April 18, 1944. J. K. BRUCE 2,346,659

MERCHANDISE CONVEYER

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Fig. 2.

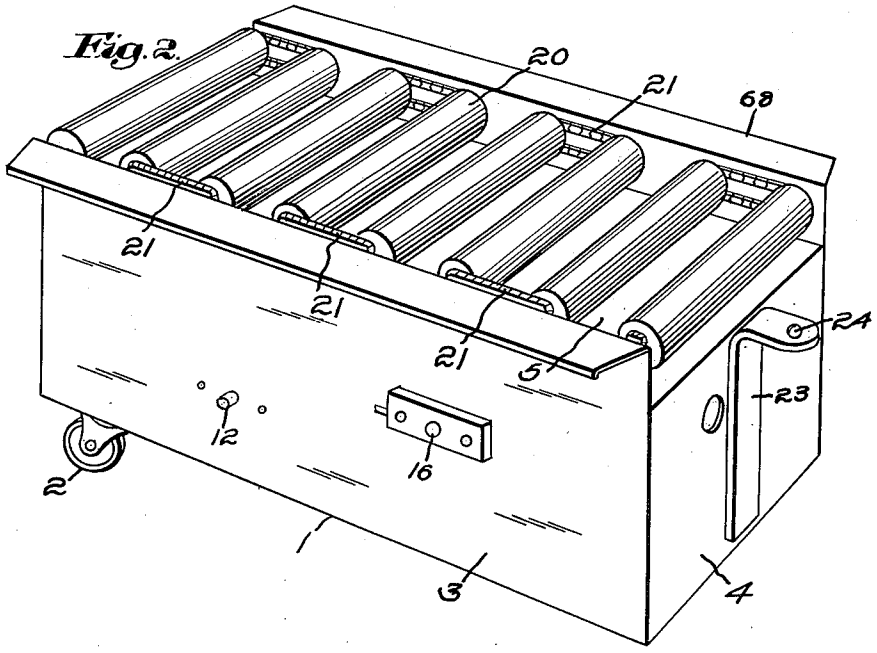
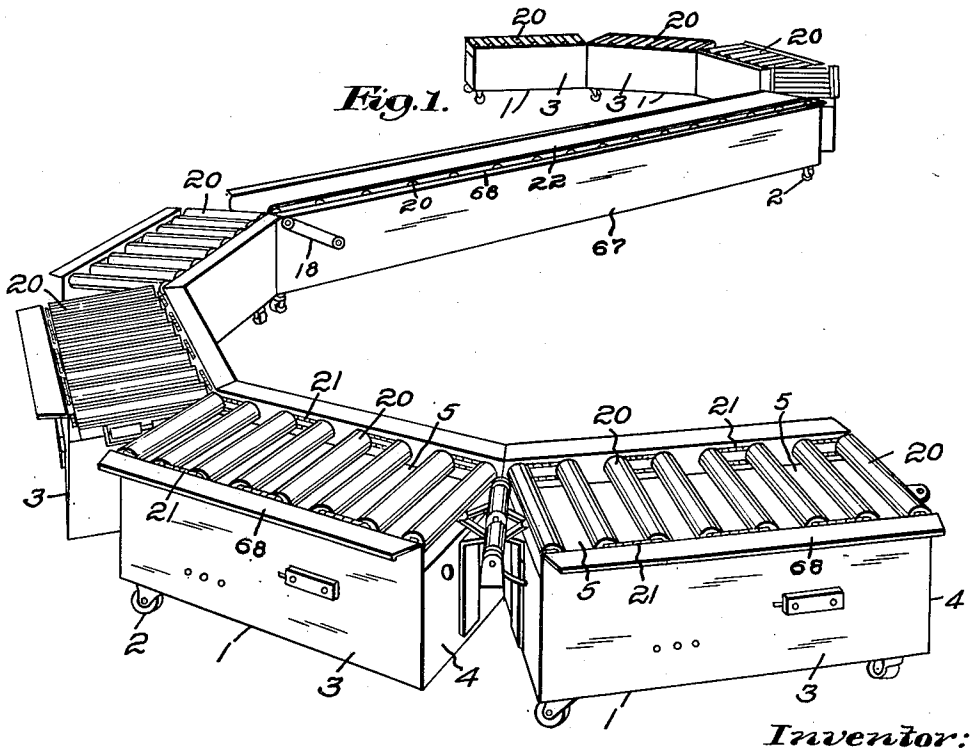


Fig. 1.



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Fig. 5.

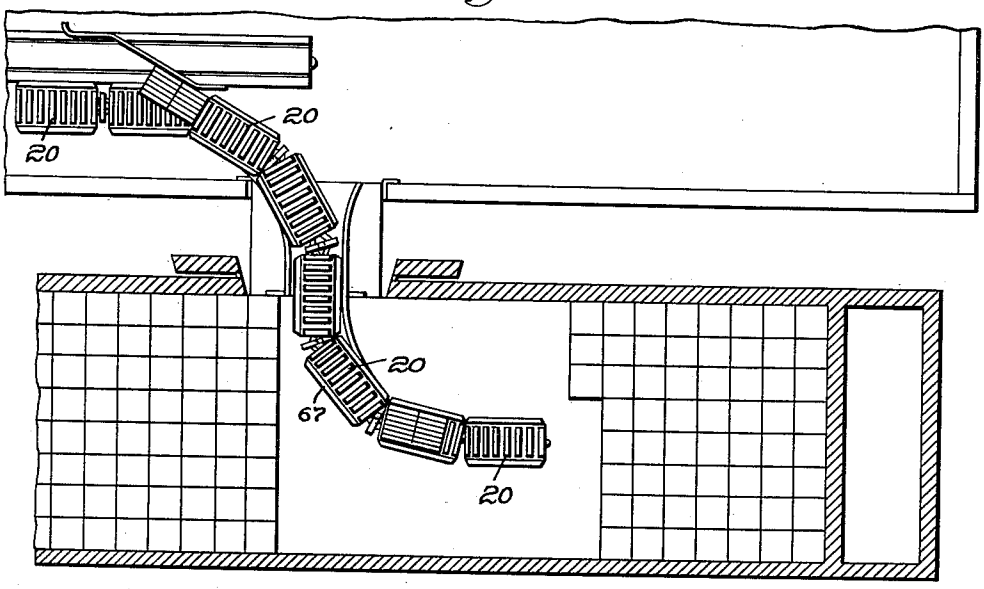


Fig. 4.

