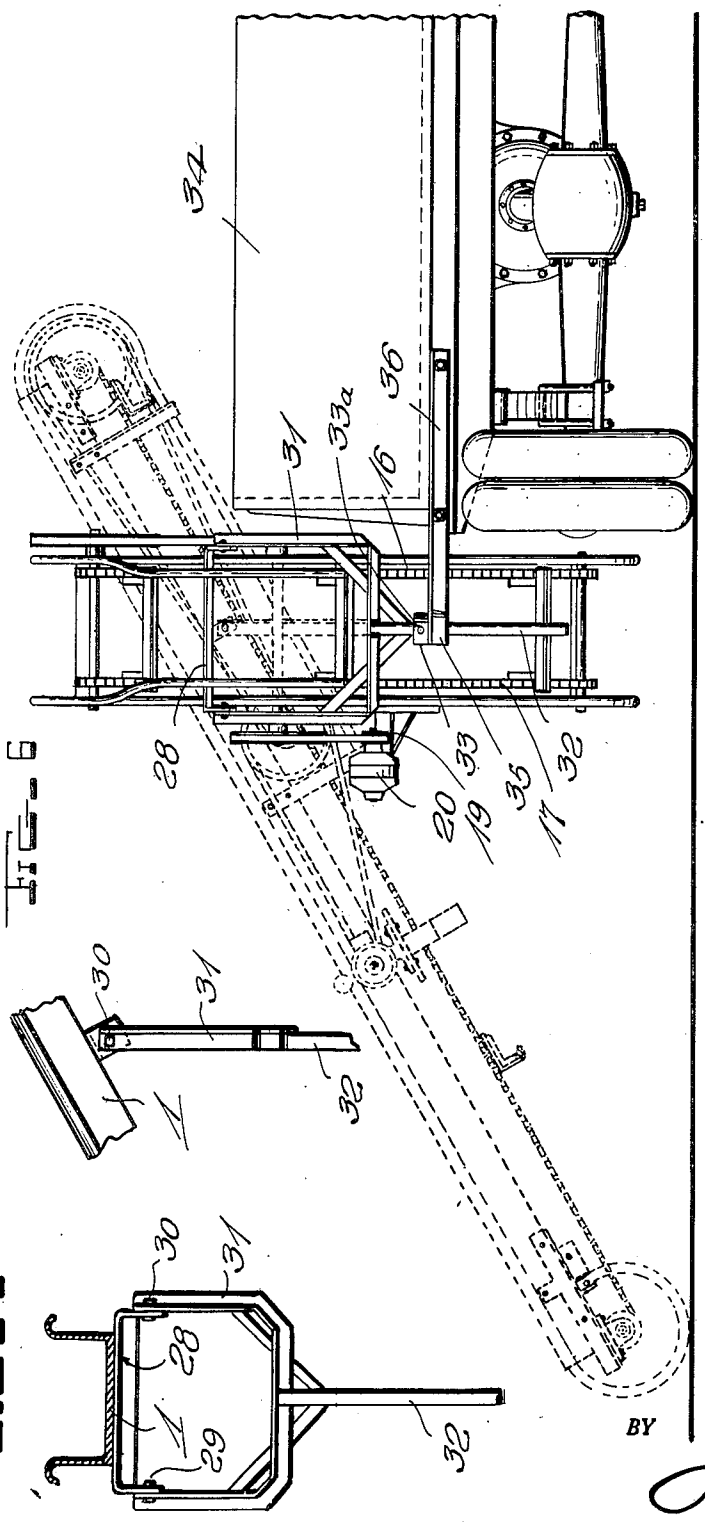


FIG. 6

FIG. 4

FIG. 5

INVENTOR.
ISAAC Z. SMOKER

BY

John B Brady

ATTORNEY

Dec. 9, 1952 I. Z. SMOKER 2,620,934

PORTABLE ELEVATING CONVEYER

Filed Nov. 13, 1948 6 Sheets-Sheet 5

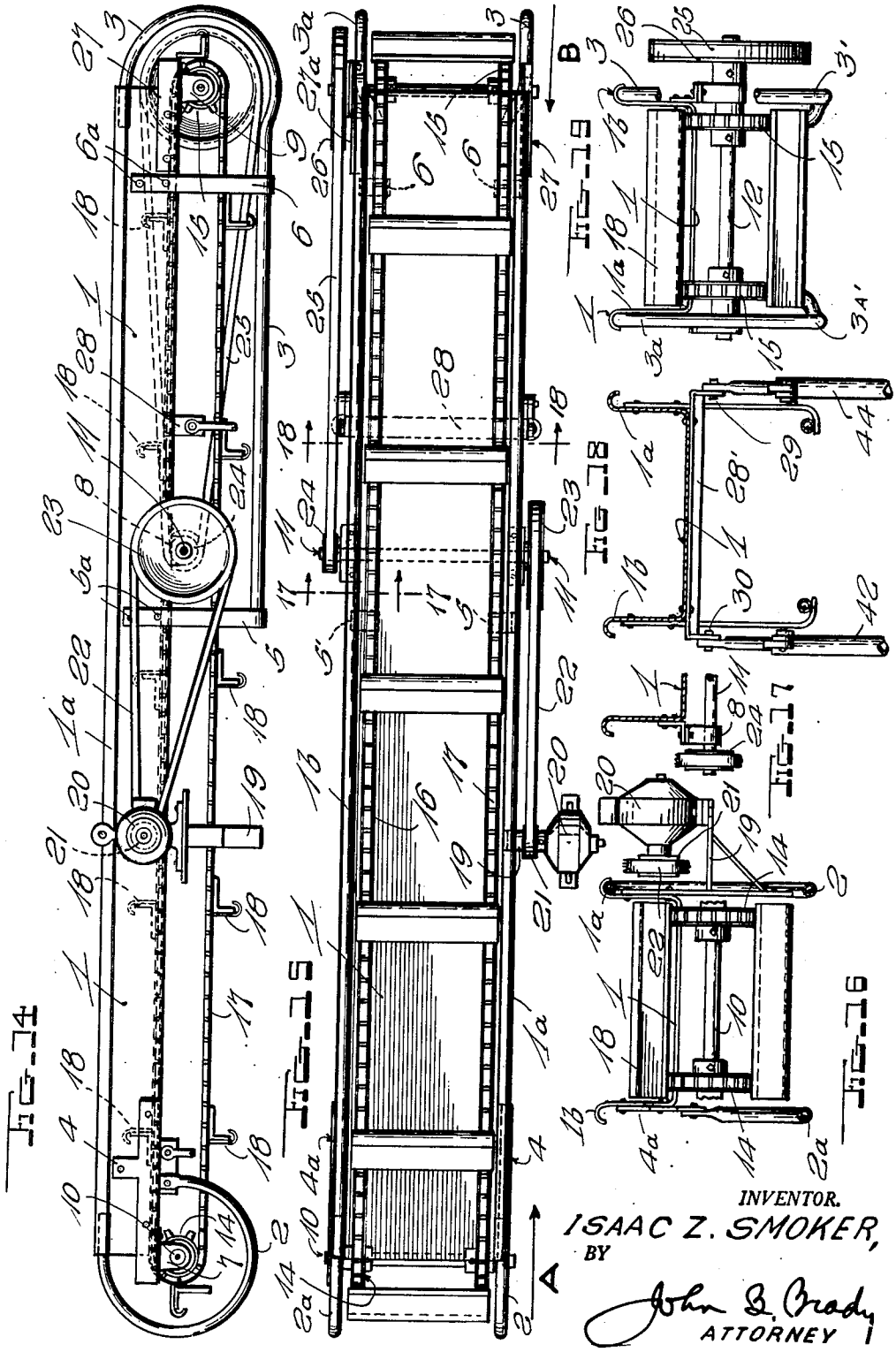


FIG. 14

FIG. 15

FIG. 18

FIG. 17

FIG. 16

INVENTOR.
ISAAC Z. SMOKER,
BY
John B. Brady
ATTORNEY

Dec. 9, 1952 I. Z. SMOKER 2,620,934

PORTABLE ELEVATING CONVEYER

Filed Nov. 13, 1948 6 Sheets-Sheet 6

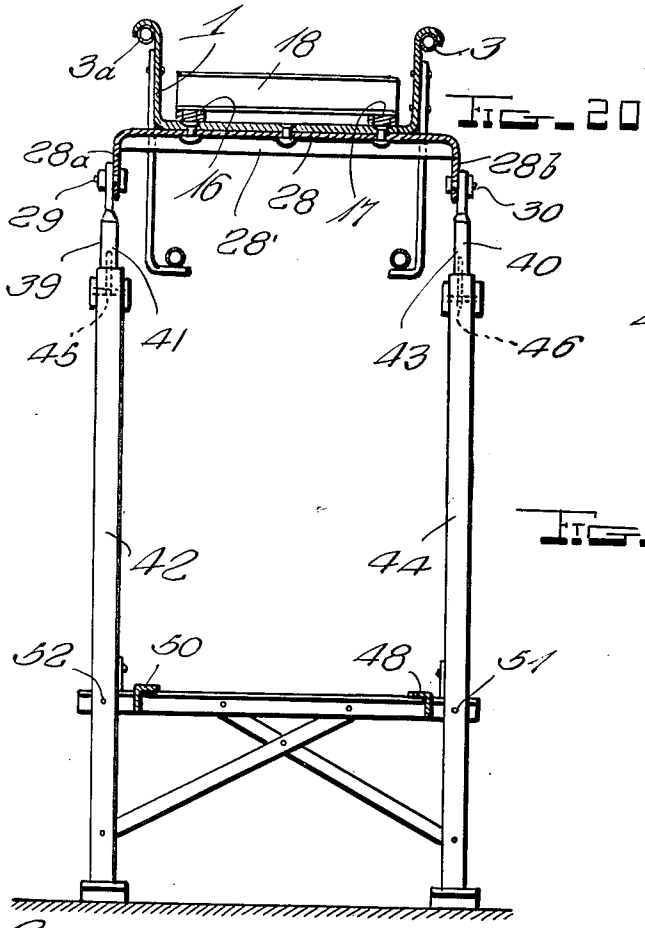


FIG. 20

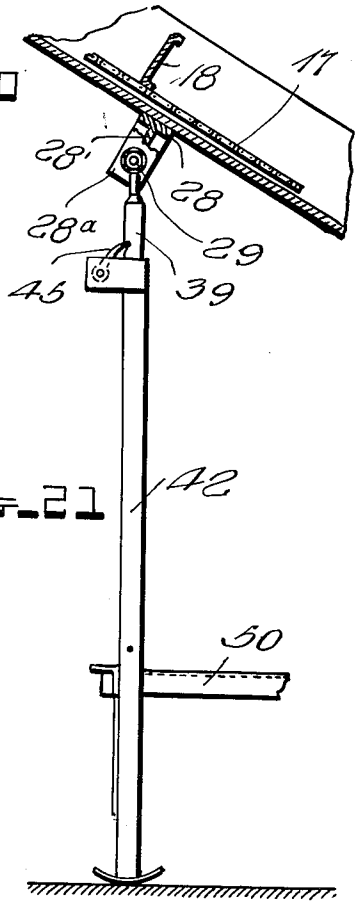


FIG. 21

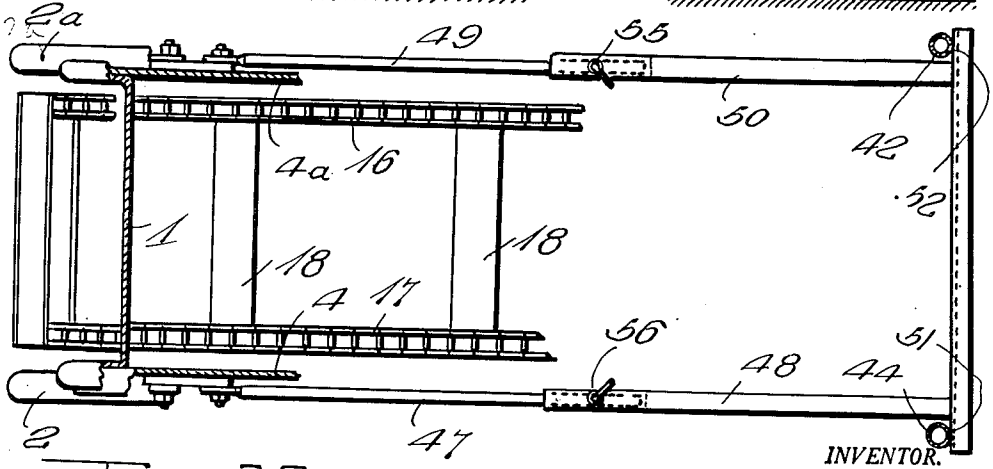


FIG. 22

INVENTOR.
ISAAC Z. SMOKER,
BY
John B. Brady
ATTORNEY

Patented Dec. 9, 1952

2,620,934

UNITED STATES PATENT OFFICE

2,620,934

PORTABLE ELEVATING CONVEYER

Isaac Z. Smoker, Intercourse, Pa.

Application November 13, 1948, Serial No. 59,928

