

March 18, 1952

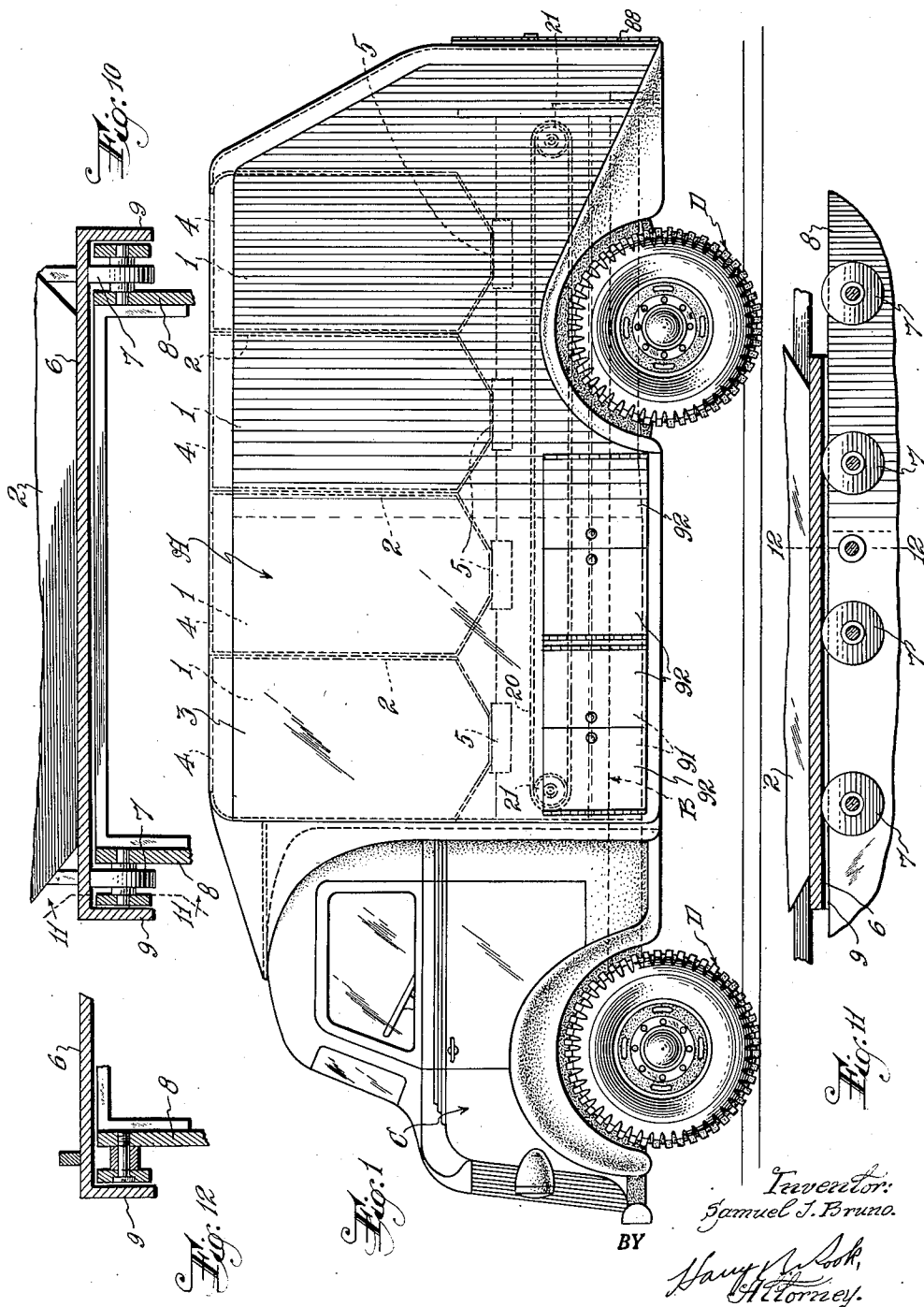
S. J. BRUNO

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COAL DELIVERY TRUCK AND DEPOSITING CONVEYER

Filed Oct. 2, 1947

11 Sheets-Sheet 1



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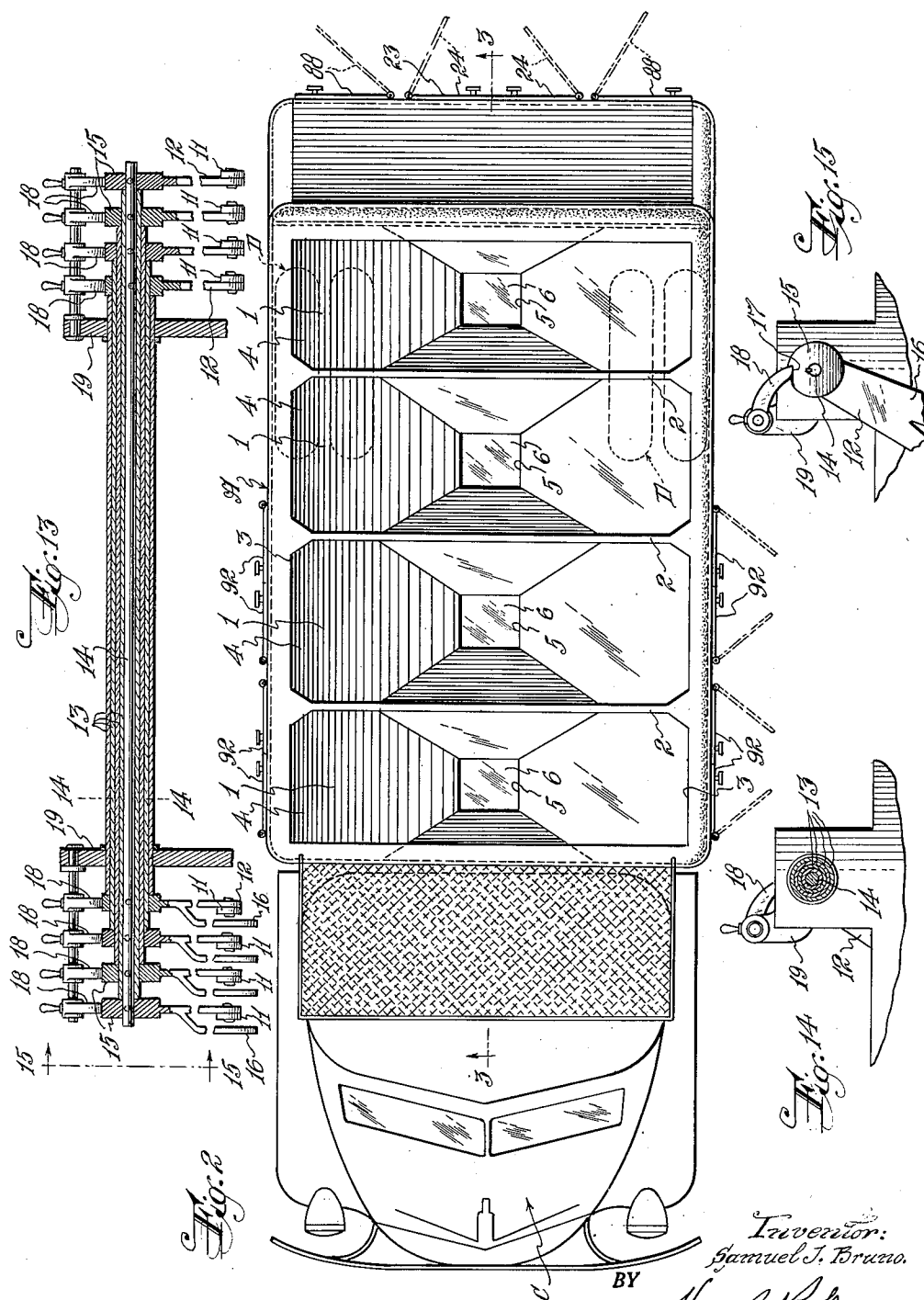
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COAL DELIVERY TRUCK AND DEPOSITING CONVEYER

