H. E. HAYWARD.

LINK STACKING DEVICE.

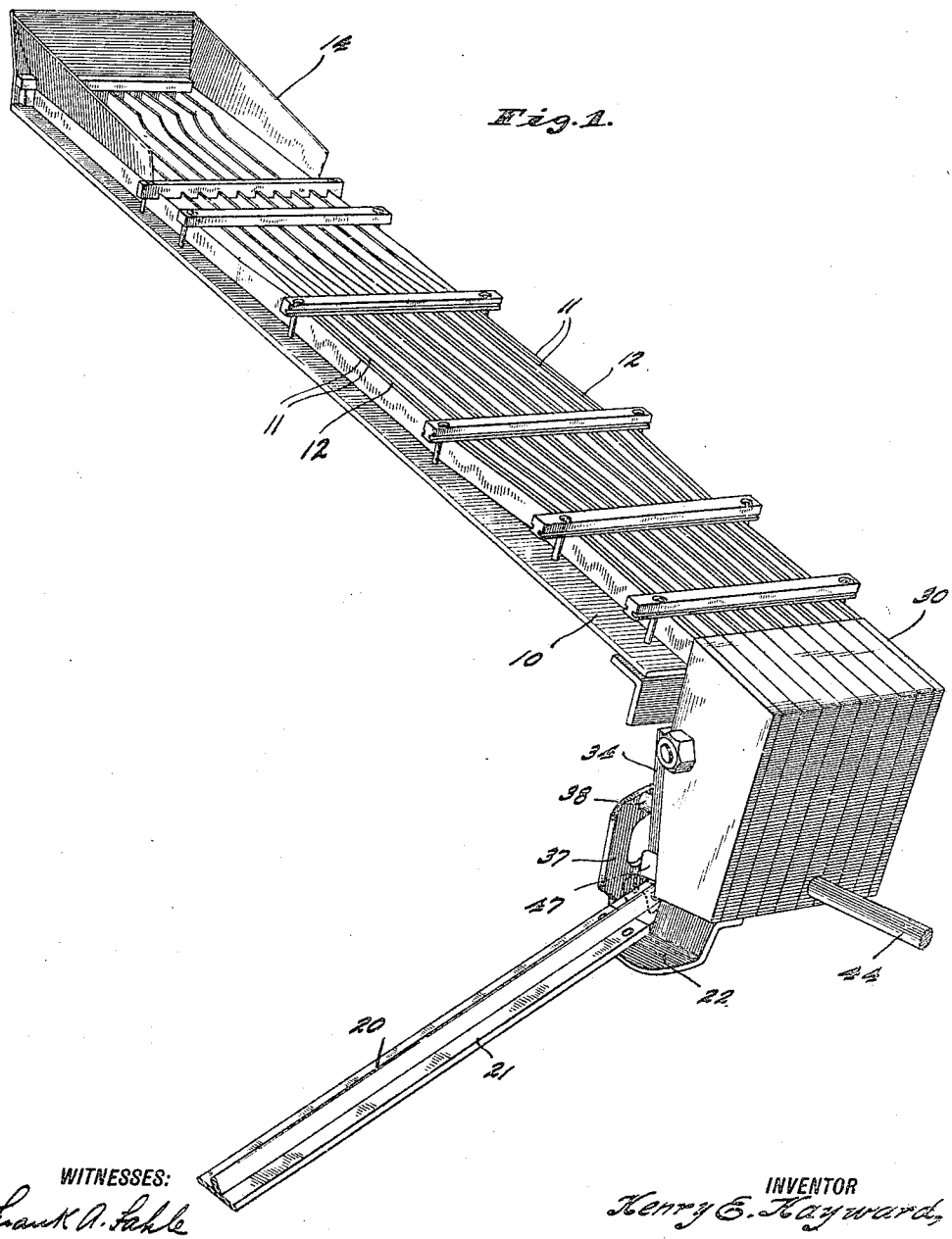
APPLICATION FILED APR. 24, 1916.

1,256,898.

Patented Feb. 19, 1918.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2.

