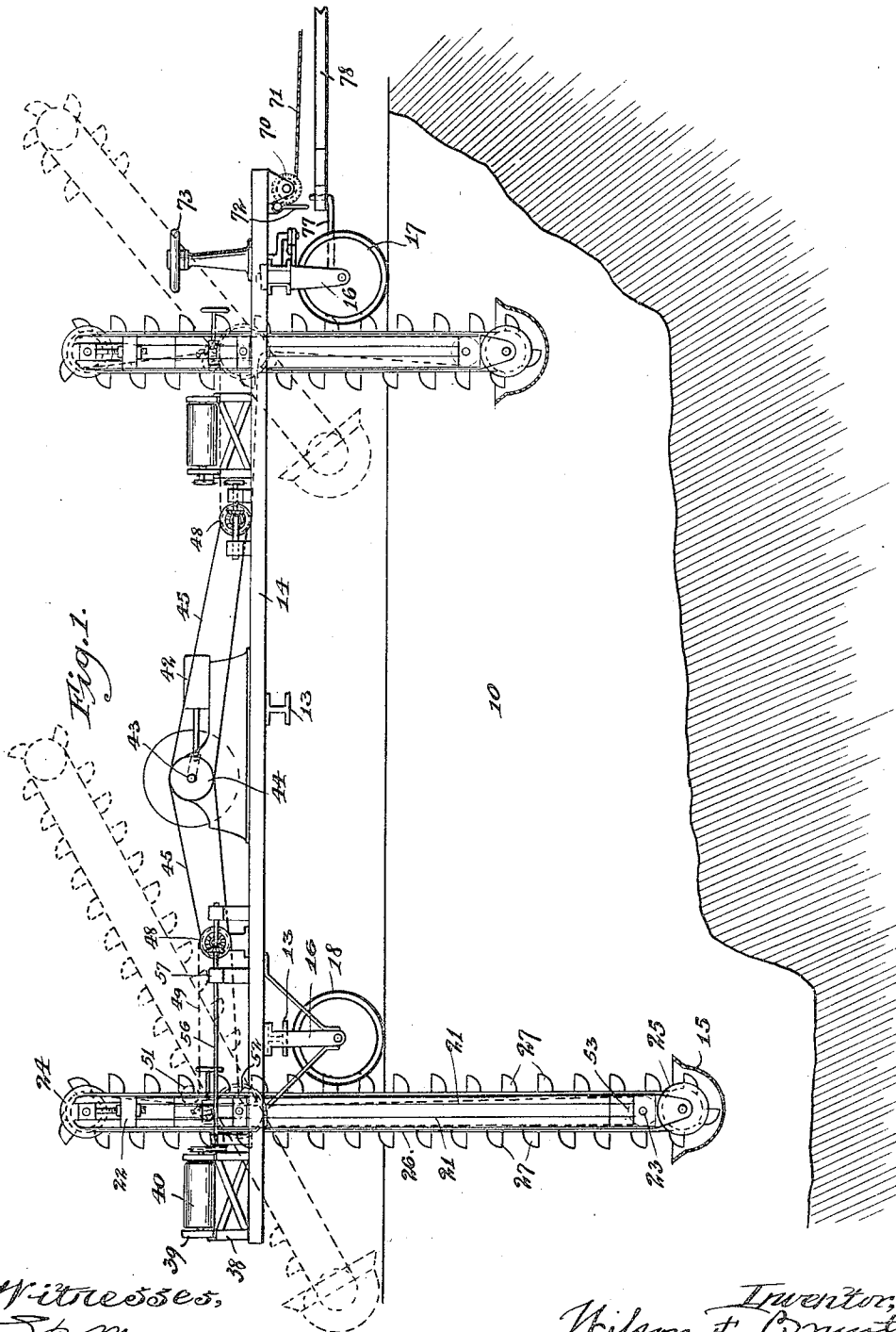


W. F. BRUNT.  
EARTH HANDLING MACHINE.  
APPLICATION FILED MAY 31, 1913.

1,134,254.

Patented Apr. 6, 1915.