3 Claims. (Cl. 214—83.26)

1

My invention relates broadly to portable elevators, and more particularly to an elevating conveyor which may be readily attached to a truck body for use in association therewith or detached therefrom for use as a loader generally.

One of the objects of my invention is to provide a construction of composite elevating conveyor which may be readily detached or attached from or to a truck body for facilitating loading of a truck, or utilized independently of a truck body for elevating operations.

Another object of my invention is to provide a construction of light weight elevating conveyor which is readily portable and which may be readily adjusted in position to meet varying conditions of loading and stacking operations, the elevating conveyor being so constructed that it is readily transportable by a light truck.

Still another object of my invention is to provide a construction of mounting means for attaching a conveyor frame alternately to a truck body or to vertically arranged adjustable jack supports.

A further object of my invention is to provide an arrangement of frame structure and guard for mounting a portable elevator and supporting a prime mover for driving the elevator in association with an adjustable jack mounting means or an angularly adjustable yoke mounting means for supporting the elevator on a truck body.

Still another object of my invention is to provide a construction of light weight elevator which permits moving and adjusting of the structure to be performed by one individual, and in which the supports for the conveyor may be folded flat against the trough of the conveyor to enable the entire structure to be stored in an extremely compact space and to facilitate shipment of the elevator.

Other and further objects of my invention reside in an improved construction of light weight portable elevator as set forth more fully in the specification hereinafter following, by reference to the accompanying drawings, in which:

Figure 1 is a side elevational view of the portable elevator of my invention supported by adjustable jacks; Fig. 2 is a side elevational view showing the elevator of my invention applied to a truck body and mounted on a swingable yoke, as distinguished from the adjustable jacks illustrated in Fig. 1; Fig. 3 is a transverse sectional view taken substantially on line 3—3 of Fig. 2 and showing the portable elevator supported by a truck body and moved to a position for transportation; Fig. 4 is a rear view of a truck body