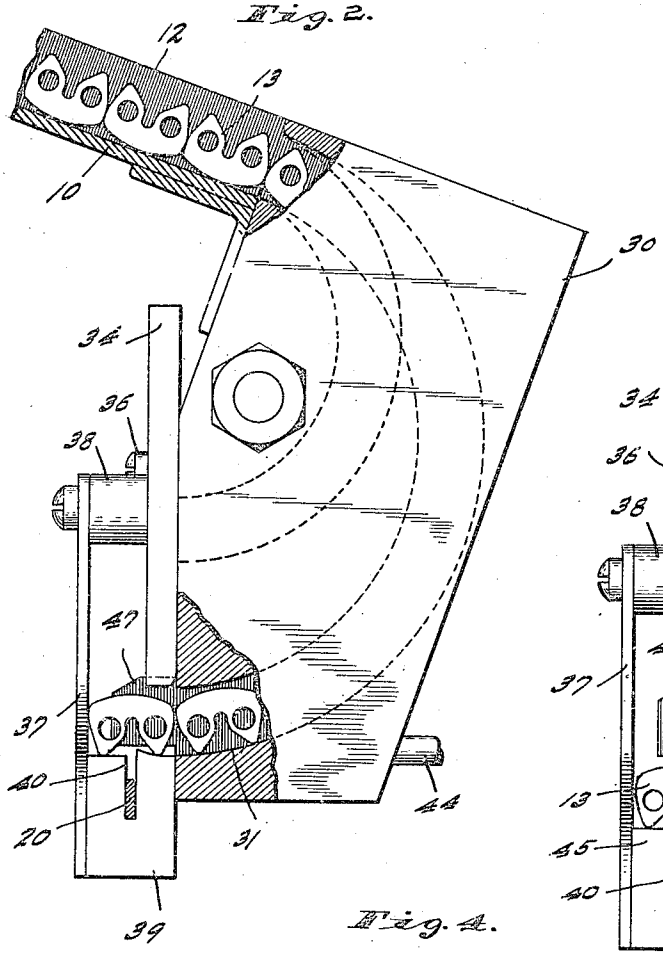


Fig. 3.

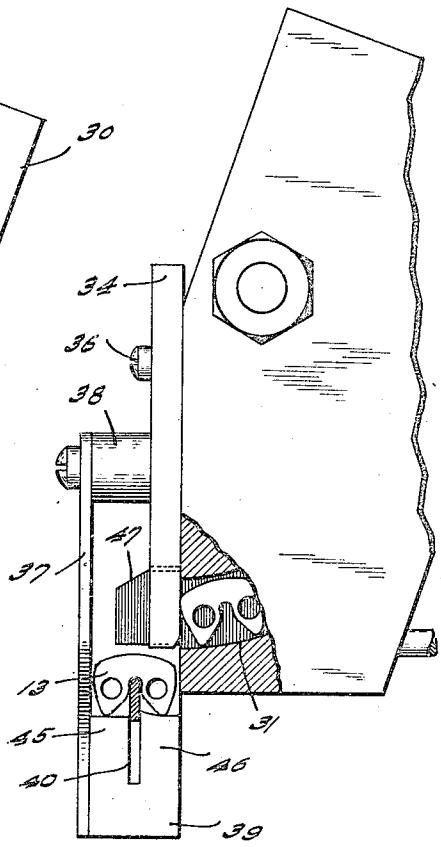
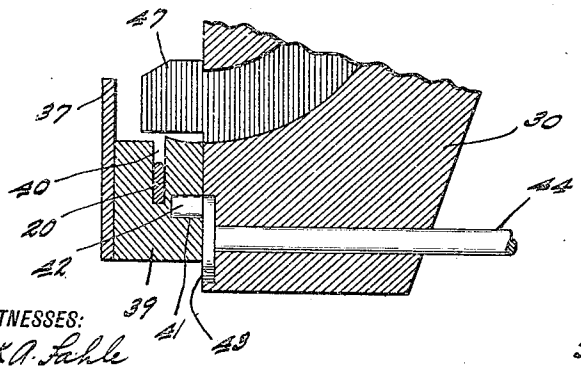


Fig. 4.



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4 SHEETS—SHEET 3.

