

C. F. BURCH.
CONVEYER MECHANISM.
APPLICATION FILED MAR. 11, 1914.

1,122,365.

Patented Dec. 29, 1914.

4 SHEETS—SHEET 1.

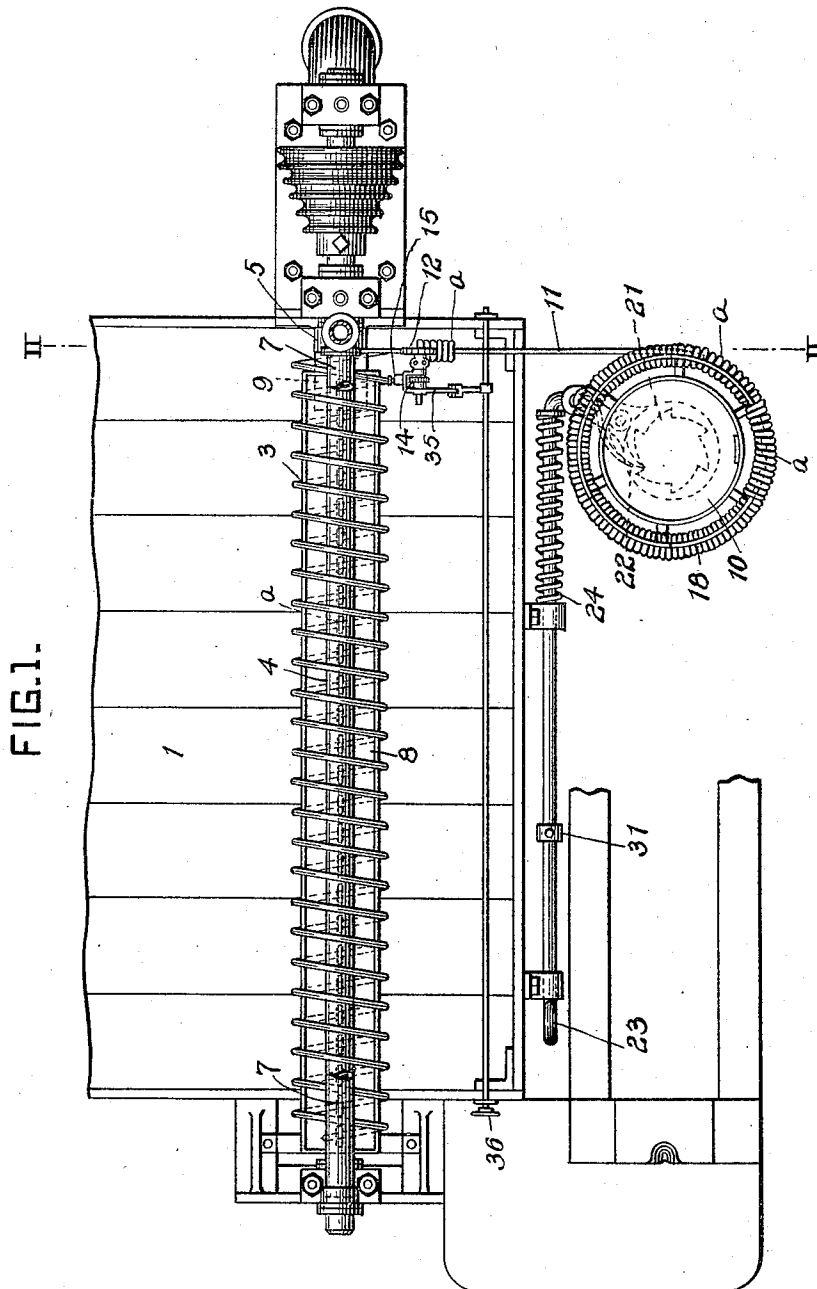


FIG. 1.

WITNESSES

James J. Tomlinson
Frieda E. Hoff

INVENTOR

Charles F. Burch
by Christy and Christy
Att'y's

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4 SHEETS—SHEET 3.