2

showing the portable elevator mounted in position with respect thereto for transportation, and illustrating in dotted lines the position to which the elevator may be readily moved while connected with the truck body for performing a loading operation; Fig. 5 is a fragmentary enlarged view of the yoke for mounting the conveyor frame with respect to the truck body; Fig. 6 is a fragmentary side elevational view of the yoke shown in Fig. 5 and the manner of supporting the conveyor with respect to the truck body; Fig. 7 is a detached front elevational view of the yoke employed for mounting the elevator on the truck body; Fig. 8 is a side elevational view of the yoke shown in Fig. 7; Fig. 9 is a side elevational view of the adjustable collar member which is associated with the yoke of Fig. 7 for mounting the yoke in a selected vertical position with respect to the truck body; Fig. 10 is a plan view of the collar member shown in Fig. 9; Fig. 11 is a side elevational view of the bracket member which is attached to the truck body for supporting the pivotally mounted yoke of Figs. 7 and 8 which carries the elevator; Fig. 12 is a plan view of the bracket member illustrated in Fig. 11; Fig. 13 is a view on an enlarged scale of the pivotally arranged yoke mounting assembly for supporting the elevator with respect to the truck body; Fig. 14 is a side elevational view of the assembled portable conveyor; Fig. 15 is a plan view of the portable conveyor shown in Fig. 14; Fig. 16 is an end elevational view looking in the direction of the arrow A shown in Fig. 15; Fig. 17 is a fragmentary vertical transverse sectional view taken substantially on line 17—17 of Fig. 15; Fig. 18 is a vertical transverse sectional view taken substantially on line 18—18 of Fig. 15; Fig. 19 is an end view looking in the direction of arrow B in Fig. 15; Fig. 20 is an enlarged elevational view of the adjustable jacks employed for mounting the elevator in lieu of the pivotal mounting therein with respect to a truck body; Fig. 21 is a side elevational view of the jack illustrated in Fig. 20; and Fig. 22 is a horizontal sectional view taken substantially on line 22—22 of Fig. 1 showing the adjustable jacks for supporting the elevator in lieu of the mounting of the elevator in pivoted relation to a truck body.

My invention is directed to a construction of portable elevator which is readily carried on a truck and housed adjacent or folded against one side of the truck body during transportation, and capable of being swung to a position approximately normal to the truck body and lowered to the ground for facilitating the loading of the

truck. The elevator of my invention is particularly adapted for the loading of bales, bags, and boxes. It may be utilized in loading corn and other material. An attachment is provided on the conveyor frame which is readily connectable to an angularly movable, vertically journalled yoke, permitting the conveyor to be swung from the housed position to the loading position. The attachment is readily disconnected from the yoke and connected to a pair of vertically adjustable jacks operative to support the conveyor frame at selected angular positions from the ground. The jacks are adjustably connected with the lower portion of the conveyor frame and may be adjusted in position for supporting the conveyor in different angular positions.

The entire conveyor and the associated supporting structure may be folded substantially flat against the trough of the convevor for storage and portability purposes. The prime mover for driving the convevor is carried directly by the conveyor frame and connected through drives with the conveyor driving moving means, thereby ensuring an extremely compact and self-contained construction.

Referring to the drawings in more detail. reference character 1 designates the convevor channel or trough formed from heavy gauge sheet metal having rolled over longitudinally extending side portions 1*a* and 1*b*. The trough 1 has curved frame members associated with opposite ends thereof as represented at 2 and 2*a*. and 3 and 3*a*. Frame members 2 connect between the rolled over edges of the trough 1 and side plates 4 and 4*a*. The side plates 4 and 4*a* are fastened to opposite exterior walls of trough 1 at the end thereof, as shown. The curved frame members 2 and 2*a* form bottom supports for the elevating convevor, and enable the elevating convevor to rest on the ground and to be moved around the curved frame members 2 and 2*a* as a fulcrum when adjusting the elevating convevor in selected angular positions. The side plates 4 and 4*a* serve to reinforce the lower extremitv of the trough.

The curved frame members 3 and 3*a* attach at one end to the rolled over edge portions 1*a* and 1*b* of trough 1 and extend at the other ends thereof in frame members 3' and 3A' which extend parallel to each other in spaced relation to the bottom of trough 1, and supported with respect thereto by members 5 and 6 which are secured at 5*a* and 6*a* respectively to the opposite side walls of trough 1.

