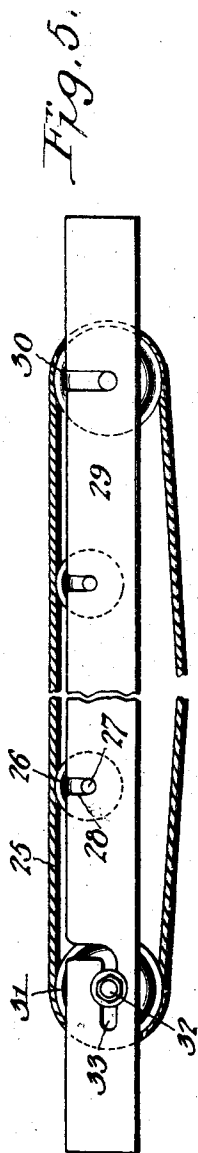


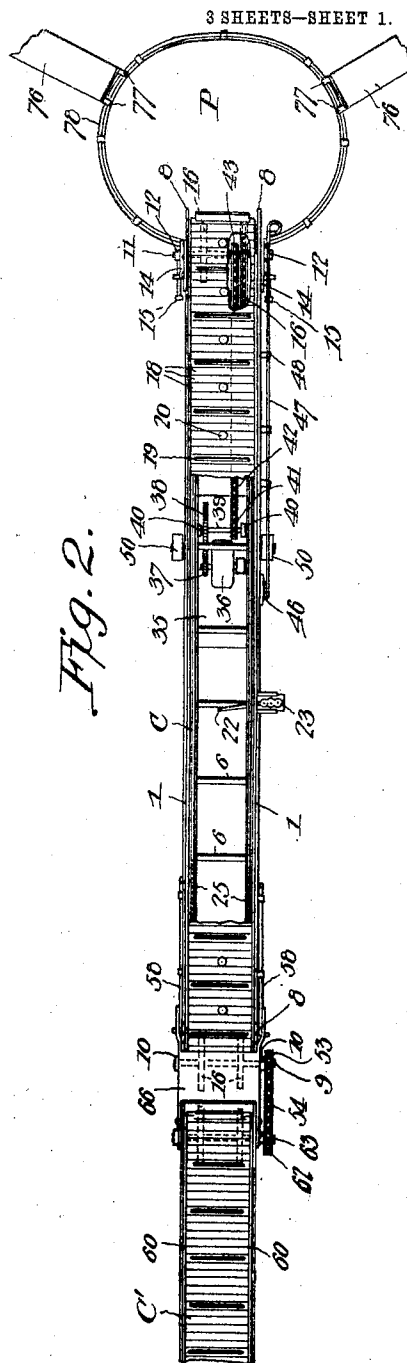
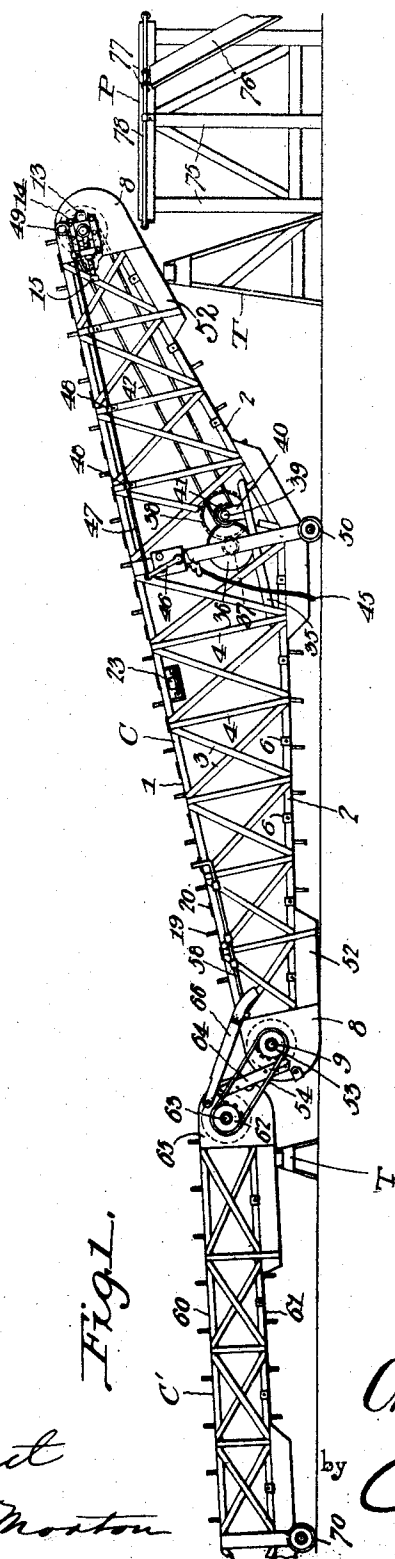
No. 779,139.