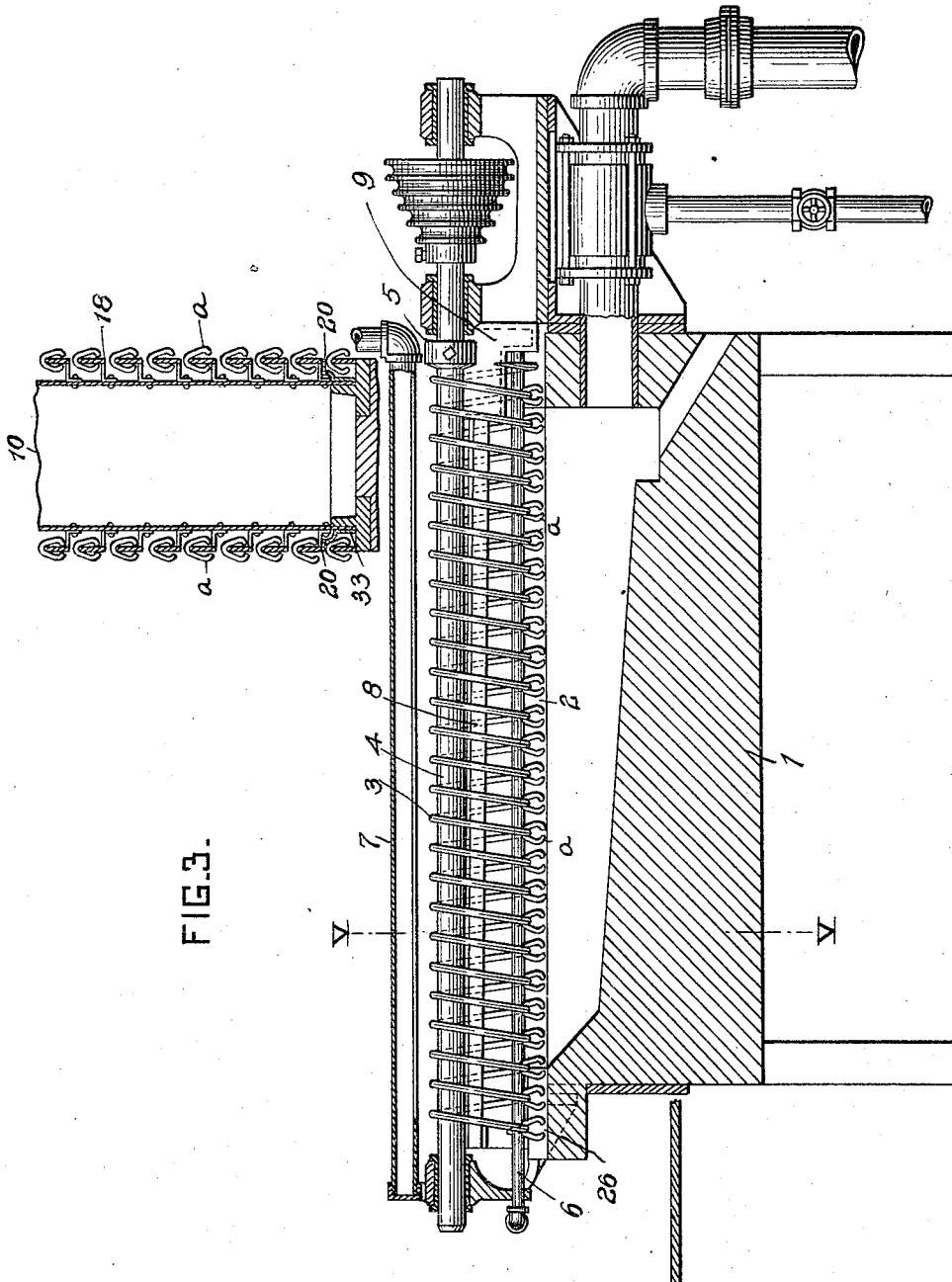


FIG. 3.

WITNESSES

James J. Tomason.
Frieda E. Hoeff.