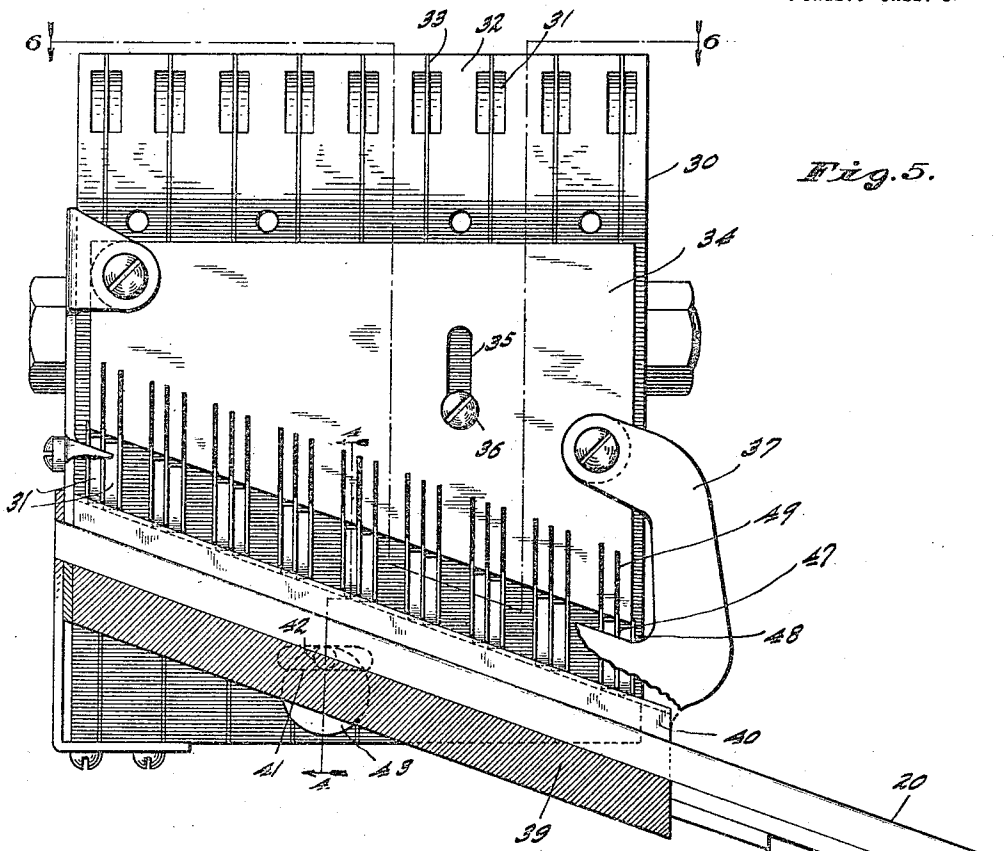


Fig. 5.

Fig. 6.

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4 SHEETS—SHEET 4.

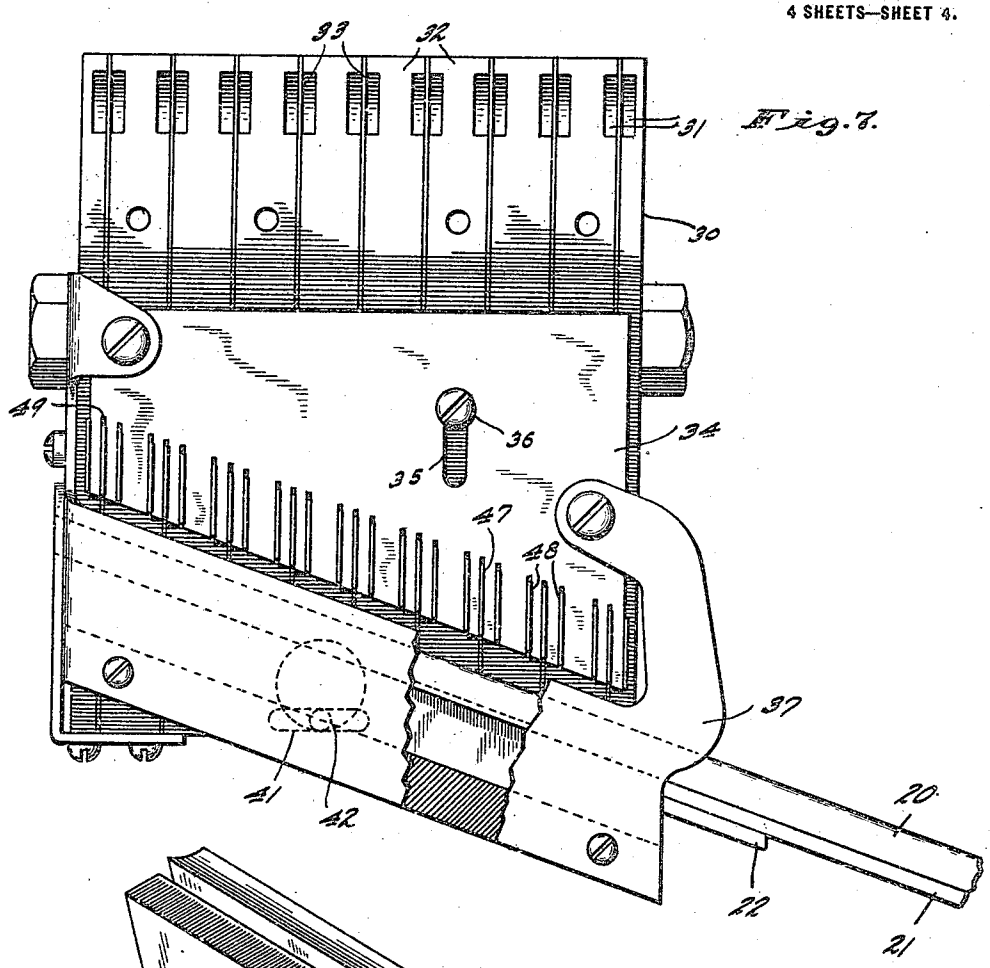


Fig. 7.

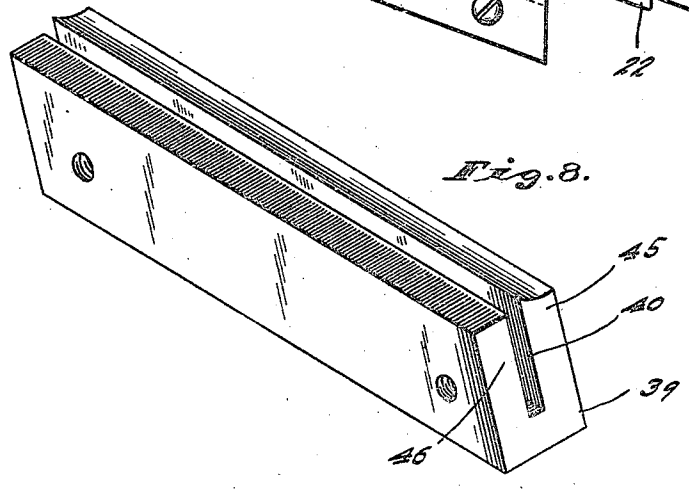


Fig. 8.