PATENTED JAN. 3, 1905.

C. H. SPENCE.
PORTABLE CONVEYER.
APPLICATION FILED NOV. 4 1903.



Witnesses
E. C. Stewart
Dexter Morton



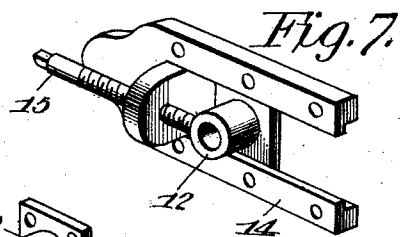
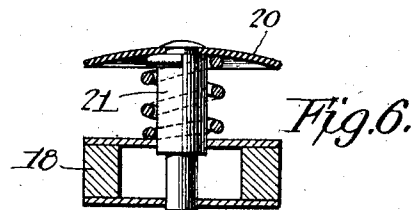
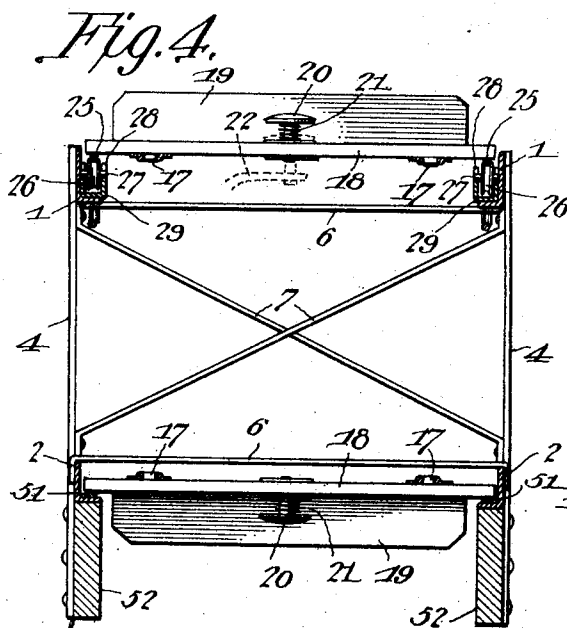
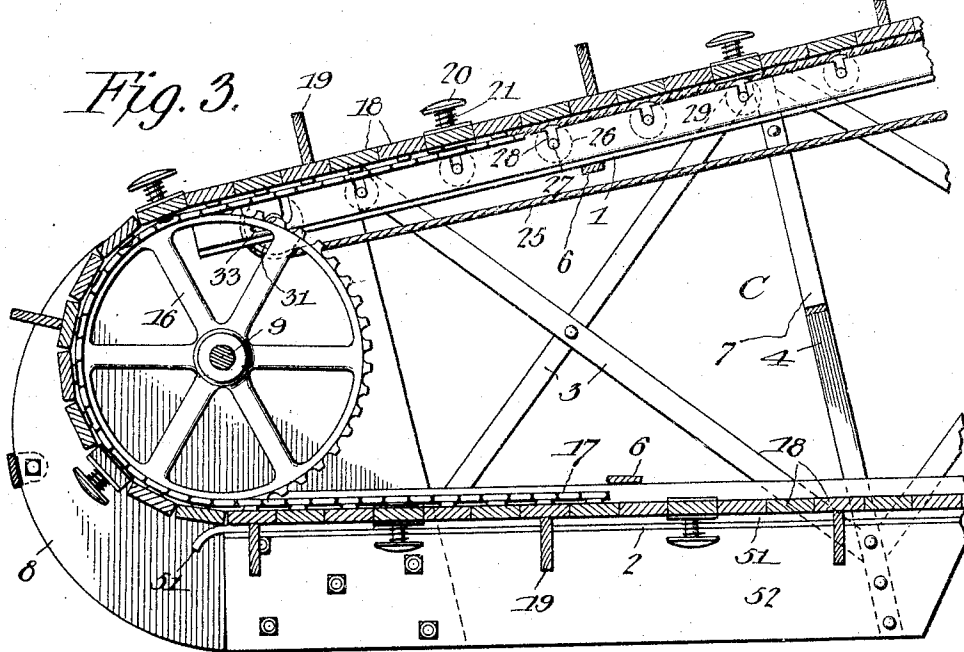
Charles H. Spence,
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3 SHEETS—SHEET 2.