3 SHEETS—SHEET 1.



Witnesses,  
J. B. Mann  
D. H. Pond

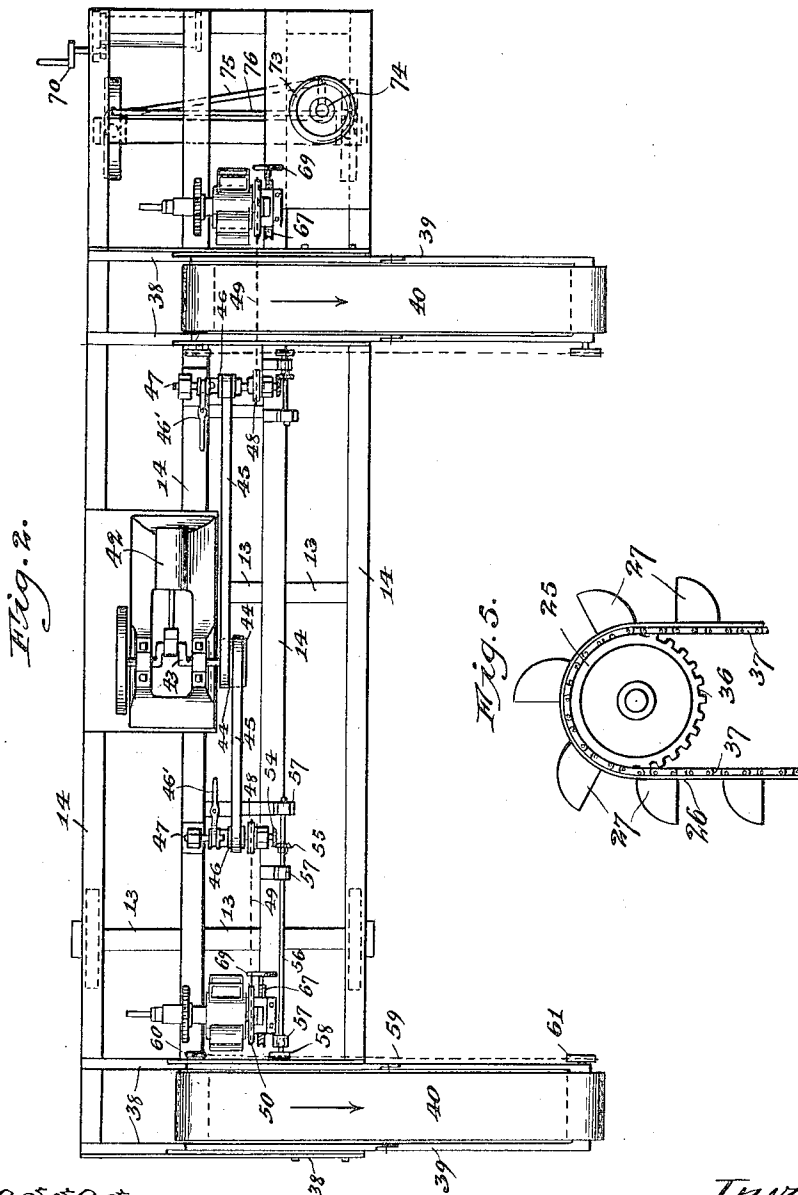
Inventor,  
Wilson F. Brunt,  
By Offield, Towle, Graves, Offield.