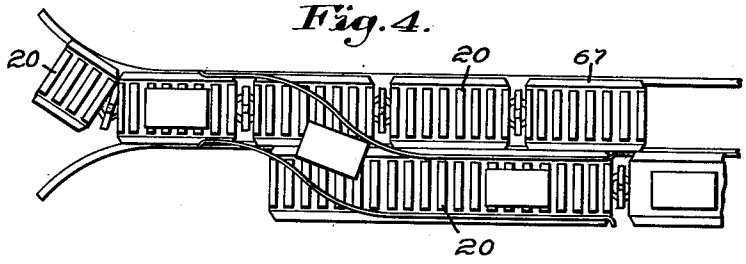
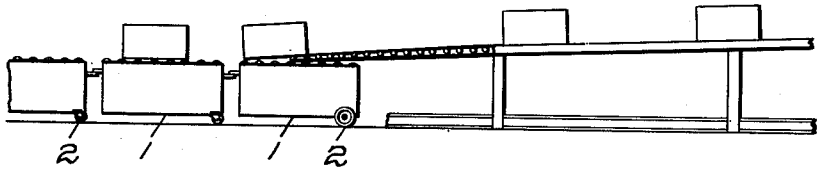


Fig. 3.



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MERCHANDISE CONVEYER

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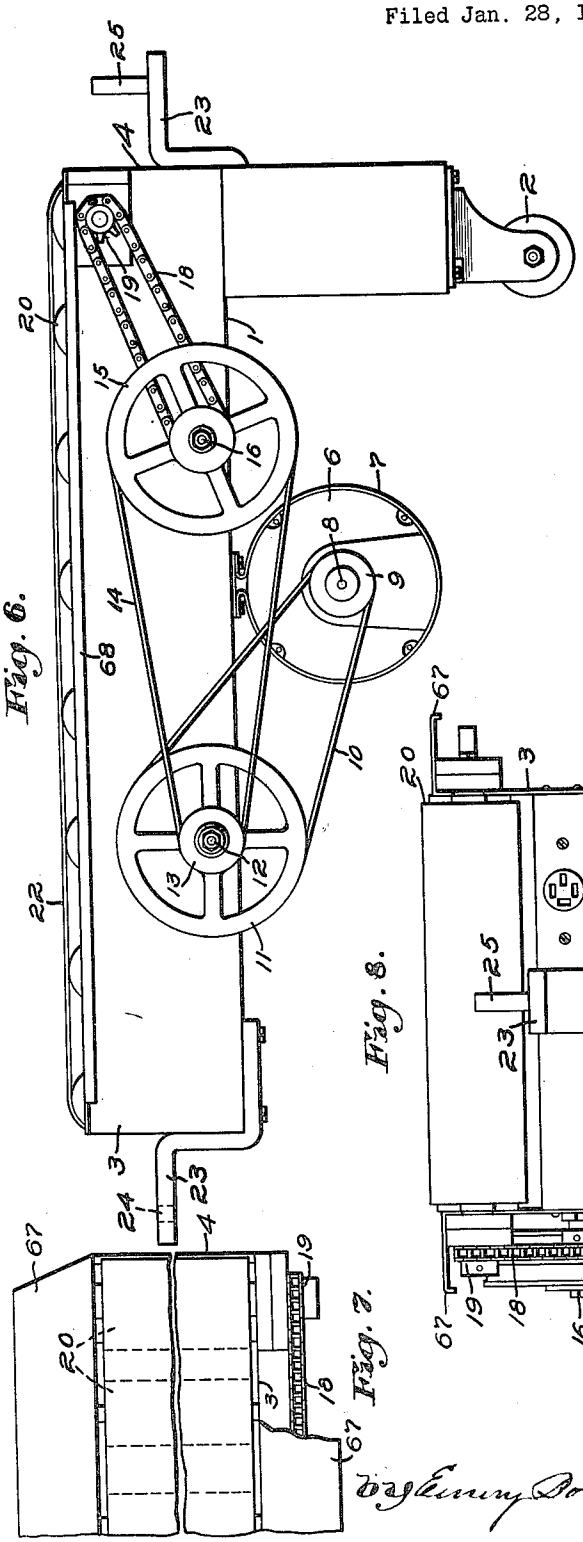


Fig. 6.

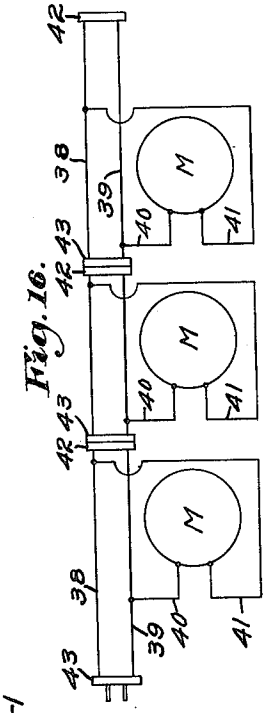


Fig. 16.