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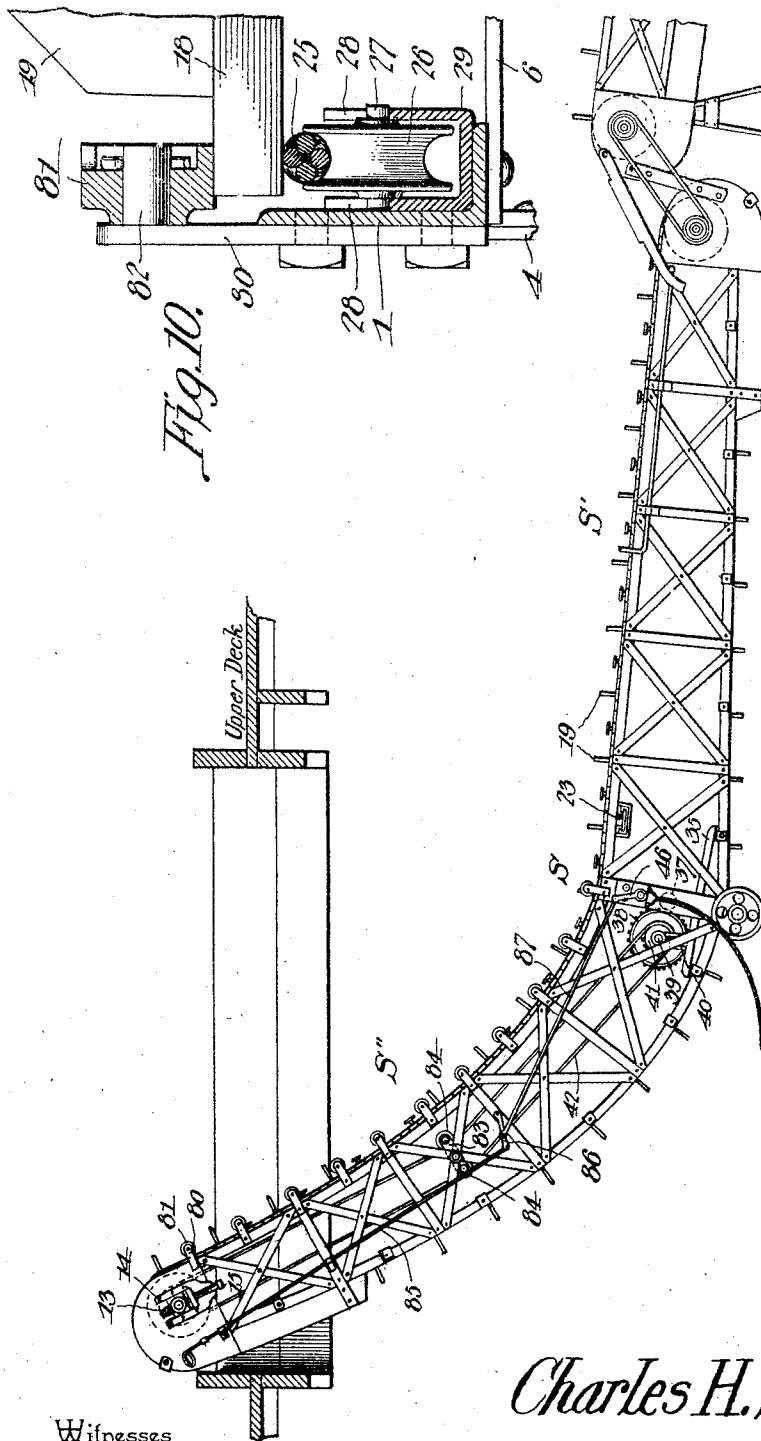
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

CHARLES HENRY SPENCE, OF ST. PAUL, MINNESOTA.

