July 1, 1930. W. K. LIGGETT 1,769,798

PORTABLE CONVEYER

Filed Dec. 15, 1920 2 Sheets-Sheet 1

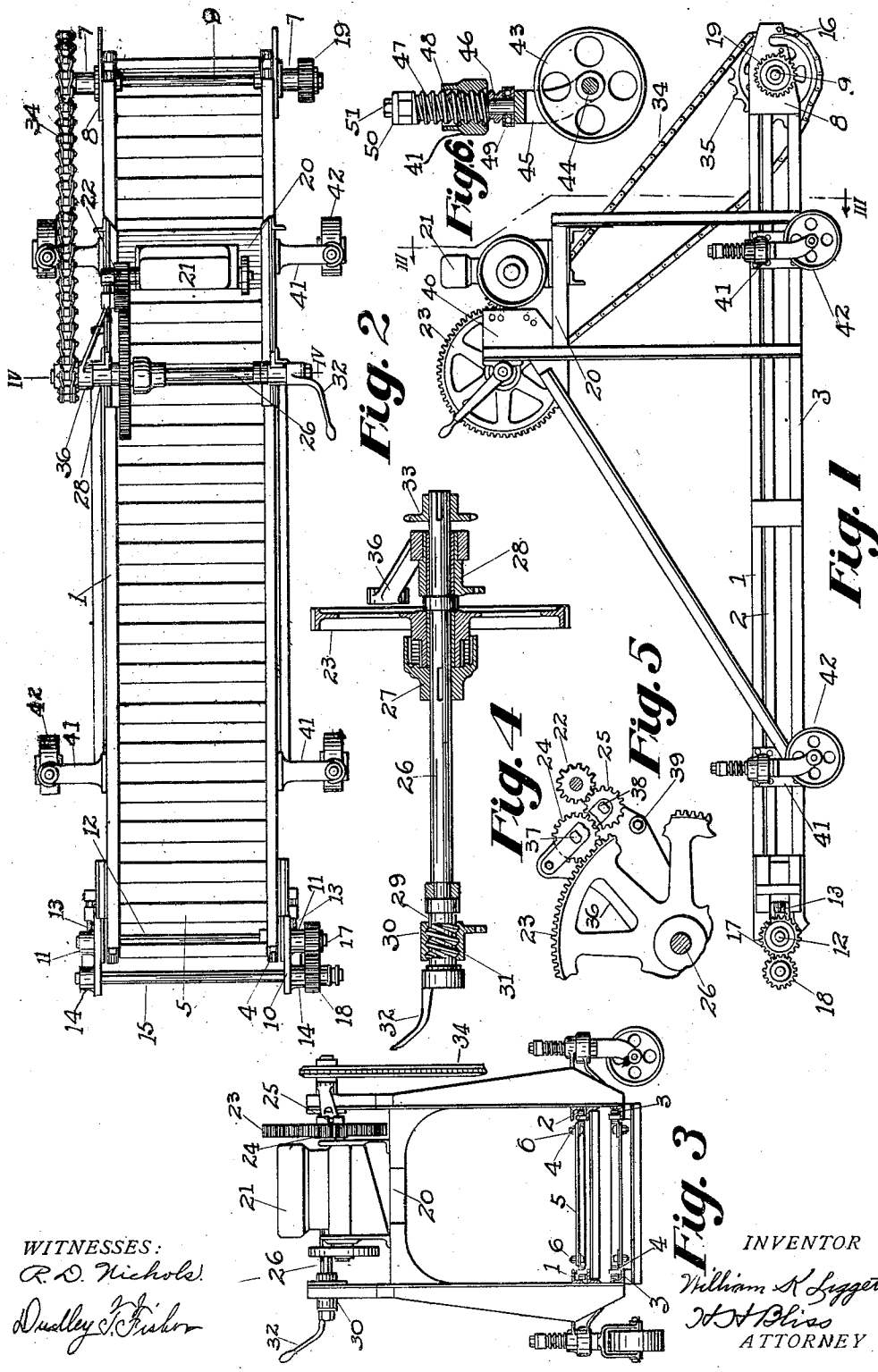


Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

WITNESSES:
R. D. Nichols
Dudley S. Fisher

INVENTOR
William K. Liggett
W. K. Bliss
ATTORNEY

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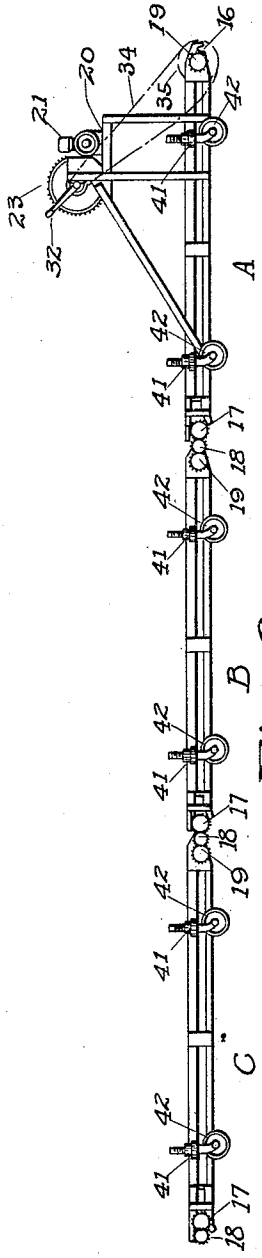


Fig. 9

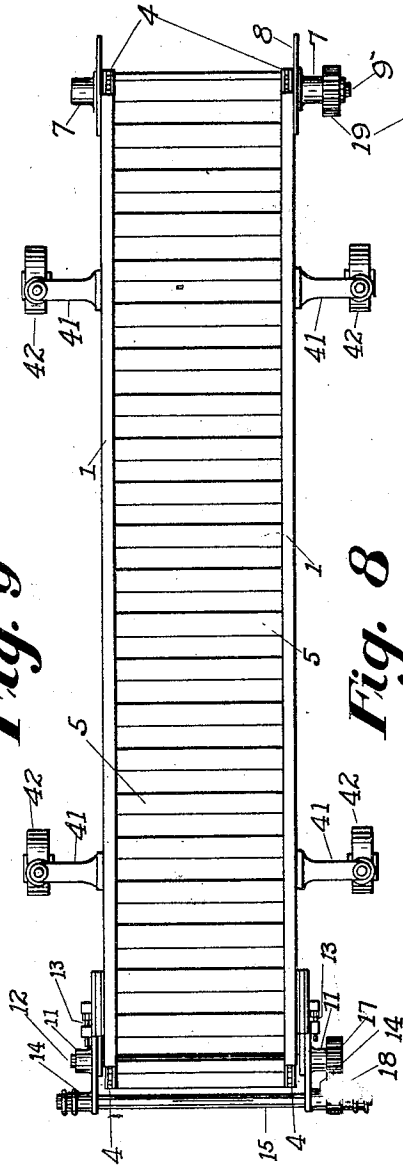


Fig. 8

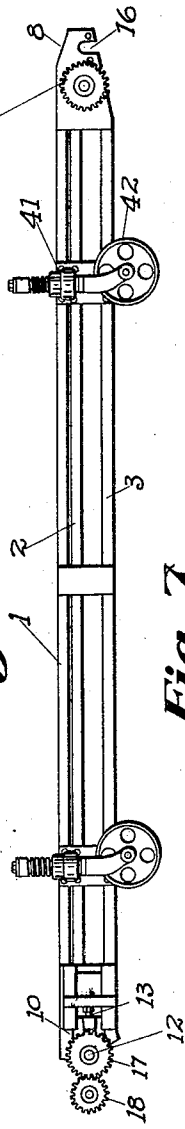


Fig. 7

WITNESSES:
R. D. Nichols.
Dudley J. Fisher.

INVENTOR
William K. Liggett
BY
H. H. Bliss
ATTORNEY

Patented July 1, 1930 1,769,798

UNITED STATES PATENT OFFICE

WILLIAM K. LIGGETT, OF COLUMBUS, OHIO, ASSIGNOR TO THE JEFFREY MANUFACTURING COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF OHIO

PORTABLE CONVEYER

Application filed December 15, 1920. Serial No. 431,006.