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UNITED STATES PATENT OFFICE.

HENRY E. HAYWARD, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO LINK-BELT COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

LINK-STACKING DEVICE.

1,256,898. Specification of Letters Patent. Patented Feb. 19, 1918.

Application filed April 24, 1916. Serial No. 93,321.

To all whom it may concern:

Be it known that I, HENRY E. HAYWARD, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Link-Stacking Device, of which the following is a specification.

In the manufacture of silent chains, it is necessary that the links be operated on individually a number of times, in order to produce the finished chain. Heretofore, it has been necessary in practice to place the individual links in position by hand, for each operation, involving great labor and expense, as the links are manufactured and handled by the million.

The present invention is one of a series, having the ultimate object of automatically bringing the links into position to be operated on; and has for its particular object the transferring of a series of links from an end-to-end arrangement with their points all in the same direction to a side-by-side arrangement so that the points and the pitch holes or pivot pin holes in all the links register, and placing the links in this latter position on a conveyer which will carry them in such position and arrangement to the desired place.

The mechanism for bringing the links from a haphazard mass to an end-to-end arrangement with the points all pointing in the same direction forms, *per se*, the subject-matter of my co-pending application, Ser. No. 93,320, of even filing date herewith; and the conveyer or slide rail on to which the links are placed by my present invention forms, *per se*, the subject-matter of a co-pending application of Frank J. Oakes, Ser. No. 93,326, of even filing date herewith. My present invention relates to the intermediate mechanism, and to the combination thereof with the initial positioning mechanism and the conveyer or slide rail. The links may be fed in the initial end-to-end arrangement referred to to certain machines for treating the links, usually individually; or may and usually are fed in such arrangement to a device such as that forming part of the present application or that forming the subject-matter of the co-pending application of Owen H. Spencer Ser. No. 93,322, also of even filing date herewith, by which this initial link arrangement, with the links arranged all in the same position end to end, is transformed to a second arrangement or stack of links, with the links arranged side by side with their points registering. This second arrangement or stack is found to be a most convenient and suitable one for transporting the links from one place to another, as on the slide rail shown in the Oakes application above referred to, and for handling the links in other machines which may operate on them, either individually, or in the assembling of the complete chain, as for instance those shown in the co-pending applications of Frank J. Oakes and Owen H. Spencer, Ser. Nos. 93,324 and 93,325, also of even filing date herewith. The various inventions covered by these several applications may be used together in the different arrangements in the manufacture of silent chains. It has been found that the initial arrangement of the links in an end-to-end relationship with the links all in the same position and their points all toward the same side is probably the most convenient and efficient starting point for getting the links into the second arrangement, or stack, with the links side by side with their points and crotches all registering; and that this second arrangement or stack is probably the most convenient and efficient arrangement for the handling of the links throughout the subsequent operations on them and in the assembling of the chain.

The accompanying drawings illustrate my invention. Figure 1 is a general perspective view of an apparatus embodying my invention, showing the combination, with my positioning means arranged at an intermediate point between the initial positioning device set forth in my aforesaid co-pending application and the conveyer or slide rail set forth in the aforesaid co-pending Oakes application; Fig. 2 is a side elevation in partial section of my positioning device, showing the vertically movable link carriage raised; Fig. 3 is a fragmentary view similar to Fig. 2, showing such vertically movable link carriage lowered; Fig. 4 is a sectional view showing a detail of the mechanism for raising and lowering the link carriage, and is a section on the line 4—4 of Fig. 5; Fig. 5 is a front elevation of my positioning device, with some parts broken away or in section, and the vertically movable link carriage raised; Fig. 6 is a section on the line

6—6 of Fig. 5; Fig. 7 is a view similar to Fig. 5, with less broken away and with the vertically movable link carriage lowered; and Fig. 8 is a perspective view of the vertically movable link carriage.

The initial positioning arrangement, set forth in my aforesaid co-pending application, comprises a base 10, which is usually arranged in a slanting position, and a number of groups of strips extending longitudinally of the base 10 and set at right angles thereto so as to form troughs, each group comprising two outer strips 11 and an intermediate strip 12 which forms with the two outer strips troughs of sufficient width to receive a silent chain link 13 edgewise, the strips 12 terminating short of the upper end of the base 10, and the strips 11 being sufficiently wide apart at such upper end so as to receive between them a link lying flatwise on the bottom of the trough with its points toward one side or the other of the trough, but so narrow that it is necessary that the points be toward one side or the other. These wider troughs at the upper end of the base 10 abut against one another, so as to form single ridges between them, and the upper ends of these troughs are within a flaring-sided hopper 14 which directs into the upper ends of the troughs links thrown into the hopper in a haphazard mass. As the links slide down the troughs, they are tilted to an upright position with the points upward on one side or the other of the intermediate strips 12 by plow points which are provided at the upper end of such intermediate strips, so that in the lower part of the troughs formed by the strips 11 and 12 the links in all the troughs have their points upward, and the links in each trough are arranged end-to-end without overlapping.