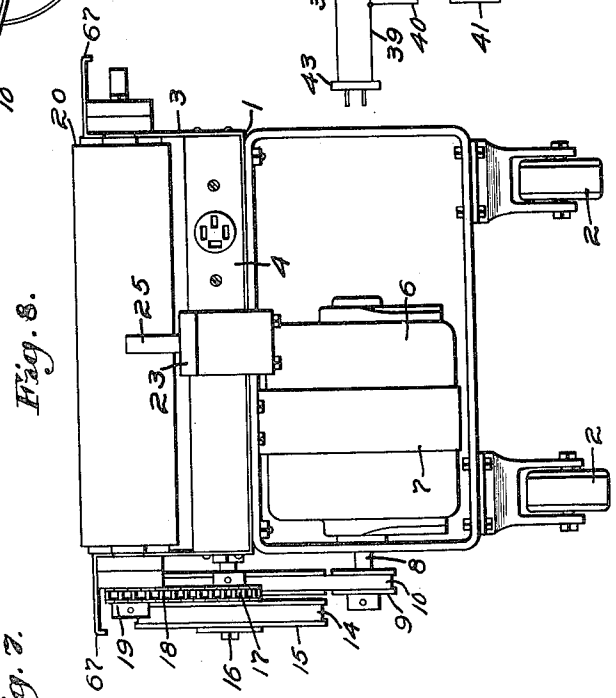


Fig. 8.

Fig. 2.

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MERCHANDISE CONVEYER

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Fig. 9.

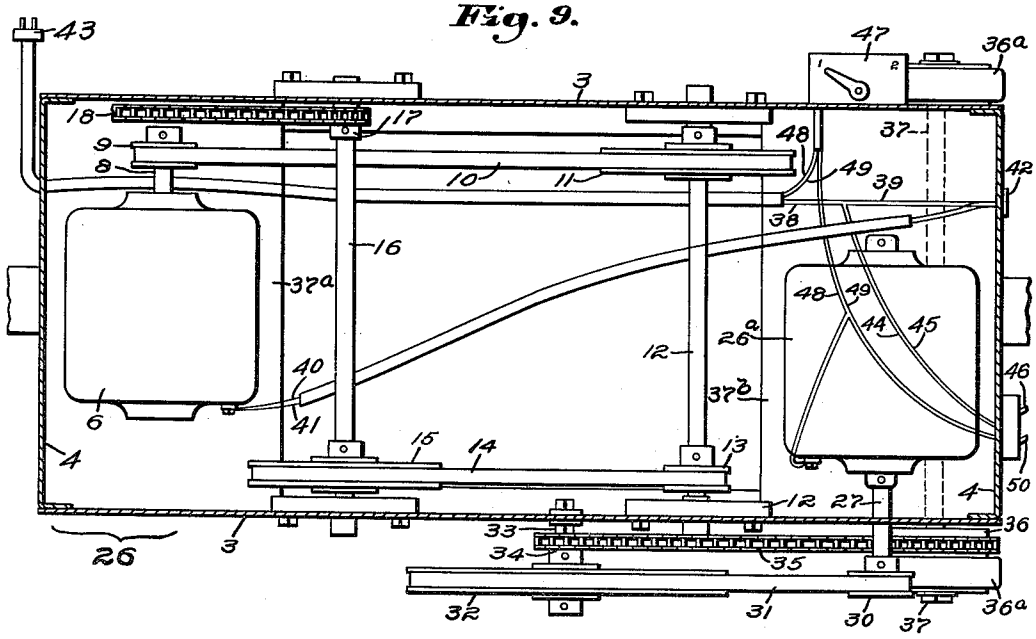


Fig. 17.

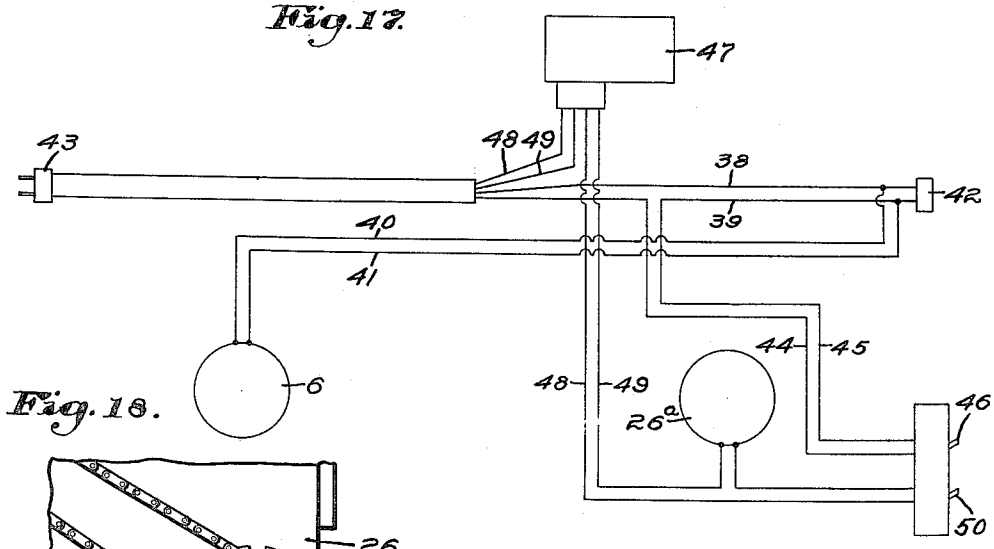
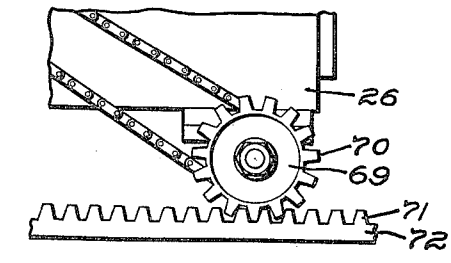


Fig. 18.