INVENTOR

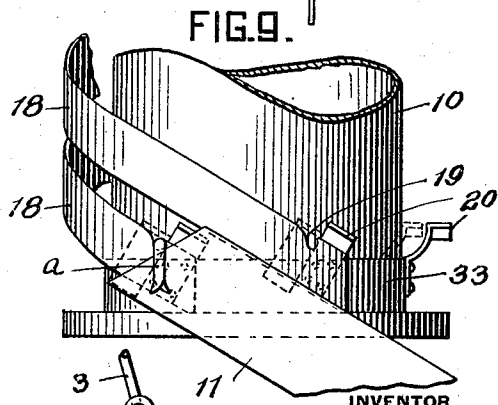
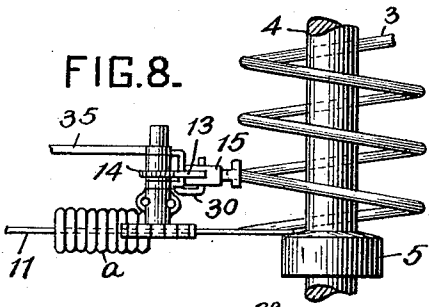
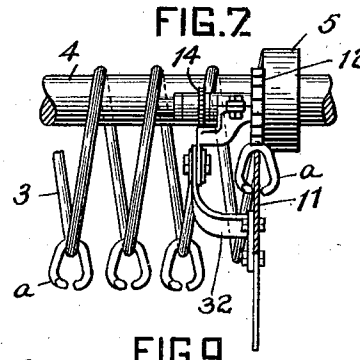
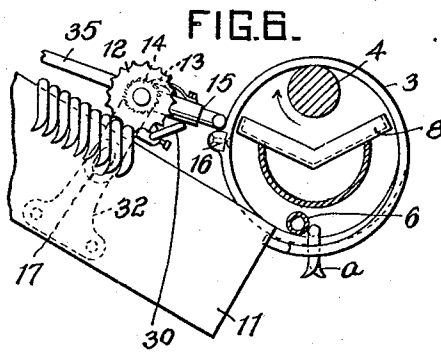
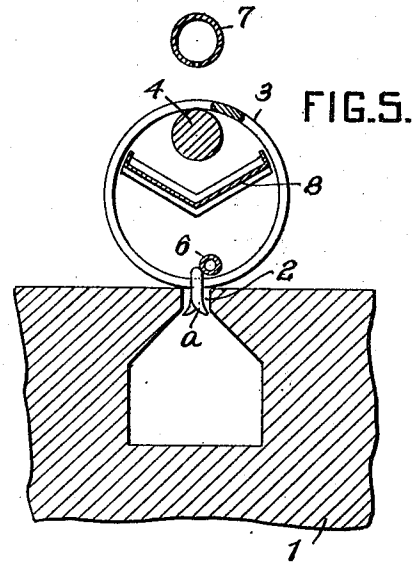
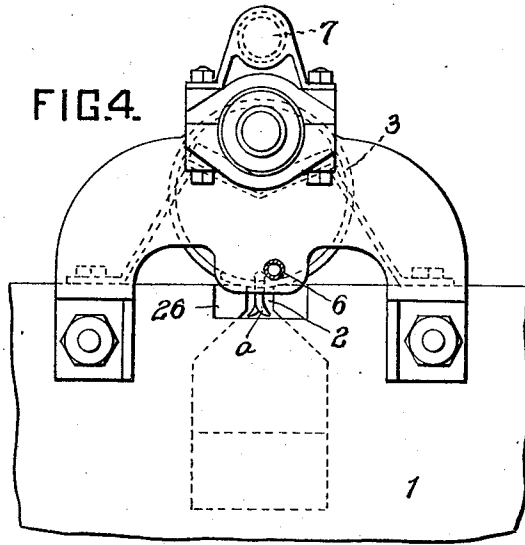
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4 SHEETS—SHEET 4.



WITNESSES
Marion J. Tomason,
Frieda E. Wolff.

FIG. 10.
FIG. 11.
INVENTOR
Charles F. Burch
by *Christy and Christy*
ATT'YS.

UNITED STATES PATENT OFFICE.

CHARLES F. BURCH, OF OAKMONT, PENNSYLVANIA.

CONVEYER MECHANISM.

1,122,365.

Specification of Letters Patent.

Patented Dec. 29, 1914.

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To all whom it may concern:

Be it known that I, CHARLES F. BURCH, residing at Oakmont, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Conveyer Mechanisms, of which improvements the following is a specification.