The conveyer or slide rail, set forth in detail in the aforesaid co-pending Oakes application, is of a general inverted T-shaped cross section having an upright 20 and a base 21 projecting on either side of the upright, the upright 20 being of such height that when a link 13 is placed astride it with its points downward the points are very close to the base 21 but cannot both touch such base at the same time. The links will slide along this conveyer or slide rail in an upright position, and only in rare instances fall off; and the very few which do fall off will fall clear of the slide rail. This slide rail is also preferably placed at an angle, so that the links will slide along it by gravity; and in the complete apparatus shown in Fig. 1 is in a vertical plane at right angles to the vertical plane in which the base 10 lies.

The lower end of the initial positioning device discharges links into, and the final slide rail receives links from, the positioning device which is the particular subject-matter of the present invention. This comprises a head 30 in which are a number of arc-shaped grooves or chutes 31. These grooves or chutes 31 are of different radius; at their upper ends they register with and are tangent to the lower ends of the respective troughs formed by the strips 11 and 12; at their lower ends they come substantially tangent to the horizontal, and discharge just above the upper edge of the upright 20 of the slide rail, which upright is continued obliquely across the front face of the head 30. For convenience in manufacture, the head 30 is built up of a number of alternate wide plates 32 and narrow plates 33, held together by one or more bolts, the wide plates 32 having the grooves 31 machined in their lateral faces so that with the flat narrow plates 33 the grooves or chutes are completely closed save at their intake and discharge ends. The base 21 of the slide rail only extends to the head 30 and not across its front face, thus stopping short of the end of the upright 20; and at its upper end the base 21 is carried by a bent finger 22 projecting from the lower face of the head 30.

Slidably mounted on the front face of the head 30 is a vertically sliding plate 34, provided with a vertical guide slot 35 which cooperates with a screw 36 fixed in such front face. A plate 37 is fixed to the plate 34 but spaced therefrom by spacing blocks 38; the plate 37 at one end—the left in Fig. 5—being bent so as to bear against that end of the head 30 opposite the one from which the slide rail 20—21 projects and thus to serve as a guide. Fixed to the lower edge of the plate 37 is a vertically movable link carriage 39, which is shown in detail in Fig. 8. This link carriage is provided with a longitudinal slot 40 opening upward, and having a sliding fit on the upright 20 of the slide rail beyond the end of the base 21. The link carriage 39, the plate 37, and the lower edge of the plate 34 are oblique, and are parallel to the slide rail 20—21; and that end face of the link carriage 39 which is toward the slide rail is vertical and abuts against the end of the base 21 of the slide rail where such base is cut away. At about its middle, the link carriage 39 is provided with a horizontal slot 41, which receives an eccentric pin 42 carried by a disk 43 countersunk in the front face of the head 30 and fixed on the end of an operating shaft 44; so that by the rotation of the shaft 44 the link carriage 39, the plate 37, and the plate 34 are alternately raised and lowered along the front face of the head 30. When the link carriage 39 is raised, the oblique upper edges of its two arms 45 and 46 are at least as high as the upper edge of the upright 20 and substantially in line with the outer or lower surface of the lower ends of the arc-shaped grooves 31, as shown in Figs. 2, 4, and 5;

and when the link carriage 39 is lowered, the upper edges of its two arms 45 and 46 are substantially in alinement with the upper surfaces of the two sides of the base 21 of the slide rail, as shown in Figs. 3 and 7. The upper edge of the arm 45 is smooth, but is slightly concave so that at the slot 40 it is higher than the arm 46, and at the front face of the head 30 it comes flush with the outer or lower surface of the grooves 31 when the link carriage 39 is raised; so that a point of a link discharged from a groove or chute 31 on to the link carriage will not fall into the slot 40 but will be carried over such slot on to the upper edge of the arm 46. The upper edge of the arm 46, however, is transversely serrated, as clear from Fig. 8, so as to prevent premature sliding of the link points along it. The plates 33 have projecting tongues 47 at the lower ends of the groove 31, which tongues extend nearly across the link carriage 39, as clear from Figs. 2, 3, and 6; and short tongues 48 are set in the sides of the grooves 31 and similarly project part way across the link carriage 39, as clear from Figs. 4 and 6. These tongues 47 and 48 hold the links upright on the link carriage 39 when the latter is raised, as clear from Fig. 2; but the links pass out of engagement with these tongues when the link carriage is lowered, as clear from Fig. 3. The lower edge of the plate 34 is provided with slots 49 which register with the tongues 47 and 48, so as to allow the vertical movement of such plate 34 past such tongues. When the link carriage 39 and plate 34 are raised, the lower edge of the plate 34 is substantially flush with the inner or upper surface of the lower ends of the grooves 31, so as to uncover the lower ends of such grooves, as clear from Figs. 2 and 5; but when the link carriage 39 and plate 34 are lowered, the plate 34 extends down past the lower ends of the groove 31 and closes such lower ends to retain the links in the grooves, as clear from Figs. 3 and 7.