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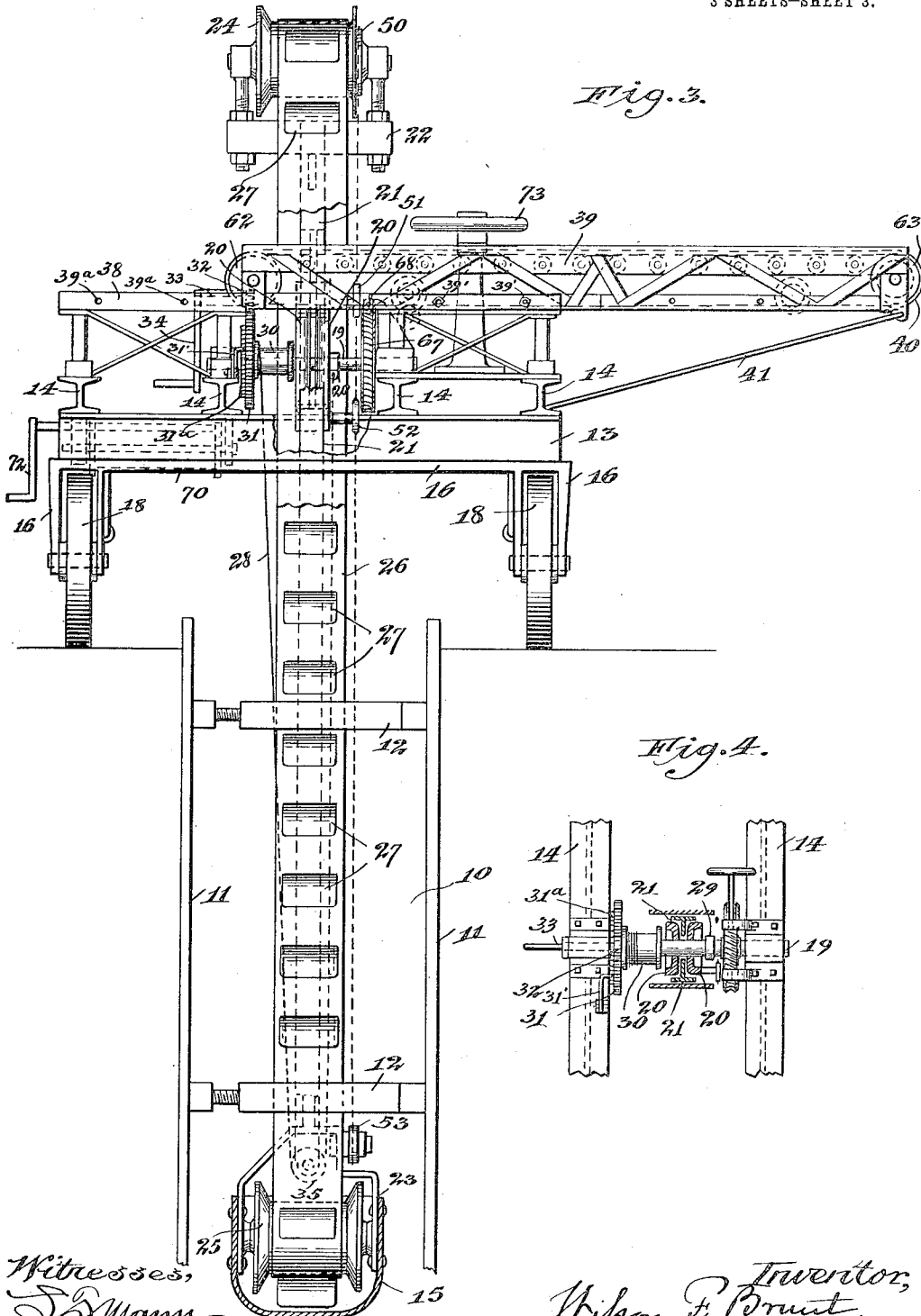
By Offield, Towle, Grann & Offield.

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Witnesses,  
J. D. Mann,  
E. H. Pond

Inventor,  
W. F. Brunt,  
By Offield, Towle, Snow & Offield  
Attys.

# UNITED STATES PATENT OFFICE.

WILSON F. BRUNT, OF HAMMOND, INDIANA.

EARTH-HANDLING MACHINE.

1,134,254.

Specification of Letters Patent.

Patented Apr. 6, 1915.

Application filed May 31, 1913. Serial No. 770,914.

*To all whom it may concern:*

Be it known that I, WILSON F. BRUNT, a citizen of the United States, residing at Hammond, in the county of Lake and State of Indiana, have invented certain new and useful Improvements in Earth-Handling Machines, of which the following is a specification.

This invention relates to improvements in earth-handling machines, and has reference more particularly to a new and improved machine for use in connection with the excavation of ditches and trenches for sewers, and the like.