PORTABLE CONVEYER.

SPECIFICATION forming part of Letters Patent No. 779,139, dated January 3, 1905.

Application filed November 4, 1903. Serial No. 179,835.

To all whom it may concern:

Be it known that I, CHARLES HENRY SPENCE, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and useful Portable Conveyor, of which the following is a specification.

This invention relates to portable conveyers of the type in which an endless traveling apron constitutes the carrying-surface; and the invention consists, generally speaking, in a portable conveyor consisting of a plurality of separately-transportable sections which may be connected in sufficient number to form a single conveyor of any desired length and which may all be driven from a single motor mounted upon one of the sections of the conveyor. The invention also includes various improvements in the details of construction of the conveyor, which will be clearly pointed out as the invention is disclosed.

The general object of the invention is to provide a conveyor composed of a plurality of separately-transportable sections having suitable devices whereby the sections may be connected to form a unitary conveyor structure and provided with driving mechanism which may be brought into communication with a single motor, so that the traveling aprons of the several conveyor-sections may be driven from a single source of power and the operation of all of the traveling aprons controlled by devices for starting, stopping, and regulating the speed of the single motor.

A further object of the invention is to provide, in a portable conveyor, improved means for supporting the separate elements of which the traveling apron is composed in order that the friction of operation may be minimized and a saving in power effected.

A further object of the invention is to provide, in a portable conveyor consisting of a plurality of separately-transportable sections, improved means for connecting the separate sections, so that bodies carried by the conveyor may be transferred from one section of the conveyor to another without injury to the bodies transferred and without the intervention of workmen.

In the attainment of the objects above men-

tioned and others which will hereinafter appear I make use of the construction and combination of parts of a portable conveyor hereinafter fully described, illustrated in preferred form in the accompanying drawings, and having the novel features specifically set forth in the appended claims.

In the drawings, Figure 1 is a view in side elevation of a conveyor constructed in accordance with this invention and a platform for receiving the articles transported by the conveyor, the entire conveyor shown comprising a main section, which is shown in full, and a supplemental section, part of which is broken away to save space. Fig. 2 is a plan view of the apparatus shown in Fig. 1. Fig. 3 is a vertical longitudinal section through the receiving end of the main conveyor-section, the view being made on an enlarged scale. Fig. 4 is a vertical transverse section through the main section of the conveyor adjacent to the receiving end. Fig. 5 is a detail view of the devices employed to support the slats of the traveling apron. Fig. 6 is a detail view, partly in elevation and partly in section, of one of the push-buttons employed to operate the registering mechanism. Fig. 7 is a detail view of one of the "take-ups" for the traveling apron. Fig. 8 is a detail view of one of the bearing-blocks at the receiving end of the main conveyor-section. Fig. 9 is a view in side elevation of a modified form of the conveyor used in unloading vessels. Fig. 10 is a detail view showing the mode of supporting and securing the ends of the slats on the traveling apron while passing over the curved portion of the main conveyor-section shown in Fig. 9.

In the drawings I have illustrated a portable conveyor consisting of two separately-transportable sections, one of which contains a motor by which the entire conveyor is operated and the other of which is so connected with the motor-containing section of the conveyor that power may be transmitted from the motor-containing section to the other section without appreciable loss. Only two sections are shown in the conveyor chosen for purposes of illustration, as in two sections all of the several features of the invention are exempli-

fied; but it is understood that additional sections may be added, if necessary, to produce a conveyer of the length required.

Referring to the drawings by reference characters, C represents generally the motor-containing section of the conveyer. The section C of the conveyer comprises a frame consisting of trussed sides formed, preferably, of iron bars 1 and 2 2 and suitable connecting-bars 3 and 4, riveted to the first-named bars. In the preferred form of the conveyer-section C the upper edge of each side of the frame is straight and consists of a bar 1, while the lower side is preferably formed of bars 2 2, connected at a very wide angle, as shown. The bars 3 and 4, which connect the bar 1 with the bars 2 2, are disposed obliquely and perpendicularly to the bar 1, respectively, and form, together with the bars 1 and 2 2, a stiff but comparatively light frame structure.