My invention relates to improvements in conveyer-mechanisms, and is in the accompanying drawings illustrated in application to a machine for heating chain-link blanks, preparatory to welding.

In these drawings Figure 1 is a plan view of the chain link blank-heating machine; Fig. 2 is a view in section and elevation, the plane of section being indicated at II—II, Fig. 1; Fig. 3 is a view of the machine in section on the broken plane indicated at III—III, Fig. 2. Figs. 4-9 are drawn to larger scale; Fig. 4 is a view in elevation of the discharge end of the machine—the end at the bottom of the sheet, Fig. 1; Fig. 5 is a view in section, on the plane indicated at V—V, Fig. 3; Fig. 6 is an enlargement of certain details of Fig. 2; Fig. 7 is a view in side elevation of the parts shown in Fig. 6, the runway (to the left Fig. 6) being shown in section; Fig. 8 is a plan view of the same parts; Fig. 9 is a view in elevation of a portion of the storage structure used in this machine; Fig. 10 is a view in section of a detail, showing a permissible variation, hereinafter described; and Fig. 11 illustrates a further variation in detail of operation.

Figs. 1-5 of the drawings show a heating-furnace 1 provided in its top with an elongate slot 2 adapted to receive the ends of unfinished chain-links and to allow the travel of such links along the slot from end to end. In this travel it will be understood the intruding ends of the chain-links are brought to welding temperature. My invention is applied in the conveying-mechanism employed in carrying these links to and through this operation.

The conveyer includes a helical runway, in this instance in the form of a rod 3. The rod shown is round in cross-section, and it will be understood that the shape in this regard will be such as to suit the particular article to be conveyed. This spiral is sup-

ported and rotated immediately above the slot 2 in the furnace roof, and it will be observed that chain-links depending from the loops of the spiral and extending into the slot will, as the spiral turns, advance longitudinally of the slot. It will also be observed of each loop of the spiral that it lies across the slot and as the spiral turns the point of crossing advances longitudinally of the slot and longitudinally of the runway also: that is to say, as the spiral turns, fresh and relatively unheated portions of the runway are constantly advancing to the point of intensest heat while the most highly heated portions are constantly receding from the high-temperature region.

The helix is supported upon a shaft 4 which extends above and parallel with the slot 2 and at a proper interval therefrom. This shaft 4 may be positively driven through the instrumentalities indicated; and it will be understood that as it rotates the helix 3 will also rotate on its own axis and in such rotation cause the chain-link blanks α which encircle it and hang from its loops into the slot 2 to advance along that slot.

In order to insure the proper position of the helix longitudinally on the supporting shaft 4, I provide means for maintaining the charging end at proper position and for rectifying any variation in this regard. As will presently be explained, the charging end of the turning helix registers once in each rotation with a fixed rail. Referring particularly to Figs. 6-8, the charging end of helix 3 is shown and the adjacent fixed rail 11. As illustrated in Fig. 8, the end of the helix is beveled and its beveled end engages the end of rail 11. Adjacent the end of the helix is the rectifying means mentioned, consisting in this exemplification of an abutment arranged adjacent the end of the helix, and, more specifically, a beveled-faced collar 5 mounted on shaft 4. The beveled face of this collar is effective to engage the end of the turning helix, once in each rotation and, the base of the bevel being alined with the rail 11, by such engagement rectify any movement of the helix in a direction toward that collar. Such movement as I here am guarding against will in the main be due to elongation of the helix as it becomes heated. The collar is effective

to maintain the charging end of the helix at a constant point and whatever thermal elongation occurs will manifest itself at the discharging end, where it can be of no effect to disturb the operation.

A skilled mechanic will understand how in various ways to insure the proper positioning of the charging end of the helix and its certain registration with the rail 11 or other source of feed. I have illustrated and described one mechanical arrangement, but do not mean to limit myself to it alone.

It is preferable that the advancing links *a* should not bear against the hot and rough surface of the brick-work in which the slot 2 will ordinarily be formed, but rather against a pipe 6 arranged adjacent the slot, preferably immediately within the helix. This pipe may be kept cool by the circulation of water within it.