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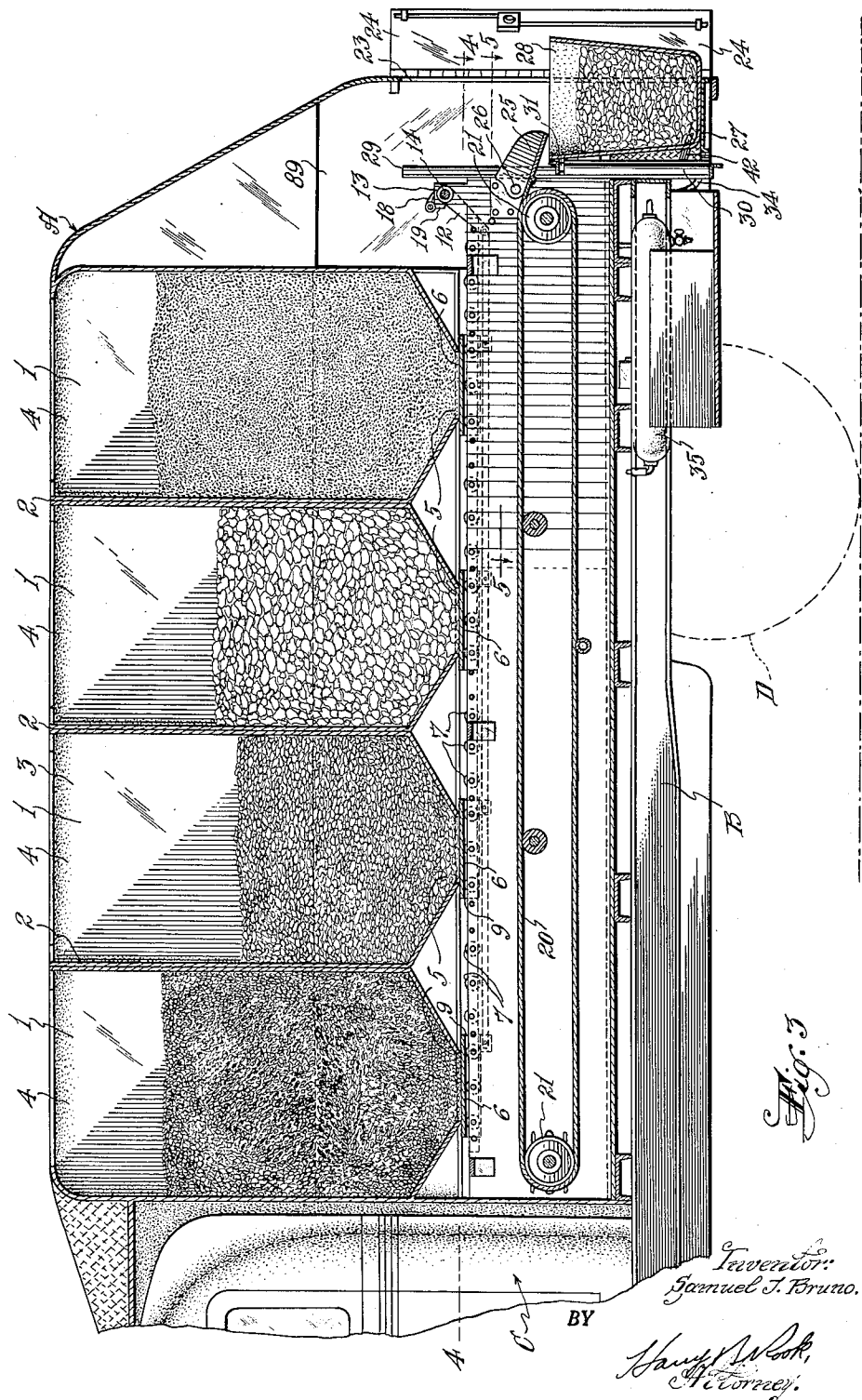
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COAL DELIVERY TRUCK AND DEPOSITING CONVEYER

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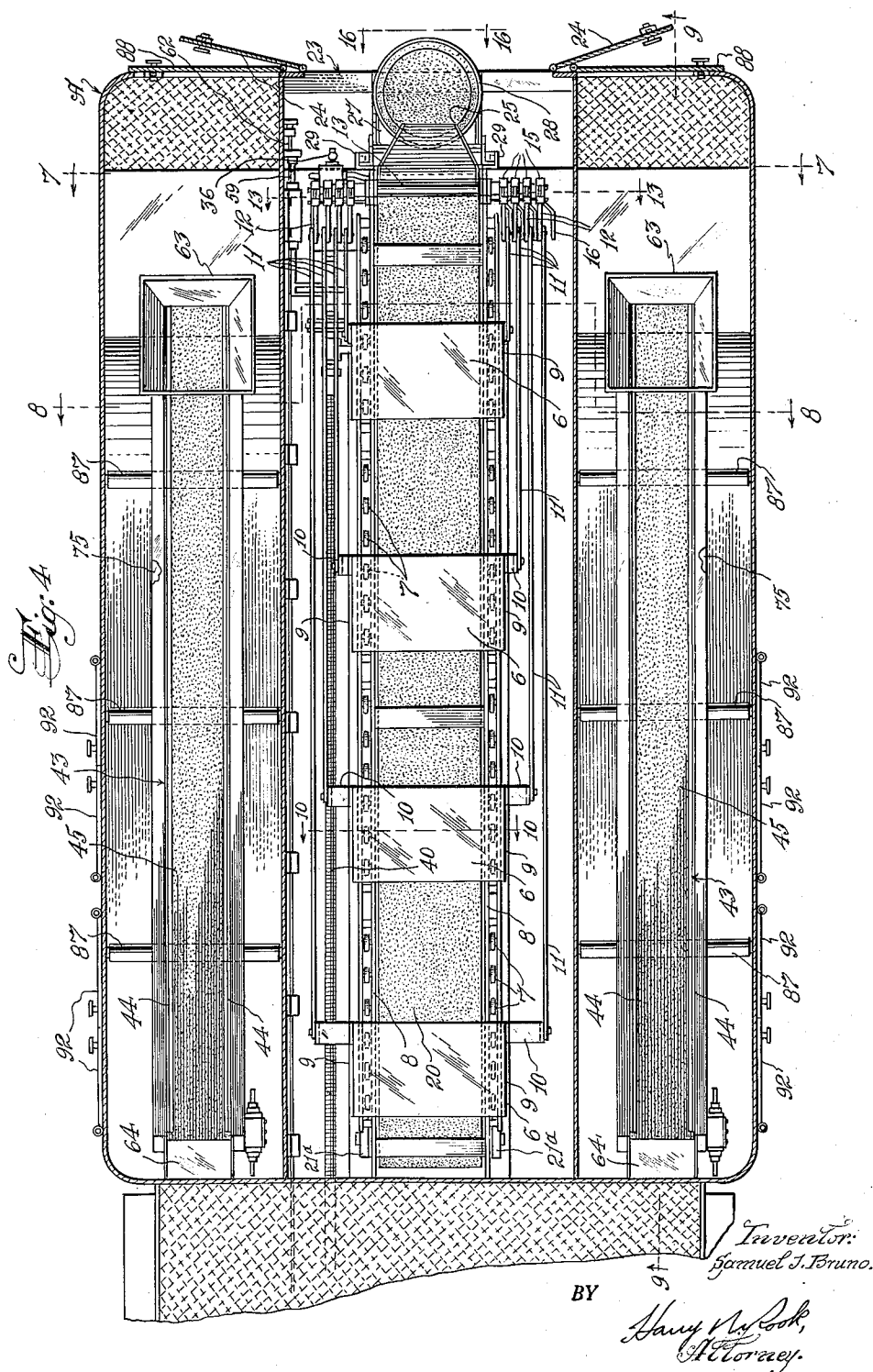
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COAL DELIVERY TRUCK AND DEPOSITING CONVEYER