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MERCHANDISE CONVEYER

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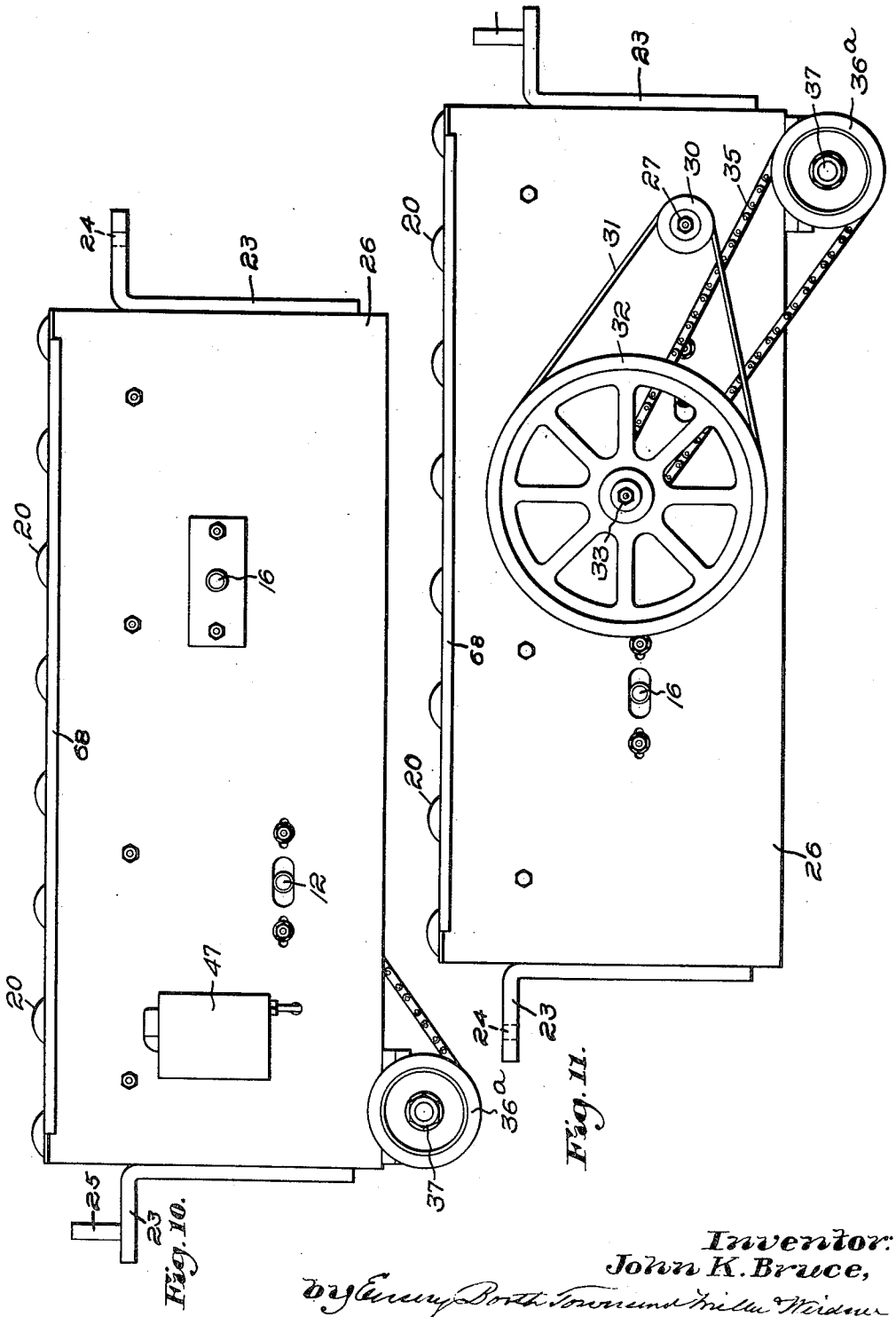


Fig. 10.

Fig. 11.

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MERCHANDISE CONVEYER

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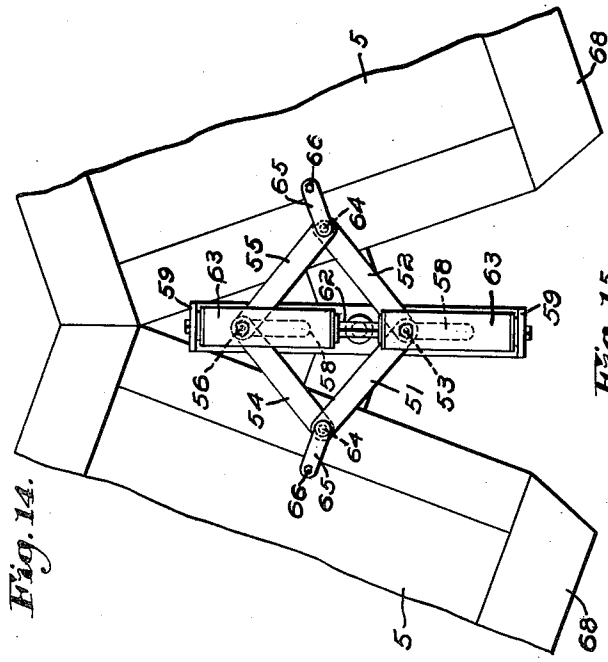


Fig. 14.