Means may be provided for keeping the shaft 4 cool, and the helical runway 3 as well, such means conveniently consisting of a vented pipe 7 extending immediately above shaft 4 and constantly supplied with a flow of water. The water flowing through the vent or vents in the under face of this pipe will play over the shaft and the upper turns of runway 3, and may be caught in a trough 8 arranged beneath the shaft and within the helix, and draining at one end of the furnace, as indicated in the escape gutter 9, Fig. 3.

Coöperating with the apparatus thus far described, and forming in combination therewith specific features of my present invention, is a source of supply of the articles to be conveyed—in this case chain-link blanks. This source of supply is controlled by a feed-mechanism, and the feed-mechanism is in its operation correlated to the turning of the helical runway already described, to the end that a properly limited number of articles (in this case one) may be fed to the spiral each time it revolves. The feed-mechanism will, preferably, be operated by instrumentalities set in motion by the revolving helix itself, as will presently be explained.

The source of supply may conveniently take the form of an inclined runway, and as will presently appear the inclined runway may be duplicated in a plurality of runways, and these runways may be shaped as concentric helices and so form a drum-shaped storage device which may be charged and discharged with facility. This specific drum-shaped storage-device forms a specific and separate invention, but, in combination with the helical runway already described, embodies specific features of my present invention, as I have already said. The source of supply then is, for the purpose of this invention, exemplified in the

drum-like storage-device, 10. The storage-device, whatever its specific form, may be provided with a delivery runway—in this instance in the form of the inclined rail 11. Referring particularly to Figs. 6, 7, and 8, it will be observed, that this inclined rail 11 terminates at a point where the advancing end of the helix 3 will on each rotation register with it. As shown, this alinement is an overlapping engagement. Coöperating with the inclined rail 11 is the feed-wheel 12, and these two parts, together with their operating instrumentalities, constitute the feed-mechanism. The wheel 12 is mounted to turn on its axis and is arranged adjacent the rail 11; its margin is recessed. When at rest it serves to check the descent of blanks along the rail, and when it turns it permits a release of the blanks at a predetermined rate. As shown, each recess in the rim of the wheel 12 is of proper size and shape to take over and engage a single chain-link blank in a series crowding down the rail 11, and the wheel being in this case provided with sixteen recesses, the turning of the wheel through one sixteenth of a revolution will segregate and release a single blank from the line and leave that blank free to descend to the end of the rail 11. The wheel 12 is turned by the pawl 13 acting on a ratchet 14 on the shaft of the wheel and the pawl is thrown through its intended stroke by being mounted on the arm 15 which is swung once on every rotation of helix 3 by engagement of an abutment 16 on the helix with the free end of the arm. When in the continued turning of the helix 3 the abutment 16 passes from engagement with the free end of the arm 15, the arm may fall back again to its initial position by gravity, and it will be understood that a stop 30 (here shown as an adjustable stop) may be provided to limit its retrograde movement. The shaft which carries wheel 12 is in this case shown to be journaled in an arm 32, and this arm is extensible, as indicated in the elongated bolt-hole 17 (Fig. 6) in the two bolt-united portions of this arm, to the end that the spacing of the feed-wheel 12 from the rail 11 may be accurately adjusted, to compensate for wear or suit blanks of different sizes. The feed-wheel 12 may, as will be perceived, be made removable from the shaft on which it turns; consequently, it may be removed and replaced by another wheel of different size and configuration; and in this manner a feed-wheel 12 particularly suited to the particular work in hand may be provided. The arm 15 may be extended beyond its pivot-point as at 35, and by moving this extension (as through a hand-wheel 36, Fig. 1) the feed-mechanism may be thrown out of automatic action without stopping the machine. It remains to be said, regarding this feed-mechanism,

that the relative dimensions and proportions are such that the feed-mechanism releases its predetermined unit of feed (in this case a single chain-link) and allows it to descend
 5 and pass from the end of the rail 11 to the advancing end of helix 3 when these parts are in engagement.

As particularly shown in Fig. 6, the charging end of helix 3 which engages rail
 10 11 departs slightly from the true helical shape, so as to leave a space between this charging end and the abutment pipe 6. By this provision, each blank as it passes from rail 11, passes beneath the abutment pipe 6
 15 and as it advances to succeeding loops of the helix comes into engagement with the pipe 6 for the purposes elsewhere described.