The machine of my present invention is designed to operate above the sewer or trench being dug, and to elevate the spoil and deliver it laterally of the ditch or trench. The machine is not an excavating machine in the sense that it cuts or scrapes up the earth from the ditch or trench, which forms the principle of operation of many excavating machines; but it simply serves to facilitate the disposition of the spoil from a manually dug ditch by providing a receptacle into which the excavated matter may be readily shoveled by the workmen, and a chain of buckets or scoops passing through said receptacle by which this matter is raised above the surface and delivered at either or both sides.

The machine is characterized, as to its chief structural features, by the provision of a main frame or platform supported on fore and aft trucks which straddle the ditch or trench, and one or more spoil receptacles and endless bucket-carriers so mounted on the frame that they may be bodily raised and lowered to the desired height, according to the depth of the ditch or trench being dug, and may also, when elevated, be swung angularly to a position in which their lower ends are above the surface of the ground, so that the machine may be readily transported from one place of operation to another. In the preferred form of the apparatus, herein shown, two such spoil receiving and removing devices are provided, one adjacent to the forward end and the other adjacent to the rear end of the main carrying frame. The main frame also supports a motor with actuating connections therefrom to the endless bucket-carrier or carriers; this motor, where two such bucket-carrier or carriers are employed, being located between the two. Each endless

bucket-carrier delivers the spoil to a laterally-extending horizontal carrier that well overhangs one side of the machine frame, so as to deliver the spoil well outwardly of the side of the ditch.

My invention, its construction, mode of operation, and advantages, will all be readily understood when considered in connection with the accompanying drawings in which I have illustrated one practical embodiment thereof, and in which—

Figure 1 is a side elevation of the machine. Fig. 2 is a top plan view thereof. Fig. 3 is a rear elevation. Fig. 4 is a cross-section through one of the endless bucket-carriers and its supporting and tilting mechanism. Fig. 5 is an enlarged detail, showing the immediate driving mechanism of the endless bucket-carrier.

Referring to the drawings, 10 designates the ditch or trench that is served by the machine, the sides thereof, where formed in sand or loose soil, being maintained from caving in by boards 11 spaced by struts 12 (Fig. 3). Straddling this ditch and operating lengthwise thereof is the earth-handling machine. The main supporting frame of the machine is a skeleton structure composed of a series of cross-beams 13 and longitudinal beams 14 extending above said cross-beams. This main supporting frame is supported by fore and aft trucks comprising yokes 16 secured to the under side of the frame and carrying front and rear wheels 17 and 18, respectively. The forked members of the front yoke which carry the wheels 17 are swiveled in the main horizontal members of the yoke, as shown in Fig. 1, to permit steering, as hereinafter described.

Adjacent to each end of this main supporting frame are mounted a pair of earth-elevating devices which, as to their structural features and mode of operation, are substantially duplicates, so that a description of one will suffice for the other. Upon and crosswise of the two intermediate longitudinal beams 14 is journaled a shaft 19 (Figs. 3 and 4), fast on which are a pair of vertical guide-bars 20. Slidably engaging the guide-bars 20 is the supporting frame of the endless bucket-carrier, said frame, as herein shown, comprising a pair of parallel oppositely positioned T-bars 21 rigidly connected at their upper and lower ends to frames 22 and 23, respectively, in which latter are journaled the upper and lower

sheaves 24 and 25, respectively, over and between which is trained an endless belt 26 carrying on its outer face a series of buckets 27. To the lower frame 23 is attached a  
 5 boot 15 into which the dirt is shoveled by workmen in the ditch and through which the buckets 27 pass continually picking up and elevating the dirt.

The bars 20 merely support the bucket-carrier laterally, the weight of the bucket-carrier frame and bucket-carrier being supported by a cable 28, one end of which is attached to a collar 29 on the shaft 19, while its other end is wound around a windlass-  
 10 drum 30 loosely mounted on the shaft 19, and having fast on one end a spur gear 31 that is engaged by a pinion 32 on a shaft 33 actuated by a windlass-arm 34. The cable 28, between its point of attachment 29  
 15 and the drum 30 passes over a sheave 35 mounted on the bottom frame 23, and the windlass-drum 30 is locked against unwinding by a pawl 31' engaging a ratchet 31<sup>a</sup> on the face of gear 31.