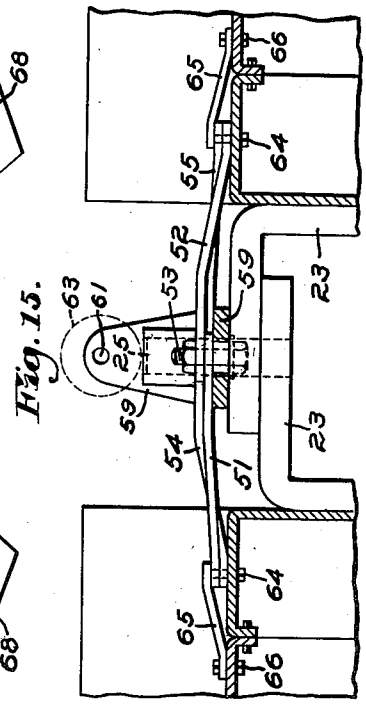


Fig. 15.

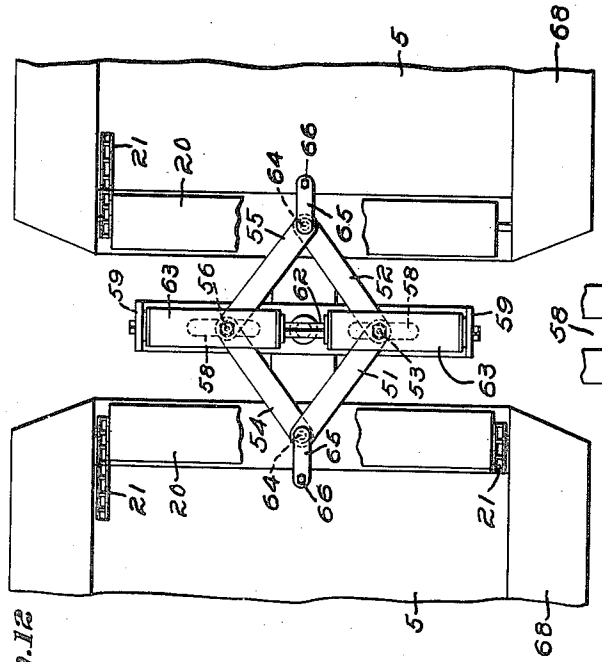


Fig. 12.

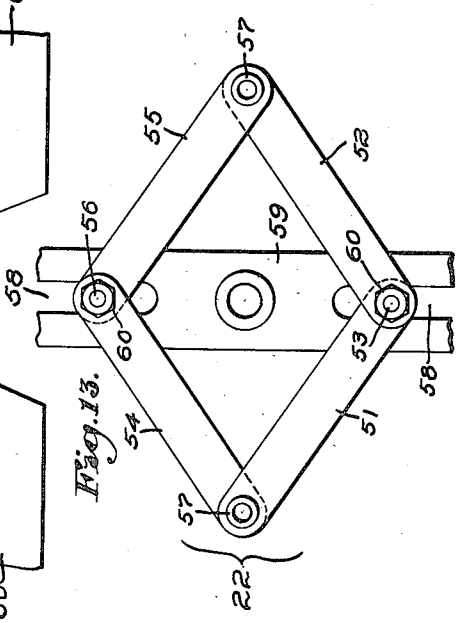


Fig. 13.

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Patented Apr. 18, 1944 2,346,659

UNITED STATES PATENT OFFICE

2,346,659

MERCHANDISE CONVEYER

John K. Bruce, Randolph, Mass.

Application January 28, 1941, Serial No. 376,314

11 Claims. (Cl. 198—92)

This invention relates to transmission or conveying means for merchandise, and its aim is to provide an improved and novel means of the above description for use either in or out-of-doors, and wherever the general conditions are suitable for its use, as will appear. In general, my novel conveying means is particularly adapted for use in manufacturing plants, storehouses, express and railroad freight houses, etc., and, when the units are grouped as what has been referred to in the specification as "an assembly unit," not only for conveying merchandise between two stations within the length of the conveyer itself, but also for conveying merchandise and delivering it between two stations by the travel of the assembly unit itself and thereafter moving the merchandise from one single unit to a second unit for more convenient delivery.

My novel invention comprises, in the form in which it will probably be found most useful, a plurality of individual conveyer units in tandem or assembly formation operating cooperatively as an assembly unit, and capable of transferring the packages, small or medium size, whether containers or individual articles of merchandise, and has been found particularly useful in factories making small machine parts, tools, food products and small bottled goods, as mucilage, inks, liquid pharmaceutical preparations in open containers, as well as a multitude of other small individual articles, from one unit to another, either in a straight line or at an angle. Obviously, single units may be used alone when convenient and preferred, and of any desired length, a short unit being preferred when sharp turns are desired.

In the drawings of the embodiment of my invention illustrated and described herein:

Fig. 1 is an illustrative perspective view of my multiple assembly unit conveyer as it appears wherever the units are in curved formation for the conveying of merchandise between two points, as well as between two points in a straight line;

Fig. 2 is a similar view of one of the units;

Fig. 3 is a diagrammatic, or illustrative, side view of the multiple assembly unit receiving merchandise from an elevated stationary conveyer of any type as at a factory, the latter conveyer being either in or out-of-doors, as desired;

Fig. 4 illustrates the use of my conveyer in the operation of transferring merchandise from a single unit to an assembly unit, or vice versa, with the use of conventional guides or deflectors;

Fig. 5 illustrates the use of my conveyer for transferring merchandise from one unit to another for the purpose of conveying the merchandise into or from freight cars, for instance, or another shed or storehouse;

Fig. 6 is a side elevation of one of the single units usable alone or in a multiple assembly;

Fig. 7 is a partial plan of the same, with parts broken away for convenience;

Fig. 8, an end elevation thereof;