The two sides of the frame of the conveyer are connected by horizontal cross-bars 6 and by oblique cross-bars 7 in order to give the entire frame structure the requisite lateral stiffness.

Each of the sides of the frame is provided at both ends with shields 8, of sheet metal, preferably of the form shown, and these shields are securely riveted to the bars forming the top and bottom edges of the sides of the frame.

At the receiving end of the conveyer-section C a shaft 9 is rotatably mounted in bearing-blocks 10, rigidly attached to the shields 8 at that end of the conveyer-section. At the other end of the section C of the conveyer a similar shaft 11 is mounted in bearing-blocks 12 and projects through slots 13, formed in the shields at that end of the conveyer. The bearing-blocks 12 are supported in U-shaped members 14, rigidly secured to the shields 8 by bolts or other suitable fastening means, and adjusting-screws 15 are mounted in the bends of the U-shaped members 14 to adjust the position of the bearing-blocks 12 for the purpose hereinafter explained.

The shafts 9 and 11 are both provided with sprocket-wheels 16, two sprocket-wheels being provided on each shaft and spaced apart at a suitable distance to afford support to link belts or sprocket-chains 17, which are mounted on the sprocket-wheels and have secured thereto by any suitable means a plurality of transverse slats 18, which form, together with the link belts 17, the endless apron which forms the carrying-surface of the conveyer.

The apron formed by the belts and transverse slats is divided into sections by transversely-arranged division-boards 19, mounted at regular intervals on the apron. The number of the division-boards 19 employed will be determined by the size of the articles to be carried upon the conveyer, being placed closer together for small articles and farther apart for larger articles. In the conveyer illustrated the division-boards are spaced at

suitable intervals for the transportation of bundles of shingles or other bodies of similar dimensions, and each section of the apron between two division-boards is of the right width to permit the ready introduction thereinto of a single bundle of shingles.

In order that the necessity for counting the articles carried by the conveyer may be obviated, I prefer to provide in the middle of each section of the apron a depressible button 20, supported upon a stem 21, which is arranged for sliding movement in an opening in the middle slat of each section of the apron and has the lower end thereof reduced in diameter, as shown in Fig. 6, and of sufficient length to project downward beneath the apron when the button is depressed and engage a tappet 22, which operates a registering mechanism 23, which may be of any preferred form, but is preferably of the type illustrated in Patent No. 695,957, granted to me March 25, 1902.

As each section of the apron is provided with one of the buttons 20, the article placed on the conveyer will depress one of the buttons, and consequently as the article travels over the registering mechanism 23 the tappet 22 will be engaged by the stem 21 of the button depressed by the article passing and the registering mechanism will be caused to register the passage of an article.

In order to diminish as much as possible the friction of operation of the conveyer, the slats 18 are supported on a pair of steel cables 25, which travel over a series of circumferentially-grooved rollers 26, having trunnions 27, which rest in notches 28, formed in the sides or wings of channel-bars 29, which are disposed immediately beneath the ends of the slats of the traveling apron along the upper edge of each side of the conveyer-frame. Each of the steel cables 25 is endless and travels over pulleys 30 and 31, arranged at the ends of the conveyer-sections. The pulleys 30 are mounted upon fixed shafts, but the pulleys 31 are mounted upon short shafts 32, which are slidably mounted in slots 33, formed in the ends of the wings of the channel-bars in which the grooved rollers are mounted. By adjusting the shafts supporting the pulleys 31 in the slots 33 the tension of the cables 25 may be maintained at any desired degree. The slats 18 have no fast connection with the cables 25, but merely rest upon the parts thereof which lie in contact with the grooved rollers 26. The cables thus serve as means for preventing the tilting of the slats under the loads placed thereon, and inasmuch as the cables travel over freely-rotatable rollers the frictional engagement of the slats with the cables keeps the cables in motion at the same rate of travel as the slats, and the movement of the slats is brought about with a minimum retardation from friction.