Trough 1 has transversely extending sets of bearing bracket supports depending from the lower face thereof at spaced intervals, as represented at 7, 8, and 9. Bearing brackets support 9 adjacent the upper end of the trough 1 are reinforced in their connections with trough 1 by side plates 27 and 27*a* which connect with the exterior side walls of the trough 1. The bearing bracket supports 7 serve as journalling means for transverse shaft 10. The bearing bracket supports 8 serve as journalling means for countershaft 11, whereas bearing bracket supports 9 serve as journalling means for the transverse shaft 12. Transverse shafts 10 and 12 each carry sets of spaced sprocket wheels 14 and 15 thereon, over which the sprocket chains 16 and 17 are arranged to operate. The sprocket chains 16 and 17 support the transversely extending cleats 18 at spaced intervals thereon and which move between the side walls of the trough 1 and within the trough 1, for supporting and elevating bales, bags, boxes, or other material which are received at the lower end of the elevating conveyor for the purpose of being moved to the opposite end of the elevating conveyor.

In order to drive the elevating conveyor I provide an extension shelf 19 intermediate the center of the conveyor frame and the lower end thereof, which shelf is attached to one side of the trough 1. This frame serves as a support for the driving motor 20. Driving motor 20 operates drive wheel 21 over which belt 22 operates. Belt 22 drives pulley 23 mounted on countershaft 11. The countershaft 11, journalled in bearing bracket supports 8, carries drive wheel 24 which engages belt 25, in turn driving pulley 26 carried by shaft 12. Shaft 12, thus driven from the prime mover 20, drives the sprocket wheels 15 thereon for driving sprocket chains 16 and 17. The elevating conveyor is well balanced by this disposition of parts, inasmuch as the mass of the prime mover is maintained adjacent the bottom end of the conveyor frame, and the belt drives adjacent the upper end of the conveyor frame tend to produce a torque operating to direct the upper end of the conveyor frame against the support on the truck body, as represented in Fig. 4, or against the jacks, as represented in Fig. 1. The trough 1 serves as a supporting means for the sets of reinforcing plates 4 and 4*a* and 27 and 27*a* adjacent opposite ends thereof, and as a supporting means for the bracket 19 that supports motor 20, and as supporting means for bearing bracket supports 8, as well as supporting means for the members 5 and 6, and supporting means for the curved end frames 2, 2*a*, 3, and 3*a*. The gauge of trough 1 is of such stiffness that all of these supporting means may be readily applied thereto. The members 5 and 6 so space the frame members 3' and 3A' below the bottom of trough 1 that adequate protective space is provided for the return passage of the cleats 18 on the sprocket chains preparatory to the succeeding cycle of operation. The curved frames 2 and 3 and frame members 3' and 3A' space the sprocket chains 16 and 17 from any obstructive surface, allowing the sprocket chains and the cleats 18 thereon to move freely in a downward direction beneath the bottom of trough 1, and in an upward direction over trough 1, in performing a loading operation.

The trough 1 carries a transverse bar 28 beneath the undersurface thereof. Transverse bar 28 is of T-shaped section, as represented at 28', for purposes of mechanically reinforcing the bar, and projects on opposite sides of the trough 1 and has opposite ends thereof turned downwardly as represented at 28*a* and 28*b*. These downwardly turned ends are apertured for the passage of removable coupling bolts represented at 29 and 30. When the conveyor is to be attached to a vehicle, such as a truck, for movement therewith, I provide a yoke frame 31 terminating in a central vertical spindle 32. The central vertical spindle 32 is provided with an adjustable collar 33 which may be adjusted in position to determine the elevation of the upper end of the conveyor frame with respect to the body of the truck represented at 34, shown more clearly in Fig. 4. The spindle 32 with the collar 33 thereon extends through the apertured end 35 of the bracket 36 which is secured to the truck body 34. The upper end of the elevating conveyor, with respect to the body of the truck 34, may thus be readily adjusted by loosening the set screw 33*a* in collar 33 and changing the position of spindle 32 in collar 33 and then tighten-