The present invention relates to certain new and useful improvements in portable conveyers and especially to conveyers of the class wherein a plurality of conveyer units are adapted to be connected in series to provide an adjustable system of transportation for the convenient handling of bags and similar packages in docks and warehouses.

The especial object of the invention is to provide a conveyer composed of units adapted to be conveniently moved from place to place, operatively connected in an extended series, and to be adjusted to and securely held in accurate alignment upon uneven floors such as are commonly found in docks and warehouses.

Another important object of the invention is to provide a conveyer composed of a plurality of units adapted to be coupled together in an extended series with means on the end of each unit, whereby they may be readily assembled so that the power transmission devices of each unit will be automatically brought into co-operative relationship with an adjacent power transmission device simultaneously with the assembling operation of the units.

The devices by which I attain this object are fully set forth in the following specification and illustrated in the accompanying drawings of which

Fig. 1 is a side elevation of a portable conveyer section provided with power devices for the actuation of the conveyer and arranged to constitute the primary unit of a conveyer system such as is here contemplated.

Fig. 2 is a plan view of the machine illustrated in Fig. 1.

Fig. 3 is a vertical section taken along the line III—III of Fig. 1.

Fig. 4 is a section taken along the line IV—IV of Fig. 2.

Fig. 5 is a fragmentary detail of the reversing gearing associated with the driving mechanism.

Fig. 6 is a detail of one of the casters upon which the conveyer frame is adjustably supported.

Fig. 7 is a side elevation of a secondary conveyer unit having no power devices of its own and adapted to be connected with and actuated from the primary unit illustrated in Fig. 1.

Fig. 8 is a plan view of the machine illustrated in Fig. 7.

Fig. 9 is an illustration of the method of connecting several units into a continuous transportation system adaptable to the requirements of modern docks and warehouses.

Like numerals refer to similar parts in the several figures.

As shown in the drawings the preferred embodiment of my invention consists essentially of an elongated conveyer frame comprising the longitudinally extending angle bars 1, 2 and 3 which are joined together by suitable structural plates in the manner well understood by those skilled in the structural steel construction. The angle bars 2 and 3 constitute the track ways upon which travel two parallel endless roller chains 4 to which are secured the carrier flights 5 of the conveyer. The carrier flights 5 are formed of lengths of suitable channel bar and are secured to lateral projections of the conveyer chains 4 by suitable attachment bolts 6 in the manner common in conveyer practice. The laterally extending flanges of the angle bars 1 project above the conveyer chains 4 to shield them from contact with the overhanging edges of the bag, or other packages, which are being carried upon the flights.

Mounted in journal bearings 7 attached to the side plates 8 at one end of the conveyer frame is the head shaft 9 to which is secured a pair of suitable sprocket wheels which engage the conveyer chains 4 to drive them. At the opposite end of the conveyer frame are castings 10 in which are formed the journal bearings 11. The journal bearings 11 support the

foot shaft 12 to which is secured a pair of sprocket wheels which engage and are driven by the conveyer chains 4. As this arrangement is well understood by those skilled in the conveyer art illustration of these sprocket wheels is not thought to be required at this time. Means is provided in the adjusting screws 13 for movement of the castings 10 longitudinally of the conveyer frame to effect the adjustment of the tension of the conveyer chains. Upon the castings 10 are formed additional bearings 14 in which the idler shaft 15 is supported parallel with the foot shaft 12. The side plates 8 at the head end of each conveyer section project beyond the journal bearings 7 and are provided with downwardly opening notches 16 adapted to engage the idler shaft 15 of the next adjacent conveyer section to hold said sections in operative relation. With the provision of the downwardly opening notches 16, it will be obvious that the conveyer frames or units may be rapidly assembled end to end, since the assembling operation may be performed by simply dropping the notched ends of the conveyer frames upon the ends of adjacent conveyer frames, so that the downwardly opening notches receive the idler shafts 15 therein. Spur gears 17, 18 and 19 mounted upon the projecting ends of the shafts 12, 15 and 9 constitute, when the sections are thus connected, power connection through which the conveyer of one section may be actuated from that of the next.