In operation, links are dropped haphazard into the hopper 14, falling into the broad ends of the troughs formed by the strips 11, are slid down such troughs, by gravity if the troughs are inclined, until they strike the plow points at the upper ends of the strips 12, are tilted by such plow points to bring the link points upward, and slide along the troughs formed by the strips 11 and 12 to the ends of such troughs, the links being positioned edgewise in these troughs with their points upward and the troughs being so narrow that the links can only be in this position and cannot overlap. The feeding of links into the hopper 14 is sufficiently rapid so as to maintain at all times a series of links arranged end-to-end with their points upward in each of the troughs formed by the strips 11 and 12.

The links from the troughs formed by the strips 11 and 12 slide into the arc-shaped grooves or chutes 31, which register with such troughs, and as they slide along such arc-shaped grooves they are inverted in position so as to bring their points downward, as clear from Figs. 2 and 3. Assume that the link carriage 39 and the plate 34 are in their lower positions, as shown in Fig. 3. The links pile up, end to end, in the grooves or chutes 31, which like the troughs 11—12 are of the proper size to receive the links edgewise and prevent them from overlapping. They are retained in the grooves or chutes 31 by the plate 34. By rotating the shaft 44, the eccentric pin 41 thereon raises the link carriage 39 and plate 34 from the lower position shown in Fig. 3 to the upper position shown in Fig. 2, so that the plate 34 uncovers the lower ends of the slots 31. Immediately on such uncovering, a link is forced out of the lower end of each groove or chute 31, by the weight of the links behind it, on to the link carriage 39, the concave upper edge of the arm 45 throwing the forward point of such link across the slot 40 on to the serrated upper edge of the arm 46, the serrations of which, coöperating with the tongues 47 and 48, hold the links upright. The links in this position are shown in Figs. 2 and 5. The crotches of the link thus forced out are now directly over the upright 20 of the slide rail. The plate 37 prevents the links which are forced out of the grooves or chutes 31 from being forced too far, and permits the forcing out of but a single link from each such groove. As the rotation of the shaft 44 continues, the eccentric pin 41 now carries the link carriage 39 and plate 34 downward, from the position shown in Fig. 2 to the position shown in Fig. 3. The plate 34 thus descends to cut off further egress of links from the grooves 31, and the links which were forced out when the link carriage was raised are dropped on to and astride of the upright 20 of the slide rail. The dropping of the link carriage 39 and the links thereon clears such links from the tongues 47 and 48, and the dropping is sufficient so that the link points are also cleared from the upper faces of the arms 45 and 46 of the link carriage. In consequence, the links now slide along the upright 20 by reason of the slant thereof, and pass from over the link carriage 39 to the complete slide rail including the upright 20 and the base 21. The links are carried along this slide rail to any desired place, or are allowed to pile up on such slide rail as desired.

The foregoing operation is repeated as the shaft 44 continues to rotate to raise and lower the link carriage 39, links being forced out from the grooves or chutes 31 on to the link carriage when the latter reaches its uppermost position and being allowed to slide

therefrom on to the side rail when the link carriage reaches its lowermost position.

I claim as my invention:

1. In combination, means for bringing a haphazard mass of crotched chain links into a definite plane in an end-to-end arrangement with their crotches all to one side, a slide rail, and means for receiving the links in an end-to-end arrangement from said first means and placing them astride said slide rail with their crotches in alinement.

2. In combination, means for bringing a haphazard mass of crotched chain links into a definite plane in an end-to-end arrangement with their crotches all to one side, a slide rail, and means reciprocating transversely of said slide rail and adapted alternately to receive links from said first means and to place said links astride said slide rail with their crotches in alinement.

3. In combination, means for delivering silent chain links in an end-to-end arrangement with their points all upward, a slide rail, and means for receiving links from said first means and inverting said links and depositing them in a side-by-side arrangement on said slide rail with their points downward.

4. In combination, means for delivering silent chain links in an end-to-end arrangement with their points all upward, a slide rail, and means reciprocating transversely of said slide rail and adapted alternately to receive links from said first means and to place said links astride said slide rail with their points downward.

5. In combination, means for delivering crotched chain links in an end-to-end arrangement with their crotches all to one side, a conveyer adapted to support the links in a side-by-side arrangement with their crotches in alinement, and means for receiving the links from said first means in said end-to-end arrangement and placing them on said conveyer in said side-by-side arrangement.

6. In combination, means for delivering crotched chain links in an end-to-end arrangement with their crotches all to one side, a conveyer adapted to support the links in a side-by-side arrangement with their crotches in alinement, and means reciprocating transversely of said conveyer and adapted alternately to receive links from said first means and to place said links on said conveyer in said side-by-side arrangement.