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COAL DELIVERY TRUCK AND DEPOSITING CONVEYER

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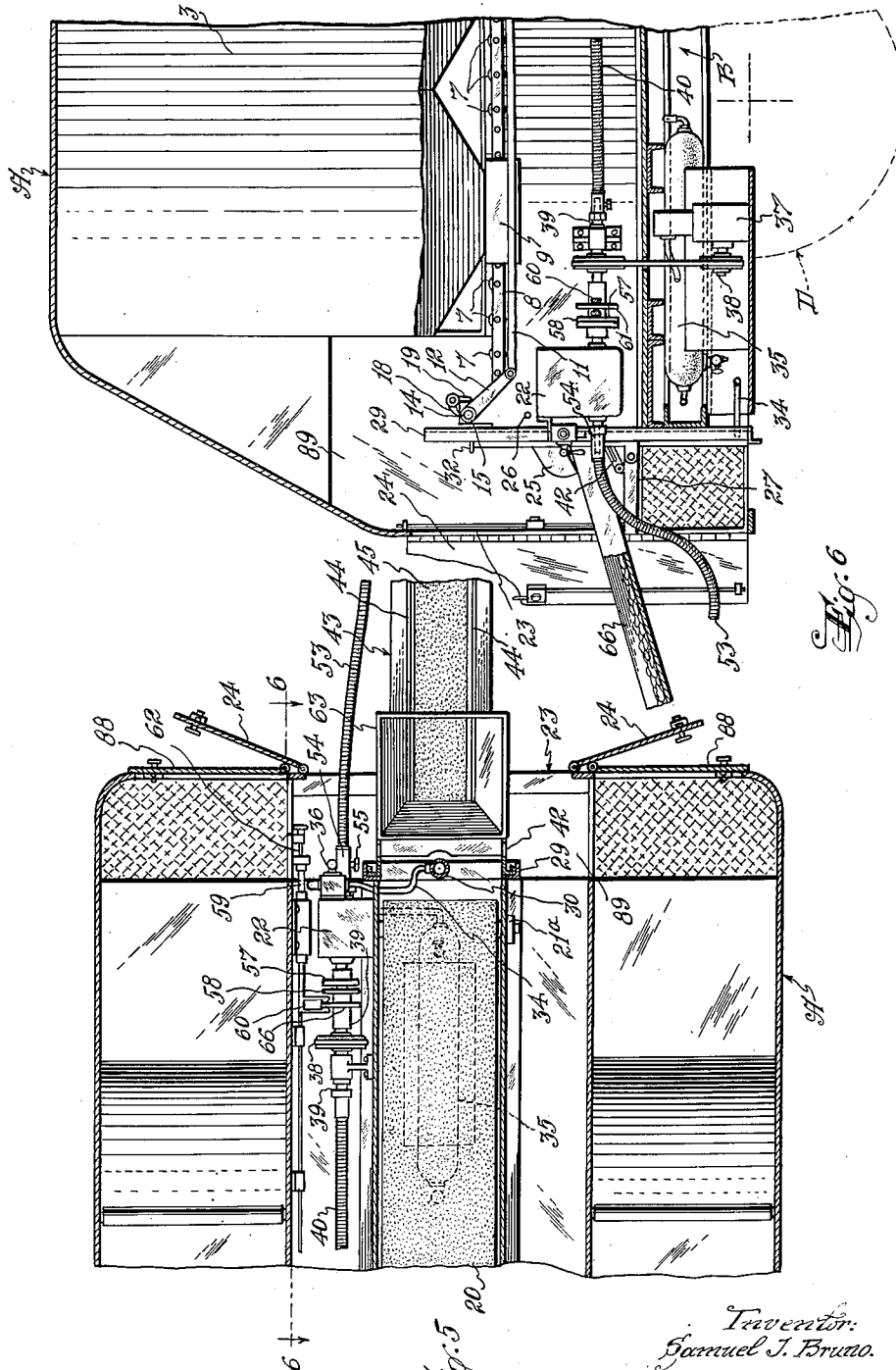


Fig. 5

Fig. 6

BY

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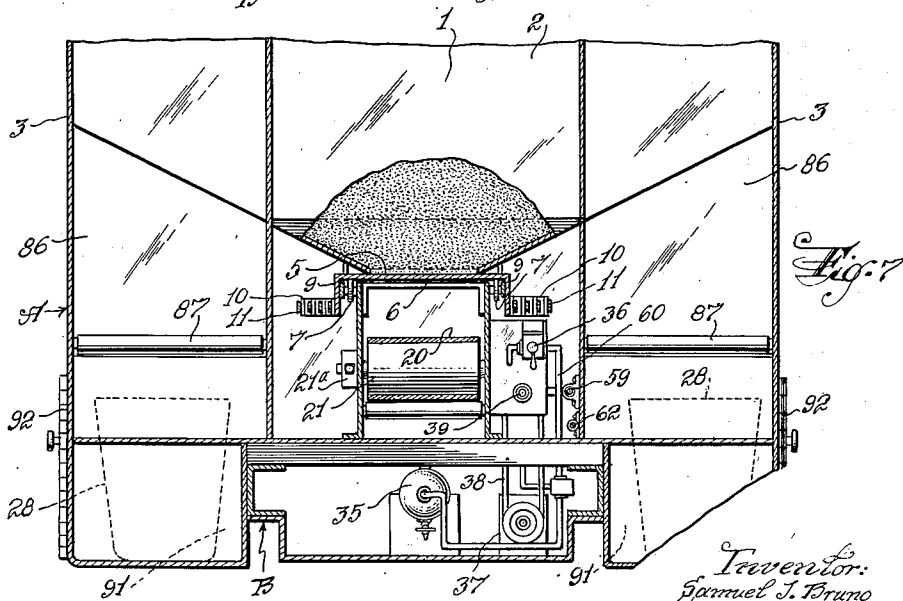
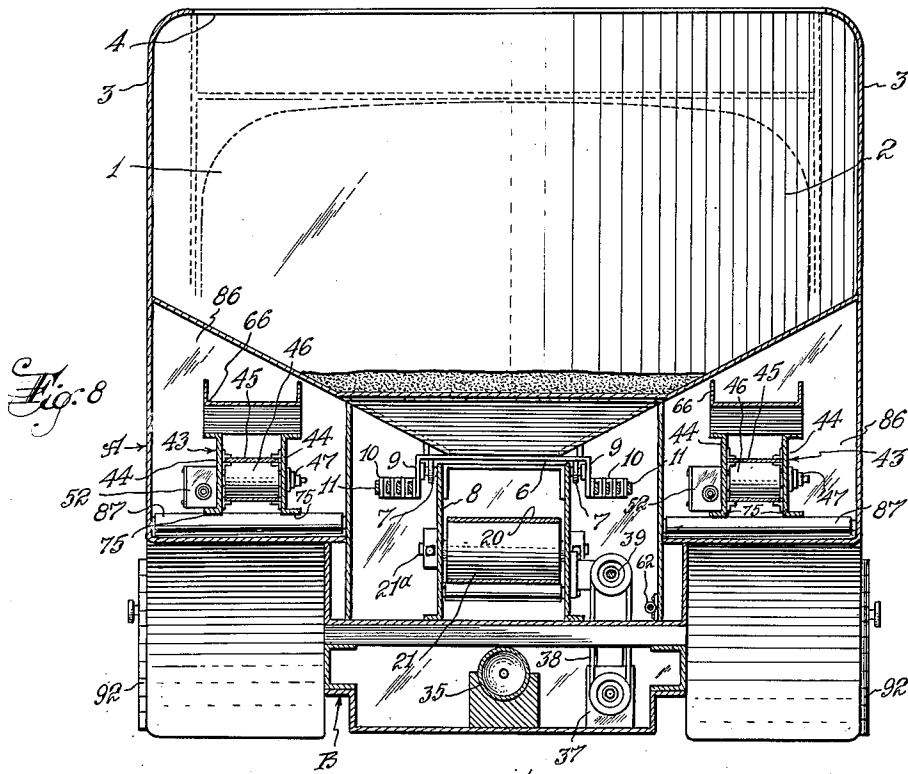
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COAL DELIVERY TRUCK AND DEPOSITING CONVEYER