ing collar 33 in position and allowing the spindle 32 to be supported on bracket 29 at a selected elevation. The mounting, as thus provided, is such that the entire elevating conveyor frame may be swung from a position adjacent the side of the truck body 34 as represented in full lines in Fig. 4, to a position substantially normal to the truck body as represented in dotted lines in Fig. 4, preparatory for a loading operation.

While the conveyor is being transported, the conveyor frame is maintained in a raised position with reference to the truck body 34, as represented more particularly in Figs. 2 and 3. In this arrangement a sliding bar 37 is extendible transversely from the truck body in a slide 38 to support the undersurface of the trough 1. Under these conditions, the curved frames 2 and 2a are elevated above the ground, allowing transportation of the elevating conveyor on the truck. When the elevating conveyor is to be placed in operation, sliding bar 37 is restored to its stored position beneath the truck body 34, and the elevating conveyor swung downwardly around spindle 32 as a pivot and moved to a position substantially normal to the truck body as represented in dotted lines in Fig. 4, with the curved members 2 and 2a in contact with the ground. By raising and lowering the spindle 32 in the bracket 36, the upper end of the conveyor may be adjusted to function in the desired position with respect to the truck body.

When it is desired to operate the conveyor wholly detached from the truck body, bolts 29 and 30 are removed from the downwardly extending ends of the bar 28, and yoke 31 detached therefrom. In lieu of the connection to the yoke, I provide a pair of telescopically adjustable jacks 39 and 40 which have their upper sections connected by bolts 29 and 30 with the downwardly extending ends 28a and 28b of transverse bar 28, as shown more clearly in Figs. 1, 18, and 20–22.

The telescopically adjustable jacks 39 and 40 are illustrated in this particular embodiment of my invention as comprising a pair of telescopic sections designated at 41 and 42 and at 43 and 44 respectively. The jack sections 42 and 44 are tubular, into which the jack sections 41 and 43 are adapted to adjustably slide. Jack sections 40 and 41 are provided with spaced notches represented more particularly in Fig. 1 at 41', 41'', 41''', 41'''', and 41v. These notches coact with the ends of pawls represented at 45 and 46 carried by the lower sections 42 and 44 of the jacks. The pawls are spring actuated and are continuously urged against the notches in the upper sections 41 and 43 of the jacks, so that as the upper sections are withdrawn upwardly from the lower sections, they may be maintained in position by the latching operation provided by the pawls 45 and 46. In order to retract the upper sections with respect to the lower sections, the bolts are released, allowing the upper sections 41 and 43 to gravitate into sections 42 and 44.

As represented in Fig. 22, the lower sections of the jacks are confined with respect to the lower end of the elevating conveyor frame, by means of telescopically arranged extensible and retractable frames 47 and 48 and 49 and 50. The sections 48 and 50 connect with the jack sections 44 and 42, as represented at 51 and 52 respectively. The extremities of the extensible and retractable frames 47 and 49 pivotally connect at 53 and 54 with the side plates 4 and 4a of the elevating conveyor frame. The adjacent ends of the sections 49 and 50 and 47 and 48 telescopically connect through fastening means 55 and 56. The fastening means 55 and 56 are released in order to enable the adjacent sections to be telescopically adjusted with respect to each other. The fastening means are set in position when the proper spacial relation of the parts of the frame is secured. The fastening means comprises lever screw members which, when tightened, clamp the parts against longitudinal telescopic movement, and which, when loosened, permit free telescopic adjustment as shown in Fig. 1. The adjustment may be carried out over a wide range. The completely lower position of the elevating conveyor frame has been illustrated in horizontal dotted line position in Fig. 1 with the telescopically adjustable parts illustrated at 47', 56', and 48'. The other extreme position of the elevating conveyor frame is illustrated adjacent the top of Fig. 1, wherein the parts have been illustrated in dotted line position with telescopic section 41 fully extended and pawl 45 shown engaged in notch 41v for maintaining the elevating conveyor in an extreme elevated position.