The motor by which movement is imparted to the traveling apron of the conveyer-section

tion C is preferably electrically driven and is supported upon a plate 35, mounted over the support of the conveyer-section. The motor may be of any approved form and is indicated at 36. The motor 36 has mounted on the armature-shaft a small spur-gear 37, which meshes with a larger gear 38 upon a counter-shaft 39, mounted in bearing-brackets 40, which rise from the plate 35. The shaft 39 bears upon the end opposite the gear 38 a small gear 41, over which travels a link belt or sprocket-chain 42 and which also travels over a sprocket 43, mounted on the shaft 11 at the delivery end of the conveyer-section. By this arrangement of the motor connections with the shaft 9 the reduction in speed always required in conveyers driven by electrical motors is accomplished by the back gearing directly connected with the motor, and the cumbersome and objectionable arrangement of pulleys and belts ordinarily employed to effect the same result is avoided. The current will be supplied to the motor through a cable 45, and the switch by which the current will be thrown on or off will preferably consist of a pivoted member 46, connected with an operating-rod 47, slidably arranged in guide members 48, which project out from the side of the frame of the conveyer-section. The operating-rod 47 terminates near the delivery end of the conveyer-section in a handle 49, by means of which the rod may be readily reciprocated in the guides in which it is supported, so enabling the operator standing at the delivery end of the conveyer to throw the motor into and out of operation without leaving his position.

The conveyer-section C is supported upon a pair of wheels 50, arranged at the sides of the conveyer-section just below the motor in the frame, in order that the entire section may be conveniently balanced upon the axle upon which the wheels are mounted and easily rolled from one place to another. In order to prevent the division-boards on the return portion of the traveling apron from striking against the axle of the supporting-wheels 50, half-oval rods 51 are arranged at the lower edges of the two sides of the frame of the conveyer-section, and the ends of the slats 18 rest lightly upon these rods and slide thereon in making the return from the delivery end of the conveyer-section to the receiving end.

To keep the division-boards on the traveling apron out of contact with the floor or ground at the receiving end of the section C, guard-rails 52 are secured beneath the side bars 2 of the frame at the ends thereof, and the lower edges of the guard-rails are continuous with the lower edges of the shield 8 mentioned in a preceding paragraph.

In addition to the conveyer-section C above described the complete conveyer may include one or more sections of the character shown at C'. The conveyer-section C' differs from

the section C already described in having the sides of the frame composed of parallel top and bottom bars 60 and 61 and in not having any motor for imparting movement to the traveling apron. The frame of the conveyer-section C' is lighter than that of section C and is designed to be connected with the frame of the section C, so that power may be transmitted from the shaft 9 at the receiving end of the conveyer-section C to the shaft at the delivery end of the section C'.

When used with a supplemental conveyer-section, such as C', the main section C has a sprocket-wheel 53 mounted on the projecting end of the shaft 9, and a chain 54, traveling over the sprocket-wheel 53, imparts motion to a sprocket-wheel 62, mounted on a shaft 63 in the delivery end of the conveyer-section C'. In order to hold the adjacent ends of the two conveyer-sections in proper relation, locking arms or bars 64 are bolted to the shields 8 at the receiving end of conveyer-section C and to shields 65 at the delivery end of the conveyer-section C'. These locking arms or bars form rigid connecting devices between the two conveyer-sections, which hold the shafts 9 and 63 at a fixed distance apart and keep the sprocket-chain 54 in alinement between sprockets 53 and 62.

The transfer of articles from the conveyer-section C' to the conveyer-section C is facilitated by an inclined connecting flap or skid 66, pivotally connected with the shields 65 of conveyer-section C' and adjustably connected with the conveyer-section C by means of sliding bars 58 on the sides of the frame of the latter conveyer-section.

The conveyer-section C' is mounted upon wheels 70, placed beneath the middle of the frame, and is provided with a traveling apron of the structure already described upon the conveyer-section C. The conveyer-section C' is also provided with devices for supporting the traveling apron similar to those described upon the other conveyer-section and has suitable means for maintaining a uniform tension of the traveling apron, as well as guard-rails at the end of the conveyer to keep the division-boards on the traveling apron from coming into contact with the ground or floor.