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11 Sheets-Sheet 6



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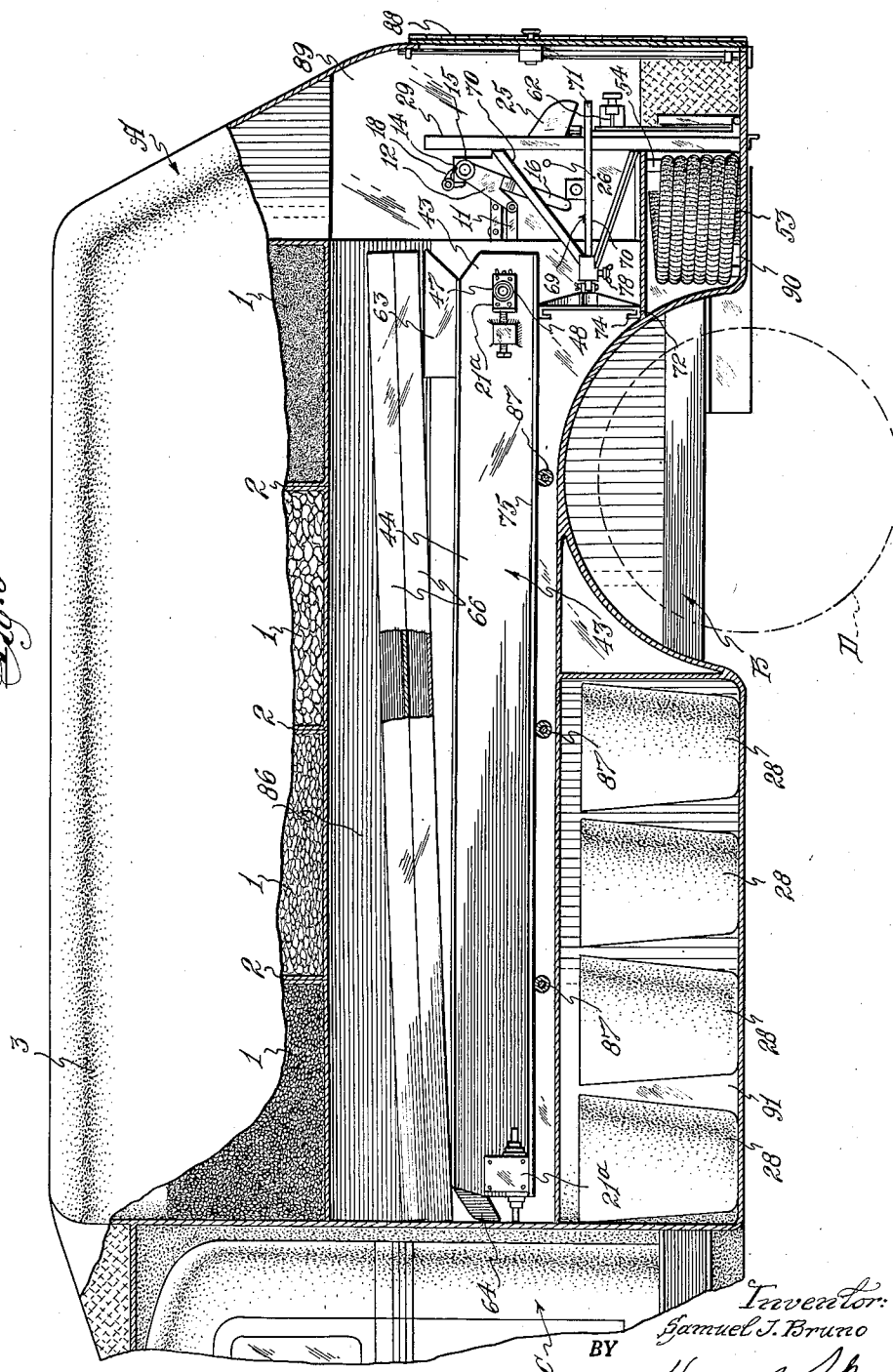
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COAL DELIVERY TRUCK AND DEPOSITING CONVEYER