For purposes of illustrating my invention, I have designated the prime mover 20 as an electric motor which may be connected through an extended cable to a power source. However, I often use a small gasoline engine in lieu of the electric motor. A ½ horsepower engine or motor has been found adequate for operating a small, lightweight elevating conveyor constructed in accordance with my invention, and capable through the ratios provided by the driving to driven pulley sizes as illustrated in Fig. 14, for obtaining a double reduction in conveyor speed, of elevating ½ ton of bales, bags, or boxes per minute.

The entire conveyor and supporting frame may be folded into a compact space with the jacks and yoke flat against the trough for purposes of shipment and storage.

I have found the embodiment of my invention illustrated herein highly practical in manufacture, production and operation, and while I have described my invention in certain of its preferred embodiments, I realize that modifications may be made, and no limitations upon my invention are intended other than may be imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. A portable elevating conveyor for attachment to the underframe of a vehicle comprising a bracket member extending transversely from the underframe and terminating in a socket opening substantially coplanar with the underframe of the vehicle and extending beyond one side thereof, a vertically disposed spindle adjustably mounted in the socket opening in said bracket member, a yoke carried by said spindle in a position substantially higher than the underframe of the vehicle, a conveyor frame journalled transversely in said yoke and extending downwardly therefrom at an angle with respect to the vehicle, supporting means on the vehicle remote from said bracket member for supporting said conveyor frame, an endless conveyor mounted in said conveyor frame, power means carried by said conveyor frame for operating said endless conveyor, said conveyor frame being movable from a position immediately adjacent the exterior of the side of the vehicle for transportation, to a position extending in a plane substantially normal to the vehicle for performing a loading operation.

2. A portable conveyor comprising a trough,

end frames secured to each end of said trough, sprocket chains movable in a path interiorly of the trough and exteriorly below the trough, cleat members carried by said sprocket chains and progressively movable interiorly through the trough, a prime mover carried by said trough for imparting movement to said sprocket chains, a transverse bar mounted beneath said trough adjacent the upper end thereof and having downwardly extending apertured ends, a yoke aligned with the downwardly extending apertured ends of said bar and secured thereto by removable fastening means, a spindle extending downwardly centrally from said yoke, a collar carried by said spindle for supporting said spindle whereby said trough may be swung radially to selected positions, and means for adjusting said collar upwardly and downwardly on said spindle for maintaining said spindle in a position for raising or lowering said yoke for positioning said trough in selected inclined planes.

3. An elevating conveyor comprising a trough, an endless conveyor operating longitudinally through said trough, a transverse bar member secured to the underside of said trough adjacent the upper end thereof, said bar member having downwardly projecting apertured ends, and a yoke having upwardly extending end portions engageable with the downwardly projecting ends

of said bar member, a spindle projecting from said yoke, brace bars extending from said spindle beneath said yoke to positions adjacent said upwardly extending end portions for reinforcing said yoke in a vertical plane, an adjustable collar on said spindle beneath said yoke, and means supporting said adjustable collar and said spindle for enabling said spindle to be raised or lowered for changing altitude of the upper end of said trough and the angle of inclination of said trough while allowing said trough to be moved in selected radial planes while maintaining said conveyor in operative condition during loading and transportation.

ISAAC Z. SMOKER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,256,830	Johnson	Sept. 23, 1941
2,284,853	Wall	June 2, 1942
2,389,779	Heller	Nov. 27, 1945
2,401,465	Cwicig	June 4, 1946
2,410,996	Patterson	Nov. 12, 1946
2,427,324	Farr et al.	Sept. 9, 1947