Fig. 9, a plan of the unit provided with an extra motor for tractor purposes, and known as the tractor unit, with its top and conveying rolls removed;

Fig. 10, a side elevation of the same;

Fig. 11, a side elevation of the opposite side;

Fig. 12 is a plan of two units coupled and with the bridging and guiding rolls between adjacent unit ends, the latter broken away;

Fig. 13, a plan on an enlarged scale of the bridging and guiding roll support, partly broken away, which is mounted on the unit ends in use;

Fig. 14, a plan of the bridging and guiding rolls installed and as adjusted when the units are in angular relation to each other, the units being partly broken away;

Fig. 15 is a side view of the bridge roll support on an enlarged scale and mounted on the units, the latter broken away;

Fig. 16 is the wiring diagram for an assembly of units and a single unit;

Fig. 17 is the wiring diagram for the tractor unit; and

Fig. 18 shows a modified form of wheel, provided with teeth to engage the teeth of a rack suitable for use on a floor, always or at times wet, or on a steep grade where unusual traction power is required, or when a long line or assembly of units are to be moved.

Figs. 1 to 5, inclusive, show in graphic manner the flexibility and adaptability of the multiple unit assembly in a variety of situations and conditions, and are demonstrations of the unusual and almost universal usefulness of the unit, with the aid of deflectors in common use, when desired, on a level and on an ascending or descending grade.

The single unit, as shown in Figs. 1 to 5, may have a deep side wall 3, or, preferably, a more shallow one, Fig. 6, with one end only extended downward to act as a support, the merchandise carrying roll driving means comprising the same elements, but differently arranged, and is provided with a base 1, swingable casters 2, and housing comprising side walls 3, ends 4 and, Fig. 1, cover or top 5.

The unit, Figs. 6, 8, has a driving motor 6, of suitable power for the contemplated use, shown

depending from the base 1 in a suitable support 7, and a shaft 8 and pulley 9, over which runs a belt 10 to a wheel 11 on a shaft 12, in bearings not shown, on the side walls 3, the shaft 12 carrying also a pulley 13, Fig. 6, over which travels a belt 14 to the wheel 15 on the shaft 16, having a sprocket 17, Fig. 8, over which runs a chain 18 to the sprocket 19 on the end of one of the merchandise carrying rolls 20. These rolls, Figs. 1, 2, are connected in pairs and driven by chains 21, alternately on the opposite ends of the rolls, so that they rotate uniformly. Or the rolls may be provided with a belt 22, as in Fig. 6.

Each unit has on each end a coupling member, Figs. 2 to 6, which comprises a plate 23 with its inner end secured to the unit end, one of the plates drilled as at 24 to receive a pin 25 on the opposite end of the adjoining unit, and which, with two casters on one unit end, and a third caster on the other end if desired, Fig. 1, provide a three-point support construction permitting free and sharp turning of the units, alone or when connected as an assembly unit.

For use with these individual units, as illustrated in Figs. 9, 10, 11, I provide a tractor unit 26, so-called, not for hauling generally, but as stated to move the units from one station to another in a warehouse or on a freight platform, and then also a few feet to adjust their position for convenience in loading and unloading, and equipped with the same merchandise-conveying rolls 20, coupled in pairs like those described and shown in Figs. 1, 7, or carrying a belt 22, and similarly operated, Fig. 9, by a motor 6, with shaft 8 and pulley 9, belt 10, to wheel 11 on shaft 12, with pulley 13, carrying belt 14 to wheel 15, on shaft 16, with sprocket 17 for chain 18, to end of conveyer roll 20, Fig. 9, as already described. The tractor unit is not designed nor equipped for tractor purposes, as generally understood.

In addition to the foregoing, Fig. 9, this unit is provided with an additional tractor motor 26*a* of required power, particularly if likely to be used on a grade, with a shaft 27 in suitable bearings, not shown, and, Figs. 9, 11, a pulley 30 with a belt 31 running thereon to a wheel 32 on a shaft 33, with a sprocket 34 carrying a chain 35 to a sprocket 36 on axle 37, which carries also wheels 36*a* at its opposite ends. The motors 6, 26*a*, are carried by shelves 37*a*, 37*b*, respectively, extending from side to side of the unit.

The motor 6, Figs. 9, 16, is suitably connected by a main supply circuit 38, 39, and shunt circuit 40, 41, by means of a socket 42 and plug 43, with any supply outlet, these lines extending to socket and plug members 42, 43, respectively, in the opposite ends of each unit, and to the adjoining units.

This type of unit has the advantage of being completely housed, except as to the conveying rolls 20, and the roll-operating means protected from bad weather and other possibly injurious agencies.

The tractor unit wiring is shown in Fig. 17, wherein the conveying roll motor 6 is provided with main circuit lines 38, 39, as before stated, leading to a socket 42 and plug 43, for connection to any suitable supply outlet, or another unit.

This circuit is provided also with a conveying roll control circuit 44, 45, leading from the circuits 38, 39, to a control switch 46.

The tractor motor 26 is provided, also, with a reversing switch 47 in shunt circuit 48, 49, and leading to a control switch 50.

Each unit is provided at one end with a novel space bridging and package guiding roll construction. This comprises, Figs. 12, 13, 14, 15, a pair of links 51, 52, pivoted at one end by a pin 53, and a second pair of links 54, 55, pivoted at one end by a pin 56, the free ends of both pairs of links pivotally connected by rings, eyelets 57, or other suitable means, the pivot pins 53, 56, being extended downwardly through slots 58 in a guiding and spacing cradle 59, and the pins 53, 56, secured therein as by nuts 60, Fig. 13. The ends of plate 59 are upturned, Figs. 14, 15, and drilled at 61, Fig. 15, to receive the outer ends of a common axial fixed shaft 62, Figs. 12, 14, on which the bridging and guiding rolls 63 rotate freely and independently.