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Fig. 9



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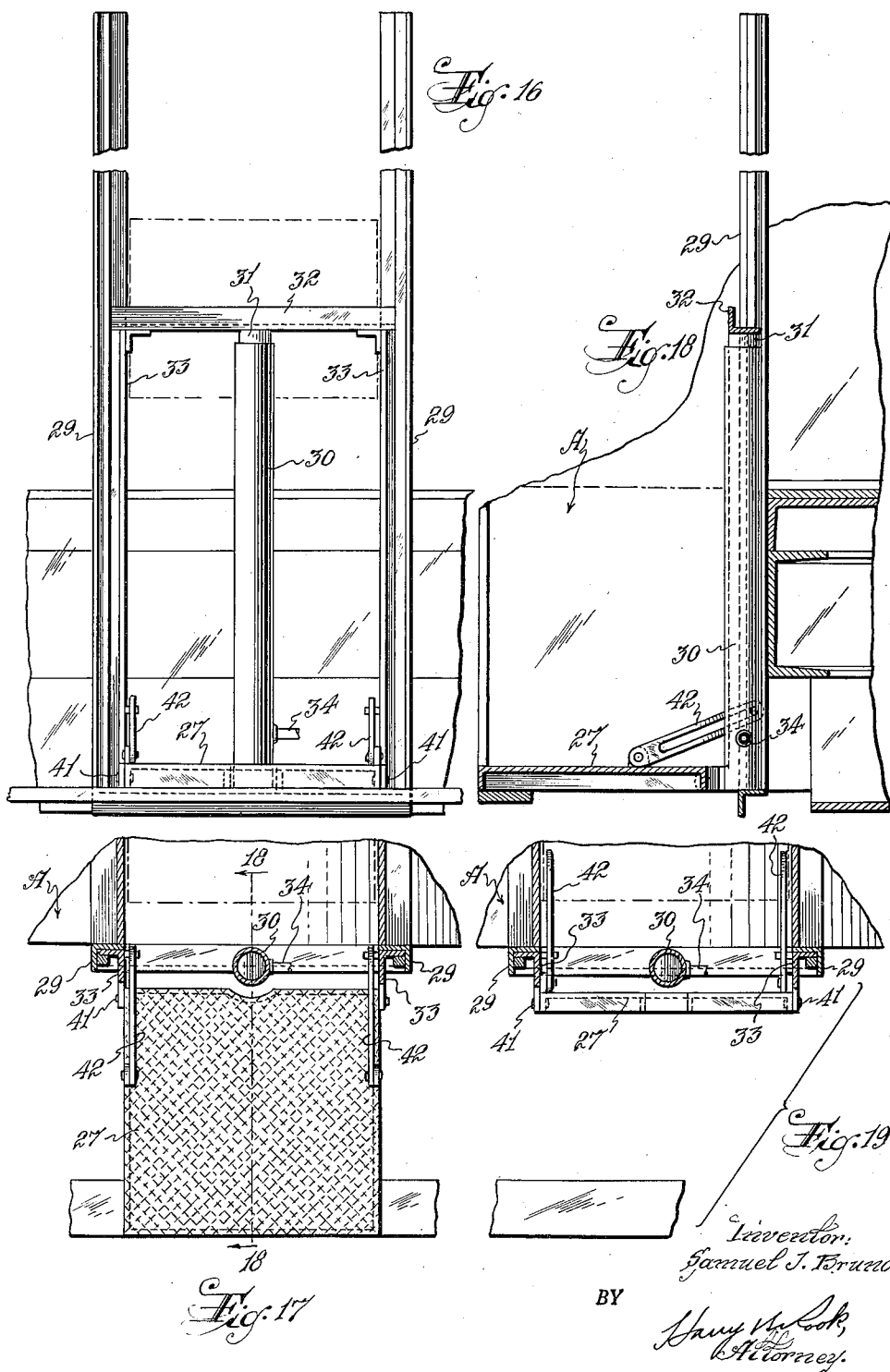
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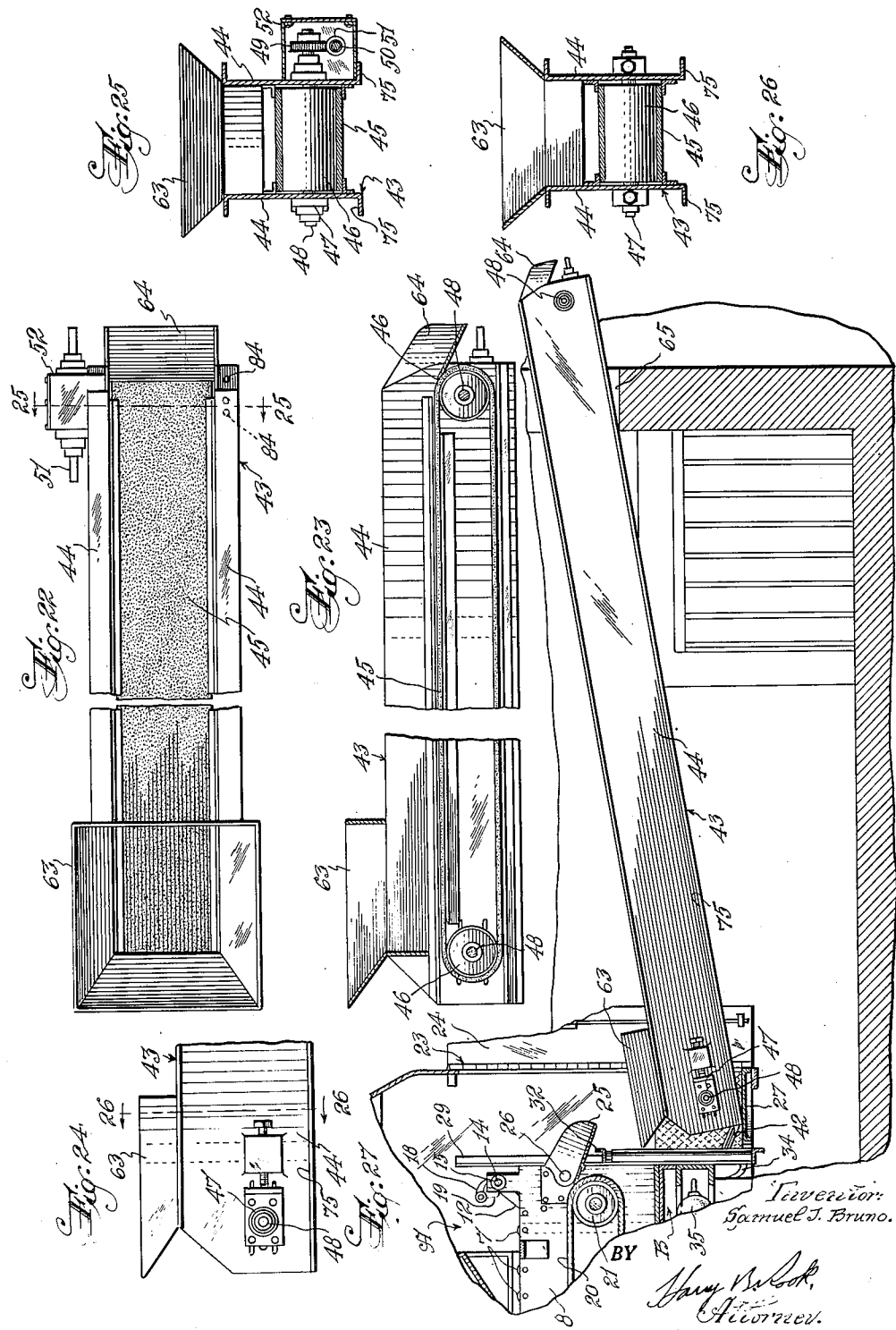
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COAL DELIVERY TRUCK AND DEPOSITING CONVEYER