When the complete conveyer is in operation, the delivery end of conveyer-section C will be blocked up at a suitable height by means of a trestle T or other suitable structure, and beneath the delivery end of the conveyer a receiving-platform P will preferably be placed. The platform P is preferably circular or oval in form and mounted upon legs 75 of such height that the platform is disposed immediately beneath the delivery end of the conveyer. To prevent the accumulation of articles upon the platform, skids 76 may be connected therewith by hooks 77 at their ends, which engage with a rail 78, surrounding the platform and permitting the

setting of the skids at any point which may be convenient for the discharge of goods from the platform.

In handling materials by means of portable conveyers of the character described only one person will be required to stand at the receiving-platform P to superintend the disposition of the goods delivered and to control the speed of the motor by which the entire conveyer is driven. One or more persons will also be required at the receiving end of the conveyer to load the materials onto the conveyer; but at points between the receiving and delivery ends of the conveyer no persons will be required to shift the goods from one section on the conveyer to another or to adjust the goods upon the conveyer.

While I have described and shown the two conveyer-sections as provided with a registering apparatus and it is desirable that such registering apparatus may be employed, it will be understood that conveyers embodying the other features of the invention may be constructed without including a registering apparatus therewith. It is also to be understood that while the main or driving section of the conveyer is preferably constructed with a frame of the form described and shown a conveyer-section having a frame of the form shown in the section C' may be provided with a motor and driving mechanism and used in lieu of section C.

In Figs. 9 and 10 I have shown a modified form of the invention especially designed for use in unloading cargoes of vessels and adapted to be set up in the hold of a vessel, as shown in Fig. 9, with the delivery end of the main conveyer-section projecting through the hatchway to a point above the level of the deck. The essential difference between the modified form of conveyer shown in Figs. 9 and 10 and the form already described lies in the curved frame of the main conveyer-section. As will be readily seen from an examination of Fig. 1, the conveyer shown therein is not adapted to discharge goods upon the deck of a vessel, and as it is frequently desirable to make use of conveyers in unloading the cargoes of vessels I provide a main conveyer-section the frame of which is so constructed that it will extend upward to the required height and project through the hatchway, so that the goods delivered may be conveniently handled by stevedores or otherwise.

In Fig. 9 the main conveyer-section, which is designated S, consists of an approximately horizontal portion S' between the receiving end of the section and the supporting-wheels and a curved portion S'' between the supporting-wheels and the discharge end. The frame is in other respects precisely similar to the frame already described, consisting of similar side bars and brace-rods. The traveling apron is made up of endless chains and slats, as already described, and motion is imparted there-

to by means of similar driving devices correspondingly numbered. In order, however, that the traveling apron may travel in a curve corresponding to the curve of the portion S'' of the frame, brackets 80 are secured at each side of the frame along its upper margin and rollers 81 are secured upon pins 82, carried by the brackets and projecting over the ends of the slats of the traveling apron. The curve of the portion S'' of the frame makes it necessary to provide means for holding the belt by which motion is imparted to the traveling apron out of contact with the under side of the apron. For this purpose the frame 83 is pivotally supported under the going portion of the traveling apron, and the pulleys 84 are mounted therein to contact with the going and return portions of the driving-belt, as shown in Fig. 9. The operation of the motor is controlled in substantially the same way that the motor is controlled in the form of conveyer first described. The switch 46 is operated by means of a sliding rod 85, a link 86, pivotally connected therewith, and a rod 87, connecting the link and the switch 46.

One of the special advantages of the curved frame in the modified form of conveyer shown in Fig. 9 is that the centrifugal force developed by the movement of the goods in a curve tends to prevent them from falling backward over the division-boards in the traveling apron, although the packages carried may be of such dimensions that they could not be supported on the curved portion of the conveyer if at rest.

The supplemental section used with the main section S is precisely similar to the supplemental section C', and description thereof is unnecessary.

Having thus described the construction and operation of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a conveyer, the combination with a traveling apron, of a registering mechanism, and load-actuated mechanism carried by the traveling apron for operating the registering mechanism.

2. In a conveyer, the combination with a traveling apron divided into a plurality of sections, of registering mechanism, and a device for operating said registering mechanism mounted in each section of the traveling apron and thrown into operative position when a load is placed thereon.