25 As shown in Fig. 5, the upper sheave 24 is formed with a central sprocket-wheel 36 that drivingly engages a sprocket-chain 37 attached to the inner face of the belt 26.

On a pair of transverse ways 38 are  
 30 mounted cross-conveyer frames 39 carrying endless cross-conveyer belts or aprons 40 suitably mounted thereon and projecting laterally of the main machine frame, each of said frames being secured to its support 38  
 35 as by bolts 39', and its overhanging end being supported from the main frame by a strut 41.

The bucket-carriers and cross-conveyers are both driven from a motor 42, preferably  
 40 a gas engine, that is mounted substantially centrally between the ends of the main frame. The engine shaft 43 carries a pair of pulleys 44, each of which drives, through a belt 45, a pulley 46 loose on an intermediate cross-shaft 47 and drivingly connected thereto by a clutch 46'. On shaft 47 is a sprocket-wheel 48 that, through a sprocket-chain 49, drives a sprocket 50 fast on one  
 45 end of the upper sheave 24, said sprocket-chain 49 being guided over idler sprockets 51, 52 and 53. The cross-conveyers 40 are likewise driven from the intermediate cross-shaft 47 through mechanism comprising a bevel pinion 54 on one end of shaft 47 engaging and driving a bevel pinion 55 on a  
 50 way-shaft 56 that is mounted in bearings 57 on the main frame, and carries at its outer end a sprocket-wheel 58 engaging and driving an endless sprocket-chain 59 trained over inner and outer sprocket-wheels 60 and 61 fast with the supporting pulleys 62 and 63 of the cross-conveyer belts 40. The latter are herein shown as delivering the spoil to one side of the machine only; but if it is  
 65 desired to deliver to the opposite side, this

may readily be effected by removing the bolts 39', sliding the conveyer-frame along the supporting way 38 to overhang the opposite side, and similarly securing it in place. To effect the reversal in the direc-  
 70 tion of drive of the bolts 40, the bevel pinions 55 may be withdrawn from the shaft 56 and reversed by simply removing the caps of the bearings 57 and raising the inner end of shaft 56 sufficiently to clear the  
 75 pinion 54.

The vertically operating bucket-carriers, after being raised by the windlass 30, can be tilted to the dotted line positions indicated in Fig. 1 so as to transfer the machine  
 80 to another place of operation by mechanism comprising a worm-wheel 67 fast on the shaft 19, a worm 68 drivingly engaging said worm-wheel, and a hand-wheel 69 fast on the shaft of the worm 68. This mechanism  
 85 is, of course, self-locking in any tilted position of the bucket-carrier frame.

For advancing the machine lengthwise of the ditch or trench being dug; I prefer to employ a windlass 70 at the forward end of  
 90 the platform, on the drum of which is wound a cable 71 which may be attached to a fixed post or stake a suitable distance in advance, the cable being wound up from time to time on the windlass by its operating  
 95 handle 72.

On the forward end of the platform is a steering-wheel 73, the steering-post 74 of which is connected by links 75 and 76 to the forks 16 in which the front wheels 17 are  
 100 mounted after the fashion of the ordinary well known automobile steering-gear; and, for convenience in transporting the machine from one place of operation to another; I provide a yoke 77 attached to the front  
 105 wheel forks 16 to which a pole 78 may be pivotally hitched, to accommodate a team.

The machine is shown in working position by full lines in Fig. 1. Workmen operating with shovels in the ditch or trench  
 110 10 shovel the dirt, sand or other spoil into the boot 15 from which the spoil is elevated by the buckets 27 and dumped onto the cross-conveyers 40, by which latter it is delivered off at one side of the machine.  
 115 Where a pair of hoisting conveyers are employed, as herein shown, the forward conveyer is somewhat shorter than the rear conveyer and is ordinarily set at a somewhat higher point, so that the forward conveyer  
 120 elevates and removes the dirt in the upper portion of the ditch or trench being dug; while the rear conveyer similarly elevates and delivers the dirt in the lower portions thereof. As the digging of the ditch or  
 125 trench proceeds, the machine is shifted lengthwise thereof by the windlass 70, to best accommodate the workmen in the ditch.