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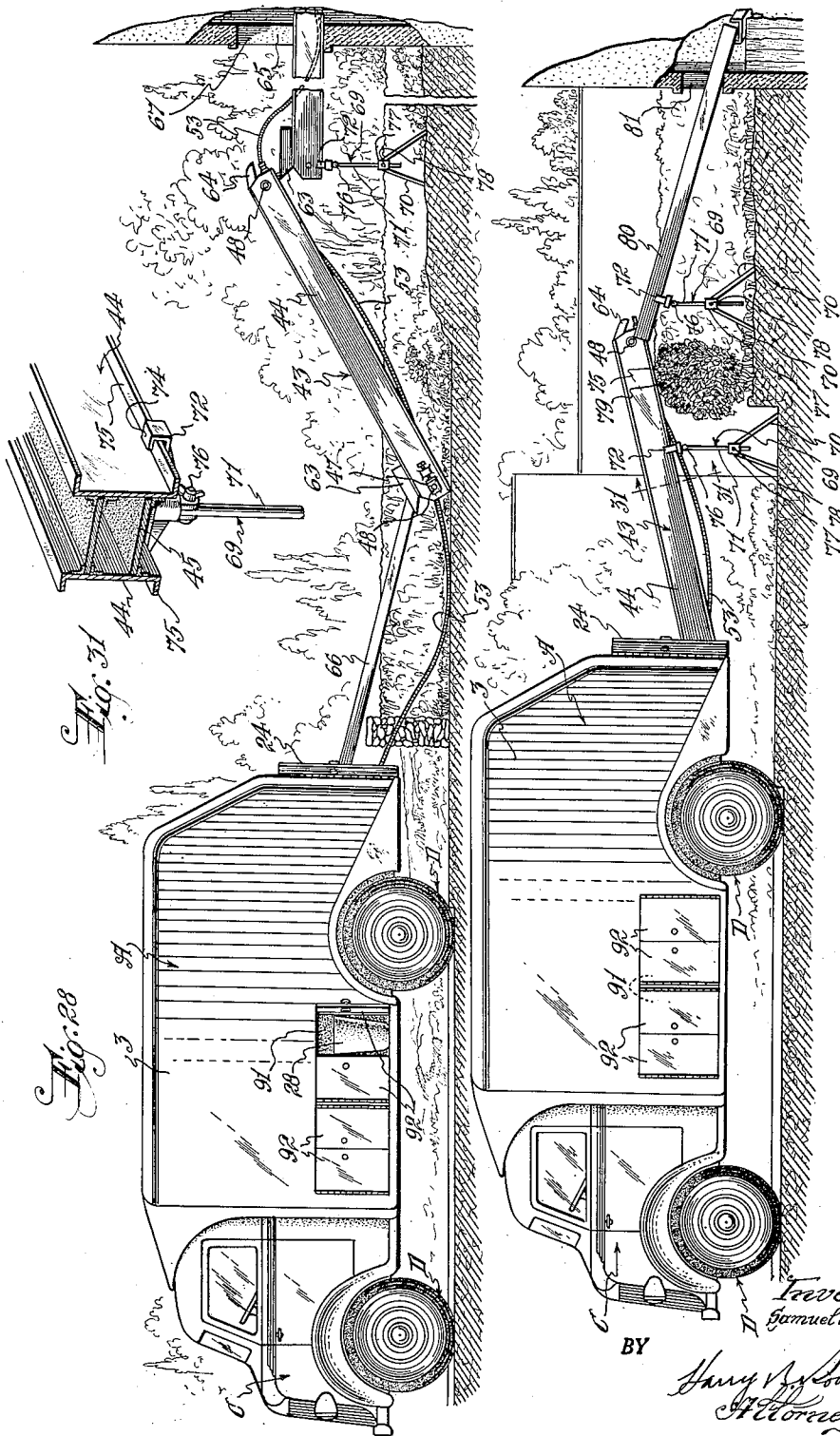


Fig. 28

Fig. 29

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UNITED STATES PATENT OFFICE

2,589,988

COAL DELIVERY TRUCK AND DEPOSITING
CONVEYER

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Application October 2, 1947, Serial No. 777,473

6 Claims. (Cl. 214—83)

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This invention relates in general to a delivery truck for material capable of flowing, such as coal, coke, gravel, etc., and means for conveying the coal or other flowing material from the body of the truck to a desired point, for example, a cellar window; and more particularly, the invention contemplates a delivery truck body which may be utilized to transport a plurality of load units, for example, different materials or different grades of a material.

Many known delivery trucks are of the tiltable rear-end dumping type and have discharge openings to which chutes are attached for guiding the contents of the truck when the latter is tilted from said discharge opening to a desired point, such as a cellar window. Such trucks are limited in that they are not adaptable to deliveries in certain restricted zones or areas where there is not room for the tilting of the body of the truck, or the point of deposit of the contents of the truck is in an inaccessible location with respect to the truck body. Therefore, one object of my invention is to provide a novel and improved construction and combination of a truck body and means for conveying the contents of the body to a desired point, whereby the contents may be discharged from the body without the necessity for tilting the body and can be conveyed in various directions horizontally and vertically, for example, around corners, or upwardly over terraces or hedges.

Another object is to provide a novel and improved combination of a truck body and a plurality of conveyor chutes which normally can be stored and transported in the body and can be removed and connected together when it is desired to discharge the contents of the body, said conveyor chutes including endless conveyors capable of being driven from any suitable source of power, for example, the motor of a motor truck on which the body is mounted.

A further object is to provide a delivery truck of the character described which shall include a discharge opening and novel and improved means for supporting a receptacle, such as a basket, in such a position as to receive material discharged through said opening, and means for elevating said supporting means to facilitate lifting of the receptacle to the shoulders of a man.

Other objects are to provide novel and improved conveyor chutes having endless conveyors therein and means for driving the latter; to provide novel and improved means for supporting a plurality of said chutes in various positions and in such relation to each other as to form a continuous delivery channel or chute; and to obtain other advantages and results that will be brought out by the following description in conjunction with the accompanying drawings, in which

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Figure 1 is a side elevational view of a delivery truck embodying my invention;

Figure 2 is a top plan view thereof;

Figure 3 is a longitudinal vertical sectional view, taken approximately on the plane of the line 3—3 of Figure 2;

Figure 4 is a horizontal sectional view, taken approximately on the plane of the line 4—4 of Figure 3;

Figure 5 is a similar view, taken approximately on the plane of the line 5—5 of Figure 3;

Figure 6 is a fragmentary vertical sectional view, on approximately the plane of the line 6—6 of Figure 5;

Figure 7 is a transverse vertical sectional view, approximately on the plane of the line 7—7 of Figure 4;

Figure 8 is a similar view, on the plane of the line 8—8 of Figure 4;

Figure 9 is a vertical longitudinal sectional view, on the plane of the line 9—9 of Figure 4;

Figure 10 is a greatly enlarged transverse vertical sectional view, approximately on the plane of the line 10—10 of Figure 4;

Figure 11 is a fragmentary vertical sectional view, on the plane of the line 11—11 of Figure 10;

Figure 12 is a fragmentary vertical sectional view, on the plane of the line 12—12 of Figure 11;

Figure 13 is a fragmentary vertical sectional view, approximately on the plane of the line 13—13 of Figure 4, with portions omitted for clearness in illustration;

Figure 14 is a transverse sectional view, on the plane of the line 14—14 of Figure 13;

Figure 15 is an end elevational view, from approximately the plane of the line 15—15 of Figure 3;

Figure 16 is an enlarged fragmentary elevational view of the basket-elevating mechanism at the rear end of the truck, viewing the same from approximately the plane of the line 16—16 of Figure 4, and showing the platform in its lowermost position;

Figure 17 is a top plan view of the parts shown in Figure 16;

Figure 18 is a vertical sectional view, approximately on the plane of the line 18—18 of Figure 17;

Figure 19 is a view similar to Figure 17, showing the platform swung upwardly into inoperative position;

Figure 20 is a fragmentary vertical sectional view of the rear end of the truck similar to Figure 4, but showing the platform of the basket-elevating mechanism in its uppermost position;

Figure 21 is a schematic view of the pneumatic system for actuating the basket-elevating mechanism;

Figure 22 is a top plan view of one of the conveyor chute sections;

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Figure 23 is a vertical longitudinal sectional view through said conveyor chute section;

Figure 24 is a fragmentary side elevational view of the chute section;

Figure 25 is a transverse vertical sectional view, approximately on the plane of the line 25—25 of Figure 22;

Figure 26 is a transverse vertical sectional view, approximately on the plane of the line 26—26 of Figure 24;

Figure 27 is a fragmentary vertical longitudinal sectional view through the rear end of the truck body, and a side elevational view of one of the conveyor chute sections in operative position;

Figures 28 and 29 are side elevational views of the delivery truck and conveyor chute, showing different ways of utilizing the chute sections in making deliveries at difficultly accessible points;

Figure 30 is a top plan view of the truck and conveyor chute, showing another manner of using the chute sections;

Figure 31 is an enlarged sectional perspective view, taken approximately on the plane of the line 31—31 of Figure 29;

Figure 32 is a fragmentary side elevational view of one end of a modified form of chute section, and

Figure 33 is a transverse vertical sectional view, approximately on the plane of the line 33—33 of Figure 32.