The drum 10 already mentioned has provided upon its surface and essentially consists of a plurality of parallel helical runways. The drum shown consists of six such runways. The drum is rotatable on its axis; the runways all terminate in a single plane at right angles to the axis of rotation; and
 25 the drum 10 and rail 11 are so arranged that in the rotation of the drum the several runways will in turn come into engagement with the rail at its higher end. Each runway is provided at or near its lower end
 30 with a stop-device consisting in this case of a notch 19, in which the lowermost of a series of blanks is normally caught. This lowermost blank, caught in notch 19 (see Fig. 9—to the left) arrests the descent of
 35 the entire line of blanks which may rest on the runway. When in the turning of drum 10 one of the runways 18 approaches alinement with rail 11, this lowermost blank is automatically lifted from the notch, the
 40 notch is bridged and as the parts come to alinement, the rail 11 becomes part of the runway, and the charge of blanks descends until checked by the feed-wheel 12, already described. This is best shown in Fig. 9.
 45 The runway to the left has a blank *a* resting in the notch 19. Ordinarily there will be on the runway a line of similar blanks piled up against the blank in the notch, but these other blanks are for the sake of clear-
 50 ness of showing omitted. The safety-lock 20 (presently to be described) has been opened and it will be understood that the drum is rotating and the lower end of the runway advancing from left to right. In
 55 this advance the tip of the rail 11, properly shaped (Fig. 1) enters the link *a*, the link *a* bears against the inclined end of the rail (Fig. 9), and is in the further advance lifted out of the notch and passes to the
 60 long slope of rail 11. As the turning drum comes to position and stops, the rail 11 bridges the notch, and its slope forms a continuation of runway 18.

A safety lock 20 may be provided, which
 65 may be moved laterally from the full-line

position to the dotted-line position, Fig. 9. In the full-line position the lock is open; in the dotted-line position, it is closed. The locks for all the runways on the drum may be mounted and move in unison on a ring
 70 33 which may be turned on the drum. This locking device will be closed when the drum has been loaded and while being conveyed to position. When the drum is set upon
 standard 25, the lock may be opened. 75

Means are provided for a properly regulated rotation of drum 10. If the drum is made up of six runways (as here shown) and these several runways terminate at intervals of sixty degrees around the periphery of the drum, the drum-rotating device will properly provide for a step-by-step movement, each step being an advance through one sixth of a revolution. To that
 80 end there is a six-toothed ratchet wheel 21 concentric and rotating integrally with the drum 10, and a pawl 22 with an operating device such as to give it a throw sufficient to advance the ratchet one sixth of a revolution. The operating device may be a hand
 85 lever 23 and proper mechanical connections; the range of movement of the lever being properly limited. Such a limitation is indicated in the adjustable collar 31 on a connecting rod between the lever and the pawl.
 90 95 Means for carrying the pawl back in retrograde movement to its inactive position may be provided, as in a spring 24, acting on a connecting rod of the pawl-swinging mechanism. It will of course be understood that
 100 my invention is not confined in its broader aspects to a storage device of any specific form; and further, if such a drum as has been described is used, the number and spacing of the individual runways may be varied
 105 as desired.

The drum 10, apart from any specific co-operating apparatus, forms a separate invention, and the mechanism for charging the drum with blanks is not material to this
 110 invention. It will be understood that all the runways of the drum 10 may be filled with blanks; the drum then brought to position on the standard 25 and one of its runways brought into alinement with rail 11.
 115 Thereupon, the rotation of shaft 4 will effect the feeding forward of the blanks one by one and their advance one by one, each depending from one of the loops of the helix 3 through the furnace orifice 2, from end to
 120 end thereof, and their delivery one by one at the farther end of the helix 3, by falling one by one in a receiving recess 26, or otherwise, whence the attendant may remove them.
 125

I have described the invention applied to a conveyor for a heating-furnace; it will be understood that, broadly, its application is not limited to such incidental circumstances or environment. Its adaptation to and its
 130

value in coöperation with a heating furnace, for the purposes described, are apparent.