7. In combination, a slide rail adapted to receive crotched chain links astride it, a vertically moving link carriage having two parts on the two sides of said slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link resting thereon touches the slide rail, a link chute discharging links on to said link carriage transversely to said slide rail and with their crotches downward, and means for permitting discharge of said links from said chute on to said carriage when the latter is elevated and for preventing such discharge at other times.

8. In combination, a slide rail adapted to receive crotched chain links astride it, a vertically moving link carriage having two parts on the two sides of said slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link resting thereon touches the slide rail, a link chute discharging links on to said link carriage transversely to said slide rail and with their crotches downward, means for permitting discharge of said links from said chute on to said carriage when the latter is elevated and for preventing such discharge at other times, and means preventing more than one link at a time from being discharged from said chute.

9. In combination, a slide rail adapted to receive crotched chain links astride it, a vertically moving link carriage having two parts on the two sides of said slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link resting thereon touches the slide rail, a link chute discharging links on to said link carriage transversely to said slide rail and with their crotches downward, and means for permitting discharge of said links from said chute on to said carriage when the latter is elevated and for preventing such discharge at other times, said chute being of such dimensions that it receives links end-to-end but prevents them from overlapping.

10. In combination, a slide rail adapted to receive silent chain links astride it, a vertically moving link carriage having two parts on the two sides of said slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link having its two points resting thereon touches the slide rail, a link chute discharging links on to said link carriage transversely to said slide rail and with their points downward, means for permitting discharge of said links from said chute on to said carriage when the latter is elevated and for preventing such discharge at other times, said chute being of such dimensions that it receives links end-to-end but prevents them from overlapping and being curved so that at its lower end it discharges links on to said

carriage with their points downward and at its upper end it receives links with their points upward, and means for feeding links into the upper end of said chute with the link points upward.

11. In combination, a slide rail adapted to receive silent chain links astride it, a vertically moving link carriage having two parts on the two sides of said slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link having its two points resting thereon touches the slide rail, a link chute discharging links on to said link carriage transversely to said slide rail and with their points downward, and means for permitting discharge of said links from said chute on to said carriage when the latter is elevated and for preventing such discharge at other times, said chute being curved so that at its lower end it discharges links on to said carriage with their points downward and at its upper end it receives links with their points upward.

12. In combination, a slide rail adapted to receive silent chain links astride it, a vertically moving link carriage having two parts on the two sides of said slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link having its two points resting thereon touches the slide rail, a link chute discharging links on to said link carriage transversely to said slide rail and with their points downward, means for permitting discharge of said links from said chute on to said carriage when the latter is elevated and for preventing such discharge at other times, said chute being curved so that at its lower end it discharges links on to said carriage with their points downward and at its upper end it receives links with their points upward, and means for feeding into the upper end of said chute links in an end-to-end arrangement with their points upward.

13. In combination, a slide rail adapted to receive crotched chain links astride it, a vertically moving link carriage having two parts on the two sides of the slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link resting thereon touches the slide rail, said slide rail and the upper ends of said link carriage parts being inclined correspondingly longitudinally of the slide rail, a plurality of link chutes discharging links on to said link carriage transversely to said slide rail at different points therealong with the crotches of the links downward, the discharge ends of said link chutes being arranged at different heights corresponding to the slant of said link carriage, and means for permitting discharge of said links from said chutes on to said carriage when the latter is elevated and for preventing it at other times.

14. In combination a slide rail adapted to receive crotched chain links astride it, a vertically moving link carriage having two parts on the two sides of the slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link resting thereon touches the slide rail, a plurality of link chutes discharging links on to said link carriage transversely to said slide rail at different points therealong with the crotches of the links downward, and means for permitting discharge of said links from said chutes on to said carriage when the latter is elevated and for preventing it at other times.

15. In combination, a slide rail adapted to receive silent chain links astride it, a vertically moving link carriage having two parts on the two sides of the slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link having its two points resting thereon touches the slide rail, said slide rail and the upper ends of said link carriage parts being inclined correspondingly longitudinally of the slide rail, a plurality of link chutes discharging links on to said link carriage transversely to said slide rail at different points therealong with the points of the links downward, the discharge ends of said link chutes being arranged at different heights corresponding to the slant of said link carriage, and means for permitting discharge of said links from said chutes on to said carriage when the latter is elevated and for preventing it at other times, said chutes being curved so that at their lower ends they discharge links on to said carriage with the link points downward and at their upper ends they receive links with the link points upward.

16. In combination, a slide rail adapted to receive silent chain links astride it, a vertically moving link carriage having two parts on the two sides of the slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link having its two points resting thereon touches the slide rail, a plurality of link chutes discharging links on to said link carriage transversely to said slide rail at different points therealong with the points of

the links downward, and means for permitting discharge of said links from said chutes on to said carriage when the latter is elevated and for preventing it at other times, said chutes being curved so that at their lower ends they discharge links on to said carriage with the link points downward and at their upper ends they receive links with the link points upward.