Specifically describing the invention, the reference character A generally designates the truck body which is mounted on the chassis B of a motor truck which may be of any suitable construction but is shown as of the cab-over-engine type, wherein the motor is located beneath the cab C, the chassis being mounted on the usual running gear including wheels D.

In accordance with one feature of the invention, the body is divided into a plurality of bins or compartments 1 that are formed by transverse partitions 2 extending between and connected to side walls 3 of the body, the upper ends of said compartments having filling openings 4 and the lower ends having discharge openings 5 which are normally closed by sliding closure plates 6 that are mounted to slide transversely of the respective discharge openings to open and close the latter. As shown, each closure plate 6 is mounted on rollers 7 that are in turn journaled on spaced vertical frame plates 8 that extend longitudinally of the body, as best shown in Figures 3 and 8. Each plate has side flanges 9 to abut the rollers 7 and limit lateral movement of the plates.

These closure plates are independently operable and each has an outwardly and downwardly projecting arm 10 at each of opposite sides thereof to which is connected one end of a link 11, the other end of which is connected to one end of a crank arm 12 which is rigidly attached to one end of one of a plurality of sleeves 13 which are arranged in telescopically associated relation on a transverse shaft 14 in the frame plates 8, as best shown in Figure 13. As shown, each crank arm 12 has a collar 15 which is pinned on the corresponding shaft 14 or sleeve 13, and each crank arm on at least one side of the truck is provided with an operating handle 16 by which the crank arms may be swung about the axis of the shaft 14. With this construction, and assuming the closure plates to be in their normal closed positions as shown in Figures 3 and 4, in order to move any one of the closure plates into open position, the handle 16 of the corresponding

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crank arm (see Figures 4, 9 and 13) must be manually grasped and swung to the rear of the truck. Any suitable means may be utilized for holding the closure plate in open position, but I have shown each collar 15 provided with a detent notch 17 with which cooperates a gravity-operated pawl 18 mounted on a bracket 19 on one of the frame plates 8 (see Figures 13 and 15).

From the foregoing, it will be observed that a different substance may be transported in each of the compartments 1, and that the contents of the compartments may be discharged selectively and independently by opening the proper closure plate 6. In accordance with the invention, the contents of the compartments are discharged by gravity upon the upper reach or rung of an endless conveyor belt 20 which is mounted on pulleys 21 that are journaled in bearings 21a in the frame pieces 8, said conveyor belt extending longitudinally of the body substantially centrally of the width thereof beneath the discharge openings 6 of all of the compartments and having its discharge end located adjacent a rear door opening 23 in the truck body which is normally closed by swinging doors 24. One of the pulleys 21 is driven in any suitable manner, but preferably through a speed-reducing gearing 22 from the engine of the motor truck as will be hereinafter described. Adjacent the discharge end of the conveyor is a transfer chute 25 that is pivotally mounted at one end on the frame pieces 8, as indicated at 26, so that selectively it can be swung substantially horizontally rearwardly as shown in Figure 3, or swung upwardly into inoperative position as shown in Figure 20.

Beneath the transfer chute is a platform 27 which serves as a support for a basket or other container 28 when the material is to be manually carried to the point of delivery, and also serves as a support for one end of the conveyor chute, as will be hereinafter described. This platform is vertically slidable in guide tracks 29 (see Figures 3 and 16—19, inclusive) and adapted to be pneumatically elevated, either to raise the basket 28 to a convenient position for placement upon the shoulder of a man to carry it, or to adjust the end of the conveyor chute to the proper elevation, as the case may be. As shown, a cylinder 30 has one end mounted on the bottom of the truck body and a piston 31 projecting from the other end thereof and connected by a cross-head 32 to the side frame pieces 33 on which the platform 27 is mounted. The lower end of the cylinder is connected by a pipe 34 to a compressed air tank 35 (see Figure 21) through a known type of two-way valve 36, so that when the valve is in one position, the air pressure will enter the cylinder 30 and elevate the platform, as shown in Figure 20, while when the valve is in another position, the air will be vented from the cylinder to the atmosphere to permit the platform to descend by gravity. Compressed air is supplied to the tank 35 from a pump 37 which is driven by a belt and pulley connection 38 from a countershaft 39 which is connected by a flexible shaft 40 to a known type of power take-off (not shown) through which power is derived from the motor of the truck in known manner.

Preferably, the platform 27 is pivotally connected to the frame pieces 33, as indicated at 41, so that normally the platform may be swung upwardly into an out-of-the-way position, as shown in Figure 9, while, when desired, the platform may be swung into a horizontal po-

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sition for use. Suitable braces 42 are provided for holding the platform in horizontal position.

Where it is possible to do so, instead of manually carrying the load from the truck to the point of delivery, a conveyor chute is utilized for automatically transporting the contents of the truck from the conveyor 20 to the point of deposit. In accordance with another feature of my invention, the conveyor chute may comprise one or a plurality of identical sections 43 each of which comprises side frame pieces 44 and an endless conveyor belt 45 mounted on pulleys 46 which are journaled in bearings 47 in the frame pieces 44. One of the pulleys 46 is driven, being mounted on a shaft 48 on one end of which is a worm gear 49 with which meshes a worm 50 carried by a shaft 51 which is journaled in a gear case 52 that is secured to one of the frame pieces 44. The shaft 51 extends from opposite sides of the gear case and is adapted to have separably connected to either end thereof a flexible shaft section 53 which has couplings 54 at its ends for attachment to the shafts. As shown, each coupling comprises a socket member to slidably fit over the end of a shaft, for example, the shaft 51, and having a set screw 55 or the like for separably fastening the socket member on the shaft. One of these flexible shaft sections also serves to transmit power from the countershaft 39 to the conveyor chute, as best shown in Figures 5 and 6, where the coupling 54 of the flexible shaft is connected to one take-off shaft of a speed-reducing gearing 22, another take-off shaft of which is connected to one of the conveyor pulleys 21 and the input shaft of which is connected to one section 57 of a friction clutch, the other section 58 of which is slidable on the countershaft 39 and actuated by a pull rod 59 which has a fork 60 embracing a flange 61 on the clutch, so that when the pull rod is moved in opposite directions the clutch is thrown in and out, respectively, to connect and disconnect the flexible shaft sections 53 from the countershaft 39, which, as before described, is driven from the engine of the motor truck. The pull rod 59 is located conveniently for operation through the rear door of the truck body, and, if desired, a pull wire 62 may be operatively connected to the motor control mechanism and operable through said rear door for controlling the speed of the motor as desired.

The end of each conveyor chute section opposite the driven pulley has a receiving hopper 63 adapted to receive material directly from the conveyor 20 of the truck body or from an adjacent chute section, and the other end of the chute section has a transfer chute 64 for guiding the material from the conveyor 45 to the point of deposit or into the hopper 63 of another chute section.