I have described the runway in the shape of a rail or rod over which link-shaped blanks may travel. It will be understood, that, broadly, the invention is not limited to a runway of any particular shape. It may be a rod of any desired section or it may, for example, be a slot and adapted to convey not chain-link blanks but blanks such as bolt blanks. This is indicated in Fig. 10, in which a bolt-blank *b* is shown suspended between successive turns 3^a, 3^a of a helix. It will be understood that the modification shown in Fig. 10 will require a corresponding modification of the particular shape of the runways on the drum and rail 11, a slot taking the place of a rod or rail.

In Fig. 11 I have shown that the blanks instead of engaging the runway 3 immediately may be carried on intermediate hangers 34, and the provision of such an intermediate hanger would be desirable in some cases, as—for instance—in conveying metal blanks through a metal-plating bath.

I claim as my invention:

1. In a conveying-apparatus, the combination of a helical conveyer and means for supporting and rotating said conveyer, the said conveyer being structurally separate from its supporting and rotating means and uninterrupted throughout its length.

2. In a conveying-apparatus the combination of a rotatable shaft and a helical conveyer, the helix being of greater diameter than the said shaft, surrounding said shaft, and bearing upon the surface thereof.

3. In a conveying-apparatus the combination of a horizontally-extending rotatable shaft, a helical conveyer, the helix being of greater diameter than the said shaft, surrounding the said shaft and supported thereon, and means controlling longitudinal movement of said helix.

4. In a conveying apparatus, the combination of a rotatable shaft, a helical conveyer of greater diameter than said shaft, surrounding said shaft and bearing upon the surface thereof, and a positioning abutment arranged adjacent one end of said helical conveyer.

5. In a conveying apparatus the combination with an elongate runway, of a conveyer shaped to helical form arranged adjacent said runway and adapted to sustain and carry an article to be conveyed while such article is at the same time engaged by the runway first named, and means arranged within the helix supporting it and causing it to rotate on its axis.

6. In a conveying apparatus the combination with an elongate runway, of a shaft extending parallel to said runway, a helical

conveyer surrounding said shaft and bearing thereon and extending adjacent said runway, and means for rotating said shaft.

7. In a conveyer-mechanism the combination of a helical runway rotatable on an axis, a source of supply of articles to be conveyed arranged adjacent the path described by the leading end of said rotatable runway, means for controlling the feeding forward of articles to be conveyed, such controlling means coördinated with the rotation of said helical runway.

8. In a conveyer-mechanism the combination of a rotary shaft, a helical runway hung from said shaft, a field runway adjacent the path of rotation of one end of the helical runway first named and means for maintaining the end of the rotating helix in alinement with said feed runway.

9. In a conveying apparatus, the combination of an inclined runway, a feed-control for said runway, a second runway of helical form arranged adjacent the inclined runway first named, rotatable on an axis and in its rotation registering with said inclined runway, the said feed-control being operated by said helical runway on its rotation.

10. In a conveying-mechanism the combination of two helical runways mounted for revolution each on its own axis and arranged in relative positions affording alinement within the range of rotation, and a feed-mechanism controlling the passage of articles conveyed from one runway to the other.

11. In a conveying-apparatus, the combination of a rotatable helical runway, a plurality of inclined runways, and means to bring the discharge end of each of said inclined runways in turn into alinement with said helical runway.

12. In a conveying-apparatus, the combination of a helical runway rotatable about an axis, a plurality of helical runways of equal diameter arranged about a common axis and rotatable about that axis, the single helical runway on the one hand and each of the plurality of concentric runways on the other being arranged to be brought in the range of rotation into alinement, the one with the other, means for bringing each of the said concentric runways in turn to such position of alinement, and a feed-control of the passage of articles conveyed from one aligned runway to the other.

13. In a conveying-mechanism, the combination of a plurality of vertically extending helical runways of equal diameter arranged about a common axis and rotatable about such axis in a cylindrical path, another horizontally extending helical runway rotatable about its axis in a cylindrical path, a connecting runway tangent to both of the

two cylindrical paths, means for bringing
the lower end of each of the vertically ex-
tending runways in turn to alinement with
said connecting runway, means for rotating
5 the horizontally extending helix, feeding-
mechanism, and means for operating said
feeding-mechanism.

In testimony whereof I have hereunto set
my hand.

CHARLES F. BURCH.

Witnesses:

BAYARD H. CHRISTY,
FRANCIS J. TOMASSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."