17. In combination, a slide rail adapted to receive silent chain links astride it, a vertically moving link carriage having two parts on the two sides of the slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link having its two points resting thereon touches the slide rail, said slide rail and the upper ends of said link carriage parts being inclined correspondingly longitudinally of the slide rail, a plurality of link chutes discharging links on to said link carriage transversely to said slide rail at different points therealong with the points of the links downward, the discharge ends of said link chutes being arranged at different heights corresponding to the slant of said link carriage, means for permitting discharge of said links from said chutes on to said carriage when the latter is elevated and for preventing it at other times, said chutes being curved so that at their lower ends they discharge links on to said carriage with the link points downward and at their upper ends they receive links with the link points upward, and means for feeding links into the upper end of each of said chutes with the links in an end-to-end arrangement with their points upward.

18. In combination, a slide rail adapted to receive silent chains astride it, a vertically moving link carriage having two parts on the two sides of the slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link having its two points resting thereon touches the slide rail, a plurality of link chutes discharging links on to said link carriage transversely to said slide rail at different points therealong with the points of the links downward, means for permitting discharge of said links from said chutes on to said carriage when the latter is elevated and for preventing it at other times, said chutes being curved so that at their lower ends they discharge links on to said carriage with the link points downward and at their upper ends they receive links with the link points upward, and means for feeding links into the upper end of each of said chutes with the links in an end-to-end arrangement with their points upward.

19. In combination, a slide rail adapted to receive silent chain links astride it, a vertically moving link carriage having two parts on the two sides of the slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link having its two points resting thereon touches the slide rail, said slide rail and the upper ends of said link carriage parts being inclined correspondingly longitudinally of the slide rail, a plurality of link chutes discharging links on to said link carriage transversely to said slide rail at different points therealong with the points of the links downward, the discharge ends of said link chutes being arranged at different heights corresponding to the slant of said link carriage, means for permitting discharge of said links from said chutes on to said carriage when the latter is elevated and for preventing it at other times, each of said link chutes being of such dimensions that it receives links end-to-end but prevents them from overlapping and being curved so that at its lower end it discharges links on to said carriage with their points downward and at its upper end it receives links with their points upward, and means for feeding links into the upper ends of said chutes with the link points upward, the curvature of said chutes being different, so that their intake ends are in a substantially horizontal line and their discharge ends are in an oblique line corresponding to the slant of said slide rail.

20. In combination, a slide rail adapted to receive silent chain links astride it, a vertically moving link carriage having two parts on the two sides of the slide rail respectively and moving between a position where the upper ends of said parts are as high as the top of the slide rail and a position where such upper ends are so low that the crotch of a link having its two points resting therein touches the slide rail, said slide rail and the upper ends of said link carriage parts being inclined correspondingly longitudinally of the slide rail, a plurality of link chutes discharging links on to said link carriage transversely to said slide rail at different points therealong with the points of the links downward, the discharge ends of said link chutes being arranged at different heights corresponding to the slant of said link carriage, and means for permitting discharge of said links from said chute on to said carriage when the latter is elevated and for preventing it at other times, said chutes being curved so that at their lower ends they discharge links on to said carriage with the link points downward and at their upper ends they receive links with the link points upward, the curvature of said chutes being

different, so that their intake ends are in a substantially horizontal line and their discharge ends are in an oblique line corresponding to the slant of said slide rail.

21. In combination, means for delivering crotched links in an end-to-end arrangement with their crotches all to one side, a slide rail, and means for receiving the links in the end-to-end arrangement from said first means and placing them astride said slide rail with their crotches in alinement.

22. In combination, means for delivering crotched links in an end-to-end arrangement with their crotches all to one side, a slide rail, and means reciprocating transversely to said slide rail and adapted alternately to receive links from said first means and to place said links astride said slide rail with their crotches in alinement.

23. In a device for handling crotched members, a support for said members in end-to-end relationship, and a second support for the reception of said members in side-by-side relationship, said first support discharging links singly onto said second support.

24. In a device for handling crotched members, a support for said members in end-to-end relationship, and a second support for the reception of said members in side-by-side relationship, said two supports being arranged in transverse planes and said first support discharging links singly onto said second support.

25. In a device for handling crotched members, a support for said members in end-to-end relationship, a second support for the reception of said members in side-by-side relationship, and discharge mechanism receiving links from said first support and depositing them on said second support.

26. In a device for handling crotched members, a support for said members in end-to-end relationship, and a second support for the reception of said members in side-by-side relationship, said second support being arranged transversely to the line of links on said first support, and said first support being cut away so as to discharge links on to said second support laterally of the line of links on the first support.

27. In a device for handling crotched members, a support for said members in end-to-end relationship, a second support for the reception of said members in side-by-side relationship, said second support being arranged transversely to the line of links on said first support, and discharge mechanism receiving links from said first support and discharging them on to said second support laterally of the line of links on the first support.

In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 21st day of April, A. D., one thousand nine hundred and sixteen.

HENRY E. HAYWARD.

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