One possible use of one chute section is shown in Figure 27, where the receiving end of the chute is set on the platform 27 beneath the transfer chute 25 and with its discharge end projecting through the opening 65 of a cellar window. The shaft 51 of the chute section is connected by one of the flexible shaft sections 53 directly to the take-off shaft of the speed-reducing gearing 56.

In operation, the proper closure plate 6 is opened to permit deposit of the contents of the corresponding bin 1 on the conveyor 20 and the conveyor is started in operation by closing the clutch 57, 58. This causes simultaneous starting of the conveyor 45 of the chute section so

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that the coal or other contents of the discharging bin is transported by the conveyor 20 over the transfer chute 25 into the receiving hopper 63 of the chute section and is then conveyed by the conveyor belt 45 of the chute section through the cellar window 65. The chute sections may be combined with each other or with known types of chutes to meet various difficult delivery problems.

Another use of the invention is shown in Figure 28, where an ordinary or known type of delivery chute 66 has one end resting on the platform 27 and is inclined downwardly with its other end in the receiving hopper 63 of one of the conveyor chute sections 43. The discharge end of the chute section 43 is arranged to discharge into the receiving end of another chute section which extends through a cellar window 67. With this arrangement, the material may be discharged by gravity through the chute 66 and then elevated by the chute section 43.

Where other support is not available, I contemplate using special supports or props for the chute sections as generally indicated at 69. Each support comprises a tripod base 70 in which is adjustably mounted a standard 71 at the upper end of which is mounted a seat 72 for a chute section. As shown, the seat is approximately U-shaped to receive the chute section between its arms and has the extremities of its arms turned inwardly at 74 so as to receive the flanges 75 of the side pieces of the chute section. Also, it is desirable that the seat be pivotally connected at 76 to the standard 71 on an axis transverse to that of the standard so that the seat may be tilted to accommodate angular positions of the chute sections, as shown in Figure 29. The standard 71 is adjustable through a sleeve 77 in the tripod base and is held in adjusted position by a set screw 78. The details of the prop are best illustrated in Figure 9 of the drawings.

Another manner of using the conveyor chutes is shown in Figure 29, where the receiving end of the chute is mounted on the platform 27 while the other end of the chute section is propped in an elevated position over the top of a hedge 79 and arranged to discharge into an ordinary chute 80 by which the material may be conveyed by gravity through a window 81.

Figure 30 illustrates a use of the conveyor chute sections in making delivery around corners. Here, one chute section has its receiving end set on the platform 27 and its other end leading into the hopper of another section which is disposed at substantially right angles to the first section and has its discharge end leading into an ordinary gravity chute that extends through a window 82. One flexible shaft section is connected to the take-off shaft of the speed-reducing gearing 22 and to the shaft 51 of the first chute section, while another flexible shaft section has one end connected to said shaft 51 of the first chute section and its other end connected to the shaft 51 of the second chute section. In this way, the conveyors of both of the chute sections are driven in series through the speed-reducing gearing from the motor of the truck. Various other combinations and arrangements of the chute sections will occur to those skilled in the art.

It may be desirable in some instances to positively hold the discharge end of one chute section against lateral movement relatively to the receiving end of another chute section, and, as shown, the hopper 63 of each chute section

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may have one or more slide bolts 83 while the lower flanges 75 adjacent the discharge end of each section may have a plurality of openings 84 to receive the bolts 83, as indicated in Figures 32 and 33, where the discharge end of one section is shown by broken lines.

In some cases it may be desirable to provide a mounting for the chute sections on the platform so that the section may be easily swung with a pivotal action relatively to the platform. For this purpose, the receiving end of each chute section may have an inverted conical bolster 85 the apex of which may rest on the platform and form a pivot for swinging the chute section.

The invention also contemplates the transportation in the truck of all of the chute sections, props and baskets required for making deliveries efficiently, and accordingly, a chamber 86 is provided at each side of the truck body below the compartments 1 for one of the chute sections 43 (see Figures 4, 8 and 9), there being rollers 87 at the bottoms of the chambers on which the chute sections may be easily rolled into and out of the chambers. Each chamber has a suitable door 88. It will also be observed that a plurality of the known type of chutes 66 may also be arranged in each chamber 86, as shown in Figure 9.

Also, space is provided for the props 69, as best shown in Figure 9, where each of the chambers 86 opens into a large compartment 89 that extends the full width of the truck body and at the center of which is disposed the discharge end of the conveyor 20 and the platform 27. The seats of the props are inserted into the chambers 88 beneath the chute sections 43, while the tripods of the props project from said chambers into the large compartment 89.

Compartments 90 are also provided for the flexible shaft sections 53, these compartments being located below the chambers 86 at opposite sides of the truck body and opening rearwardly into the rear compartment 89.

The baskets and other desirable equipment may be carried in compartments 91 disposed at opposite sides of the truck body beneath the chambers 86 and having doors 92 for access.

While I have shown and described the invention as embodied in certain details of construction, it should be understood that this is primarily for the purpose of illustrating the now preferred embodiment of the invention and that many modifications and changes can be made in the structural details of the truck body and the conveyor chute within the spirit and scope of the invention.

Having thus described the invention, what I claim is:

1. A conveyor chute section comprising a frame, belt pulleys journaled therein one of which has a shaft with one end projecting from said frame, an endless belt on said pulleys, a worm gear on said end of said shaft, a drive shaft journaled on said frame, a worm on said drive shaft meshing with said worm gear, and a flexible shaft section having means at its ends for separable operative connection to one end of said drive shaft and to a driving shaft respectively.

2. A conveyor chute comprising a plurality of identical sections each including a frame, belt pulleys journaled at opposite ends thereof one of which has a shaft with one end projecting from said frame, said chute sections having co-operative means for mounting one end of one

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upon one end of another whereby the first-mentioned section will discharge by gravity into the other section, a drive shaft journaled on said frame with both ends thereof exposed, a driving connection between said driving shaft and said pulley shaft of the corresponding chute section, a flexible shaft having means at its ends for separable driving connection to a driving shaft and to one end of said drive shaft of one chute section respectively, and another identical flexible shaft having one end connected to the other end of said drive shaft of the first-mentioned chute section and its other end connected to one end of the drive shaft of another chute section.

3. The combination of a truck including a body having a load-carrying compartment provided with a discharge opening disposed at the rear end of the body, a support on said body below said discharge opening, a plurality of complementary chute sections adapted to be arranged end to end with one end of one section resting on said support, a chamber extending longitudinally of said body at one side of said discharge opening to receive said chute sections when the latter are not in use, and a door for said chamber at the rear end of said body.

4. The combination of a truck including a body having a load-carrying compartment provided with a discharge opening disposed at the rear end of the body, a support on said body below said discharge opening, a plurality of complementary chute sections adapted to be arranged end to end with one end of one section resting on said support, means for raising and lowering said support relatively to said body, and a vertically adjustable prop for the other end of the first-mentioned section.

5. The combination of a chute section including a frame having outwardly extending longitudinal flanges, and a prop for supporting said chute section comprising a base, a vertical standard vertically adjustably mounted in said base and a U-shaped cradle on said standard to receive said chute section between its arms and having portions of its arms overlying the respective said flanges of said chute section.

6. The combination of a truck including a body having a load-carrying compartment provided with a discharge opening disposed at the rear of the body, a support on said body below said discharge opening, a chute having one end resting on said support, means for raising and lowering said support relatively to said body, and a prop for the other end of said chute including a base, a vertically adjustable standard mounted in said base and a cradle pivotally mounted on said standard to swing on a horizontal axis to receive and support said chute.

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