In my co-pending application of even date herewith I have disclosed a stacking machine adapted to be used in connection with the above described portable conveyers to form a conveniently adjustable system of transportation adapted to the needs of modern docks and warehouses. This stacking machine is equipped with coupling devices such as are here above described whereby the portable conveyer sections may be actuated from the power devices upon the stacker.

To provide for the operation of the portable conveyers independently of the stacking machine above referred to I have provided a power equipped primary conveyer section adapted to be connected with the conveyers above described as secondary units in a system of warehouse transportation. As illustrated in Figs. 1, 2 and 3 of the drawings I have supported above the primary conveyer frame by a suitable structural steel frame work arranged to avoid obstruction of the fairway of the conveyer, a platform 20 upon which is mounted the power devices for the actuation of the conveyer. These power devices comprise a motor 21 which may be of any preferred type adapted to the conditions under which the machine is operated. For purposes of illustration I have shown an internal combustion engine the fuel supply devices and cooling mechanism of which are not shown in the drawings since they form no part in the present invention. To the crank shaft of the engine 21 is secured a pinion 22 adapted to be connected with the master gear 23 through the pinions 24 and 25 of the reversing mechanism. The master gear 23 is mounted upon the jack shaft 26 to which it may be connected by a multiple disk friction clutch 27. The jack shaft 26 is journaled at one end in the bearing 28 attached to the frame work of the machine, and at the other end in a sleeve 29 which is rotatable in the bearing 30 attached to the frame work of the machine. The sleeve 29 is in fixed longitudinal relation with the shaft 26, and upon its outer surface is formed a screw thread 31 which engages the corresponding thread in the bearing 30 in such manner that rotation of the sleeve will produce longitudinal movement of the shaft to cause the engagement or disengagement of the friction clutch 27. A hand lever 32 is provided for the manipulation of the sleeve 29 and the control of the friction clutch. A sprocket wheel 33 fixed to the jack shaft 26 is connected through a suitable endless chain 34, with the sprocket wheel 35 attached to the projecting end of the head shaft 9 to drive the conveyer.

Mounted for rotation about the jack shaft 26 is a yoke 36 which carries two stud shafts 37 and 38. Upon the stud shaft 37 is journaled the pinion 24 which is arranged to mesh with the spur gear 23, and upon the stud shaft 38 is mounted the pinion 25 which is slightly smaller than the pinion 24 with which it meshes while avoiding engagement with the spur gear 23. The shafts 37 and 38 are so positioned relative to the shaft 26, and the relative diameters of the pinions 24 and 25 are such that when yoke 36 is rotating about the shaft 26 either of the pinions 24 or 25 may be brought into engagement with the motor pinion 22. By the arrangement of gearing just described the master gear 23 may be driven from the motor pinion 22 through the pinions 25 and 24 to drive the conveyer in one direction, or through the pinion 24 alone to drive the conveyer in the opposite direction. The yoke 36 is adapted to be held in either of its operative positions of adjustment by bolts 39 which may be thrust through preferred apertures in the plate 40 of the frame work of the conveyer.

Laterally extending brackets 41 are attached to the angle bars 1, 2 and 3 of the conveyer frame, and these brackets are pivotally and adjustably connected with the casters 42 upon which the conveyer frame is supported. Each of the casters 42 comprises a ground engaging wheel 43 journaled upon a spindle 44 which is attached to the lower end of the arms of a wheel fork 45. The wheel fork 45 is provided with an upwardly extending spindle 46 which is journaled in a sleeve 47. The vertical spindle 46 and the

journal of the ground wheel 44 are offset laterally, so that the ground wheel trails, and is a self directing wheel which responds to movement of the conveyer frame in any direction. Upon the outer surface of the sleeve 47 is formed a screw thread 48 which engages the corresponding screw thread in an aperture of the bracket 41. A ball bearing 49 interposed between the wheel fork 45 and the sleeve 47 affords an anti friction support for the weight of the conveyer. At its upper end the sleeve 47 is formed of hexagonal cross section to permit engagement by a suitable wrench by which the said sleeve may be rotated relative to the bracket 41 to effect vertical adjustment of the caster relative to the conveyer frame. A cap washer 50 connected with the spindle 46 by a machine screw 51 prevents the accidental removal of the caster from the sleeve 47.