The pivoted links 51, 52, 54, 55, Fig. 15, are secured to the opposite unit ends by pins 64 in the ends of links 65, pivoted respectively to each unit end, as at 66. This device is a very important feature, as it ensures the safe conveyance of packages along the units and over the conveying rolls without regard to the number of turns the units make, and is readily attachable and detachable to and from the units. As the adjoining ends of two units 1, Fig. 14, separate at a curve in the path they are traveling, the pivot pins 53, 56, of the links 51, 52, 54, 55, slide laterally accordingly and automatically in the slots 58, dotted lines, in plate 59, to properly position the rolls 63, and provide guiding roll supports or bridging elements for the merchandise, Fig. 14, bisecting the angle between the unit ends. As the rolls 63 are loose on the shaft 62 and thus rotate independently of each other as to speed, the outer roll may rotate faster than the inner roll and thus act to help guide at times the package in a curved path and prevent the package from proceeding tangentially or at an angle off from one roll and toward another, and this assists the package to follow closely the central line of travel along the units. When in use, a package moving to the left from one unit to an adjacent unit, as in Fig. 14, contacts first edgewise the upper or left guiding roll 63 which assists and facilitates in the transfer of the package from one unit to the next unit, and causes the package to turn or swing to the left of the previous path of travel and the inner and upper corner of the package contacts first the conveying roll in the succeeding unit, and this tendency is increased as the lower roll 63 contacts the outer and lower corner of the package and thus causes the package to swing inwardly of the curve and to be transferred from one unit to the next unit safely.

In some cases, a long unit 67 can be used to advantage, and in Figs. 1, 4, such a unit is shown. It preferably has a like motor 6 as the small unit, and has, in addition thereto, the conveyer belt 22 or roll 20. Such units can be used to advantage when the merchandise is to be conveyed along a path with no short turns, the unit being, for instance, 10 feet long.

The units are provided in most cases with overhanging guards or shelves 68, which are convenient when conveying large packages which overhang the roll ends, and also for supporting package deflectors for deflecting a package from one unit to another, as in Fig. 4, when used.

For use on steep grades or on floors which are frequently or usually wet, Fig. 18, the unit may be provided with wheels or gears 69, provided with teeth 70, in lieu of wheels or casters 2, to engage teeth 71 on a rack 72 laid on the floor.

The word "wheel" wherever used herein is used in a generic sense and includes a wheel however made, either as a caster, spoke or solid wheel, or a so-called roller, whichever may be the most desirable for use in a certain case. Obviously

for a tractor unit, the fixed or traction wheel is best.

My invention is not limited to the precise construction shown herein, but may be modified in many details, without departing from the spirit of the claims, and within the scope thereof.

I claim:

1. A merchandise conveyer assembly unit comprising a plurality of single merchandise carrying units adapted to carry merchandise from station to station and simultaneously and thereafter move the merchandise from one single unit to another like unit in the assembly unit for more convenient delivery, said assembly unit comprising a plurality of units each having wheels and coupling means, each unit provided with a housing, a merchandise carrying roll motor therein, a series of coupled merchandise carrying rolls operated by said motors; a detachable space bridging cradle and a package-directing-roll thereon between each two units and supported in elements movable laterally and automatically with curved movement of the units to bisect the angle and position said roll between two angularly positioned unit conveyers, and means on each said unit to operably connect its motor to a source of power and also to a second unit motor in the series, the merchandise carrying rolls on said units forming a series of cooperating merchandise carrying rolls the length of the assembly unit, and a tractor motor on one unit and means to connect it to a source of power.

2. A merchandise conveyer unit adapted to carry merchandise from station to station, said unit having a housing, wheels and coupling means therefor, a series of merchandise carrying rolls on the housing, a motor operating said rolls, means for connecting said motor to a source of power and to connect it to other unit motors, a tractor motor for the unit and means to supply it with a source of power; space bridging and package-directing-and-carrying roll means on the unit and comprising a cradle, a shaft therein with package-directing-and-carrying rolls rotatable thereon, and link members on the unit slidably mounted in said cradle acting, when the unit is turning, to position automatically said merchandise directing rolls to bisect the angle between the adjacent unit ends.

3. A merchandise conveyer, assembly unit comprising a plurality of single merchandise carrying units adapted to carry merchandise from station to station and simultaneously move the merchandise from one single unit to another like unit for more convenient delivery, said unit having wheels and coupling units therefor, a series of merchandise carrying rolls thereon, a motor operating said rolls, means connecting said motor to a source of power and means to connect the motor to other like unit motors to operate the carrying rolls; one unit having a tractor motor and means to connect it to a source of power, and a space bridging and package guiding roll cradle on the unit comprising a relatively wide U-shaped member, a shaft therein with a package guiding roll rotatable thereon and adjustable link members on said cradle and units to position said roll midway between the units, and means to lock said links to the units.

4. A merchandise conveyer assembly unit having wheels, coupling means, and comprising a plurality of single merchandise carrying units each with a motor and a motor connection to a source of power, merchandise carrying rolls operated thereby and adapted to carry merchandise from station to station and simultaneously and thereafter move the merchandise from one single unit to another like unit for more convenient delivery, one single conveyer unit having a tractor motor, having also a space bridging and merchandise conveying and angularly directing roll member for attachment to the single conveying units, said member comprising a space bridging and roll carrying cradle attachable to the unit end, a shaft in said cradle, rolls on the shaft, links movable on said cradle and units, and the opposite ends of said links attachable to adjacent conveyer units; said links, when two conveying units are positioned relatively angularly, acting to position the cradle and rolls thereof to bisect the angle between the adjacent conveyer unit ends and direct the moving merchandise thereover, and package deflecting guide members on the units to deflect moving packages laterally from one unit to an adjacent unit.