Whenever it is desired to deliver the spoil to the opposite side of the ditch, this may  
 130

readily be done by loosening the fastenings 39' of the cross-conveyer frames 39, removing the strut 41, shifting the conveyer frames lengthwise of their supporting ways 5 38 so as to overhang the other side of the machine, and then refasten the conveyer frames by similar bolts inserted through holes 39<sup>a</sup> at the opposite end of the way 38, and applying the strut 41 to the other end 10 of the conveyer frame.

When the machine has completed work upon one ditch or trench, and is to be transported to another place of operation, the bucket-conveyers are bodily raised by the 15 windlass 30 until their lower ends are at or near the top of the ditch, and are then swung to the inclined positions shown by dotted lines in Fig. 1 by the worm 68 and worm-gear 67, until their lower ends are 20 clear of the surface of the ground. The cable 71 is then taken in, a team is hitched to the pole 78, and, by manipulation of the steering-wheel 73, the machine is guided and directed, under the draft of the team, to 25 its new place of operation.

The apparatus of my invention is particularly useful in connection with the excavation of deep sewer trenches, and the like, wherein the relation of the depth to the 30 width of the trench is such that it is very difficult or impossible for the workmen in the trench to manually throw the soil out of the trench by their shovels. As hereinabove stated, the apparatus is not an excavating 35 machine in the sense that it directly cuts or otherwise digs the soil from the ditch or trench, but it is designed as an auxiliary to the manual digging of comparatively deep ditches, trenches, or like excavations. By 40 making the main frame or platform in the skeleton form shown, it is possible to carry thereon and lower therethrough any material or materials such as sheet piling for retaining trenches, and the like that may be 45 used in connection with the ditch or trench being dug. It will be manifest to those skilled in the art that the minor details of the apparatus may be more or less varied without involving any departure from the 50 principles involved or sacrificing any of the benefits and advantages of the invention. Hence, I do not limit the invention to the exact device of the apparatus shown and described except to the extent clearly indicated 55 in specific claims.

I claim—

1. In an earth-handling machine of the character described, the combination of a main frame, a shaft having its ends journaled in said main frame, a pair of longitudinal guides each embracing, keyed to, 60 spaced apart on, and extending in a direction at right-angles to the axis of said shaft intermediate the journal supports on said shaft, a bucket carrier frame including two 65 members T-shaped in cross-section with their center legs placed adjacent and opposite to each other on either side of said shaft and between said guides, and adapted to slide upon and within said guides, a drum 70 rotatably mounted on said shaft between said guides and one of the journal supports for said shaft, a flexible member trained around said drum, secured to it at one of its ends and having its other end secured to the 75 lower end of said bucket carrier frame, and adapted to be rotated independently of said shaft to raise or lower said bucket carrier frame with reference to said main frame, and means for rotating said shaft to 80 adjust the angle of inclination of said T-shaped members.

2. In an earth-handling machine of the character described, the combination of a main frame, a shaft having its ends journaled in said main frame, a pair of channel-shaped guides each embracing said shaft 85 and keyed thereto with the legs of said guides adjacent to each other and slightly spaced apart on said shaft, the flanges of said members being located adjacent to each other on each side of said shaft and extending in a direction at right-angles to the axis thereof, and a bucket carrier frame adapted to slide upon said guide members including 95 a pair of members T-shaped in cross-section, spaced apart on either side of said shaft, with their middle limbs extending toward each other between said channel-shaped guide members and having their flanges 100 adapted to slide upon the adjacent flanges of said channel-shaped guide members, means connecting said T-shaped members together, and means for raising and lowering said bucket carrier frame with reference 105 to said shaft.

WILSON F. BRUNT.

Witnesses:

SAMUEL N. POND,  
MARY M. LEFPO.