As shown in Fig. 9 of the drawings a plurality of sections of my improved portable conveyer may be connected together in a series to form a conveniently adjustable system of transportation adapted to use upon docks and in warehouses. As here illustrated a primary section A may be placed in alignment with a plurality of secondary sections B, C, etc., and the parts adjusted to cause the engagement of the gears 17, 18 and 19 at each coupling to transmit power from the motor 21 to drive the entire series. By the adjustment of the casters 42 the entire series may be conveniently placed in exact alignment and each section may be provided with a stable support upon the irregularily uneven surface of the floor upon which the machine must operate.

What I claim is:

1. In a portable conveyer comprising a plurality of elongated frames adapted to be arranged in an extended series, a transversely extending coupling shaft cooperating with means on an adjacent frame to connect the ends of adjacent frames and permit vertical adjustment of either frame about said coupling shaft, means to effect vertical independent movement of each frame, an endless conveyer mounted in each frame, and power transmission devices including said coupling shaft arranged to transmit power from one conveyer to the next.

2. A portable conveyer comprising a plurality of elongated frames adapted to be arranged in an extended series, a transversely extending coupling shaft cooperating with means on an adjacent frame to connect the ends of adjacent frames and permit vertical adjustment of either frame about said shaft, an endless conveyer mounted in each frame, a head and a foot shaft associated with each conveyer, and gears upon the head and foot shafts adapted to engage a gear upon the coupling shaft to transmit power from one conveyer to the next.

3. A portable conveyer comprising a plurality of elongated frames adapted to be arranged in extended series, a transversely extending coupling shaft journaled in bearings at one end of each frame, a hook member formed on each frame at the end opposite said bearings and adapted to engage the coupling shaft of an adjacent frame, a conveyer mounted upon each frame, and gears at both ends of said frames connected with said conveyers and adapted to engage pinions upon said coupling shafts to operatively connect adjacent conveyers.

4. In a portable conveyer comprising a plurality of elongated frames adapted to be arranged in extended series, a transversely extending coupling shaft journaled in bearings at one end of each frame, each frame at the end opposite said bearings having a downwardly opening recess adapted to engage the coupling shaft of an adjacent frame, a conveyer mounted upon said frame, and power transmission devices arranged to connect said conveyers with said coupling shaft to thereby operatively connect adjacent conveyers.

5. A portable conveyer comprising a plurality of frames adapted to be arranged in an extended series, means to connect said frames end to end on horizontal axes for relative vertical swinging movement, a power driven conveyer on each frame, gears on the ends of said frames and being arranged to be automatically meshed upon connection of said frames, and means for adjusting the individual frames about said horizontal axes.

6. A portable conveyer comprising a plurality of frames adapted to be arranged in an extended series, means to connect said frames end to end on horizontal axes for relative vertical swinging movement, a power driven conveyer on each frame, means for operating said conveyers comprising reversing means, gears on the ends of said frames and being arranged to be automatically meshed upon connection of said frames, and means for adjusting the individual frames about said horizontal axes.

7. A portable conveyer comprising a plurality of frames adapted to be arranged in an extended series, means to connect said frames end to end on horizontal axes for relative vertical swinging movement, gears on the ends of said frames arranged to automatically be meshed upon connection of said frames, a plurality of self-directing ground engaging wheels on each frame, and means to adjust each wheel vertically to effect vertical adjustment of said frames about said horizontal axes.

8. A portable conveyer comprising a plurality of frames adapted to be arranged in an extended series, a transversely extending coupling shaft associated with each end of one frame, a power transmitting device

mounted upon said shaft, a conveyer carried by each frame and actuated by said power transmitting device, each frame having at its end opposite said coupling shaft a recess, and a power transmitting device associated with said last named end of each frame and arranged to cooperate with said first mentioned power transmitting device upon disposal of the coupling shaft of one frame in the recess of another frame.

In testimony whereof, I affix my signature.

WILLIAM K. LIGGETT.