5. A merchandise conveyer assembly unit comprising a plurality of single merchandise carrying independently operable units and designed to carry open as well as closed containers of merchandise both liquid and dry from station to station, also each unit having wheels and coupling means, each unit provided with a merchandise-carrier-roll motor and a series of merchandise-carrier rolls operated thereby, some of the units being tractor units having a tractor motor, and means to drive the unit by said motor; means on each tractor unit to operably connect its tractor motor to a source of power, and means on each conveyer unit to operably connect its merchandise-carrier-roll motor to other unit like motors in the series and to a source of power, the merchandise-carrier rolls on said units forming a series of operatively connected cooperating merchandise carrying members the length of the unit assembly, each unit provided with a space bridging cradle and roll thereon movably supported at one unit end to move with it as the unit end moves to bisect the space between two adjacent unit ends and support, direct and move merchandise from one unit to another unit while they are traveling, for more convenient delivery at the end of the said assembly unit, said conveyer units separable at will between a tractor unit accompanied by a carrying unit, and the remaining units, thus providing a plurality of assembly units each independently operable at will.

6. A merchandise conveyer assembly unit comprising a plurality of single merchandise carrying units, designed to carry single and grouped articles of merchandise from station to station and thereafter move the merchandise from one single unit to another like unit of the assembly on the same substantial level for more convenient delivery, each unit having wheels and coupling means, each unit provided with a housing, a merchandise-carrying roll motor built therein and a series of auxiliary merchandise-carrying rolls mounted in the housing and operated by said motor; and means on said assembly unit to operably connect one of its single unit carrying-roll motors to a source of power, and means on each single unit to operably connect its carrier-roll motor to other carrying-roll motors in the series and to a source of power; some single units having also a built-in tractor motor and means to connect the unit to a source of power, the carrying rolls on said units forming a series of auxiliary, cooperating merchandise carrying members the length of the assembly unit and substantially on a level and adapted to travel as an

assembly unit, and means on one unit end comprising pivoted elements carrying a roll and self adjustable to mid position between the units at all times to support and guide merchandise from one unit to a second unit.

7. A merchandise conveyer assembly unit comprising a plurality of single merchandise carrying units designed to carry merchandise from station to station and simultaneously and thereafter move the merchandise from one single unit to another like unit for more convenient delivery from one unit, said assembly unit comprising a plurality of single merchandise carrying units each having wheels and unit coupling members, each unit provided with a merchandise carrying roll motor, a series of merchandise carrying rolls and connections therefor and operated by the said motor; one unit having a tractor motor and means to connect it to a source of power; and means on said assembly unit to operatively connect one of its carrying roll motors to a source of power, and means on each single unit to operably connect its merchandise carrying roll motor to other unit like motors in the series and to a source of power, the carrying rolls with the motor connections therefor on the assembly unit forming operatively cooperating merchandise carrying members the length of the unit assembly in substantially the same plane, and means on each unit comprising space bridging rolls automatically adjustably supported between movable units to bisect the space between the adjacent unit ends and to support and convey the merchandise between the units.

8. A merchandise conveyer unit designed to carry merchandise from a platform to within a freight car or like terminal, from a station to a storeroom, and in the reverse direction, and, when connected in assembly conveying formation, carry the merchandise also from end to end of the assembly unit, and comprising single merchandise conveying units, each having wheels and coupling means, each unit provided with a housing, a merchandise carrying roll motor therein, a series of coupled merchandise carrying rolls positively operated by said motor, a detachable space-bridging cradle and a package directing roll thereon between two units and supported by link elements movable laterally and automatically with the curved movement of the units to bisect the angular space between the units and so position said roll between two angularly positioned units as to support the merchandise, and means on each said unit to operably connect its motor to a source of power and also a second unit motor in the assembly, the merchandise carrying rolls of said units forming a series of cooperating merchandise carrying rolls substantially the length of the assembly unit and in substantially the same plane, and a tractor motor on one unit and means to connect it to a source of power for moving the entire assembly unit.

9. A merchandise mobile conveyer unit adapted to carry merchandise from station to station, said unit having a frame, wheels therefor with teeth to engage cooperating teeth on a platform, a merchandise-carrying-roll motor on said unit, a series of coupled merchandise-carrying-rolls on said unit and operated by said motor; a space bridging cradle movably mounted on one unit end with a merchandise travel directing roll therein, the cradle adapted to be movably connected between and to two units, and thus adjustable, when so secured, to bisect the space between the units and to support and facilitate the travel of the merchandise from one unit to an adjoining unit; said first unit having therein a conveying roll control circuit and switch, and means connecting said circuit with a source of power.

10. In a merchandise carrying traveling unit, having also merchandise moving rolls, means to operate the unit and said rolls, a cradle with supporting links on one end of the unit and securable to an adjoining unit end, merchandise conveying and directing rolls rotatable independently in the cradle, the cradle links movable with the unit end when accompanied by and secured to a second unit to cause the cradle and rolls to bisect the angular space formed between the two unit ends when turning and to support and guide the merchandise over said space.

11. In a traveling merchandise conveying assembly unit, of a plurality of independent single units having separately operable merchandise conveying rolls thereon, means to operate the assembly unit and said rolls, means on a single unit end including a cradle with a roll supporting rod, links on the cradle to pivotally lock it to the adjacent single unit ends, and bridging rolls mounted end to end in the cradle and independently rotatable on said rod to support and direct the moving merchandise from one single unit to another adjoining unit over the angular space between said unit ends on a curve.

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