3. The combination with an endless conveyer, of an endless support for the upper run of the conveyer, said support being of a length less than that of the conveyer.

4. The combination with an endless conveyer, of rollers underneath the upper run of the conveyer, and an endless cable passing over the rollers, said cable being of a length less than that of the conveyer.

5. The combination with an endless con-

veyer, of an endless cable forming a support therefor, and means for adjusting the cable independently of the conveyer.

6. The combination with an endless conveyer, of an endless-conveyer support, and independent adjusting means for the conveyer and the support.

7. The combination in a conveyer, of a traveling apron including a plurality of transversely-disposed rigid members, a pair of bars disposed beneath said apron at opposite sides thereof, and a series of supporting-rollers journaled in each of said bars.

8. The combination in a conveyer, of a traveling apron including a plurality of transversely-disposed rigid members, a pair of channel-bars having their sides provided with corresponding notches disposed beneath said apron at the sides thereof, and a plurality of supporting-rollers arranged in said channel-bars and having trunnions disposed in the notches at the sides of said bars.

9. The combination in a conveyer of a traveling apron, a plurality of grooved rollers beneath said apron, and a cable traveling over said rollers and affording a support for said traveling apron, said cable having movement independent of said apron.

10. In a conveyer, the combination with a traveling apron consisting of a plurality of transverse slats connected by an endless belt, of a support for said slats comprising a series of grooved rollers, arranged at each side of said apron, and an endless cable traveling over each series of rollers.

11. In a conveyer, the combination with a traveling apron, of a pair of channel-bars arranged beneath the edges of said apron, a plurality of grooved rollers rotatably mounted in said channel-bars, and an endless cable traveling over each series of rollers and supporting said traveling apron, said cable having movement independent of said apron.

12. In a conveyer, the combination with a traveling apron, of a pair of channel-bars arranged beneath the edges of said apron, said channel-bars being provided with notches in either side, a plurality of grooved rollers having trunnions engaging said notches, and an endless cable traveling over each series of grooved rollers.

13. The combination in a conveyer, of a plurality of conveyer-sections, a skid secured at the delivery end of one section, and means upon the receiving end of the next section for adjustably securing said skid thereto.

14. The combination in a portable conveyer, of a plurality of conveyer-sections, a skid pivotally mounted at the discharge end of one of said sections, and a rod adjustably mounted

near the receiving end of the next section upon which the free end of said skid rests.

15. The combination in a portable conveyer, of a supporting-frame, an endless traveling apron comprising going and return sections, and half-oval strips arranged in the frame to support the return-section of the apron.

16. The combination in a portable conveyer, of a supporting-frame, an endless traveling apron carried by said frame, transverse members provided on said traveling apron to divide the carrying-surface thereof into a plurality of sections, shield-plates arranged at the ends of said frame and projecting beyond and below the transverse members carried by the traveling apron to prevent injury thereto from contact with adjacent objects.

17. The combination in a portable conveyer, of a frame, an endless traveling apron carried by said frame, transverse division members mounted upon the carrying-surface of said apron and disposed perpendicularly thereto to divide said traveling-surface into a plurality of sections, guard-rails arranged below the lower edges of said frame near the ends, and shield-plates arranged at the ends of said frame on both sides to form continuations of said guard-rails to protect said transverse members from injury thereto from contact with adjacent objects.

18. A portable conveyer including a trussed supporting-frame having its receiving end approximately horizontal, the frame of the conveyer curving sharply upward toward a discharge-point at the opposite end, a conveyer-support approximately at the juncture of the horizontal and curved portions of the frame, conveyer-supports mounted at the opposite sides of the frame, an endless-conveyer member extending around said supports, and guided on lines following the curvature of the frame, the curvature of the conveyer being such that the articles being carried will in part be held in position by centrifugal force, and transverse slats arranged on the conveyer and serving to carry the articles over and beyond the top of said conveyer.

19. The combination in a portable conveyer, of a main conveyer-section having a supporting-frame curved in a vertical plane and with its delivery end elevated, and a supplemental section connected with the main section and driven from the main section.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES HENRY SPENCE.

Witnesses:

H. BRAYTON,
P. P. STAINS.