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Klusmier et al.

[11] **3,837,465**

[45] **Sept. 24, 1974**

[54] **ASSEMBLY AND TRANSFER APPARATUS**

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[73] Assignee: **Morgan Construction Company,** Worcester, Mass.

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[52] **U.S. Cl.** ..... **198/27,** 100/18, 214/1 BD, 214/1 P, 214/6 H

[51] **Int. Cl.** **B65g 47/08**

[58] **Field of Search** ..... 198/27; 214/6 H, 1 BD, 214/1 P; 100/18

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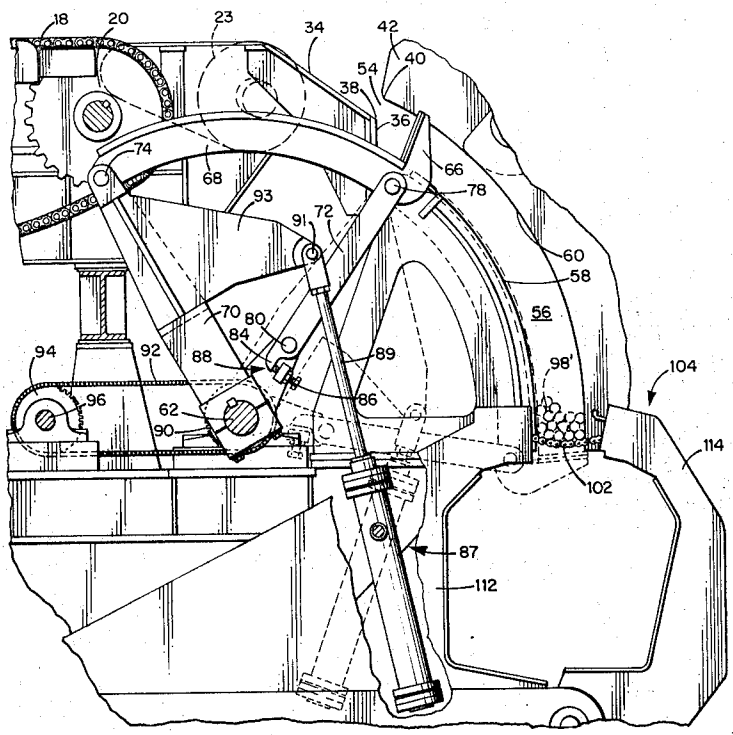
Attorney, Agent, or Firm—Thompson, Birch, Gauthier & Samuels

[57] **ABSTRACT**

An apparatus for laterally receiving elongated elements at an upper first location, for assembling the elements thus received, and for transferring the assembled elements downwardly to a lower second location. The apparatus includes a pair of spaced opposed guide surfaces defining an assembly and transfer zone which extends downwardly from the upper to the lower of the aforesaid locations. Carrier members protrude into and are movable along the length of the zone. Elongated elements are fed laterally, and preferably although not necessarily singly, into the zone through an inlet at the upper location. The elements are initially retained adjacent to the inlet and against the carrier members and are thus assembled at the upper end of the zone. The carrier members are moved downwardly along the length of the zone, initially for the purpose of accommodating the entry of elements into the zone during the assembly thereof, and thereafter to carry the assembled elements to the lower second location. The invention further includes apparatus for receiving the assembled elements at the second location, for carrying the same laterally to a third location where the elements are strapped into a dense bundle, and then to a fourth location where the bundle is delivered to other handling apparatus.

16 Claims, 7 Drawing Figures



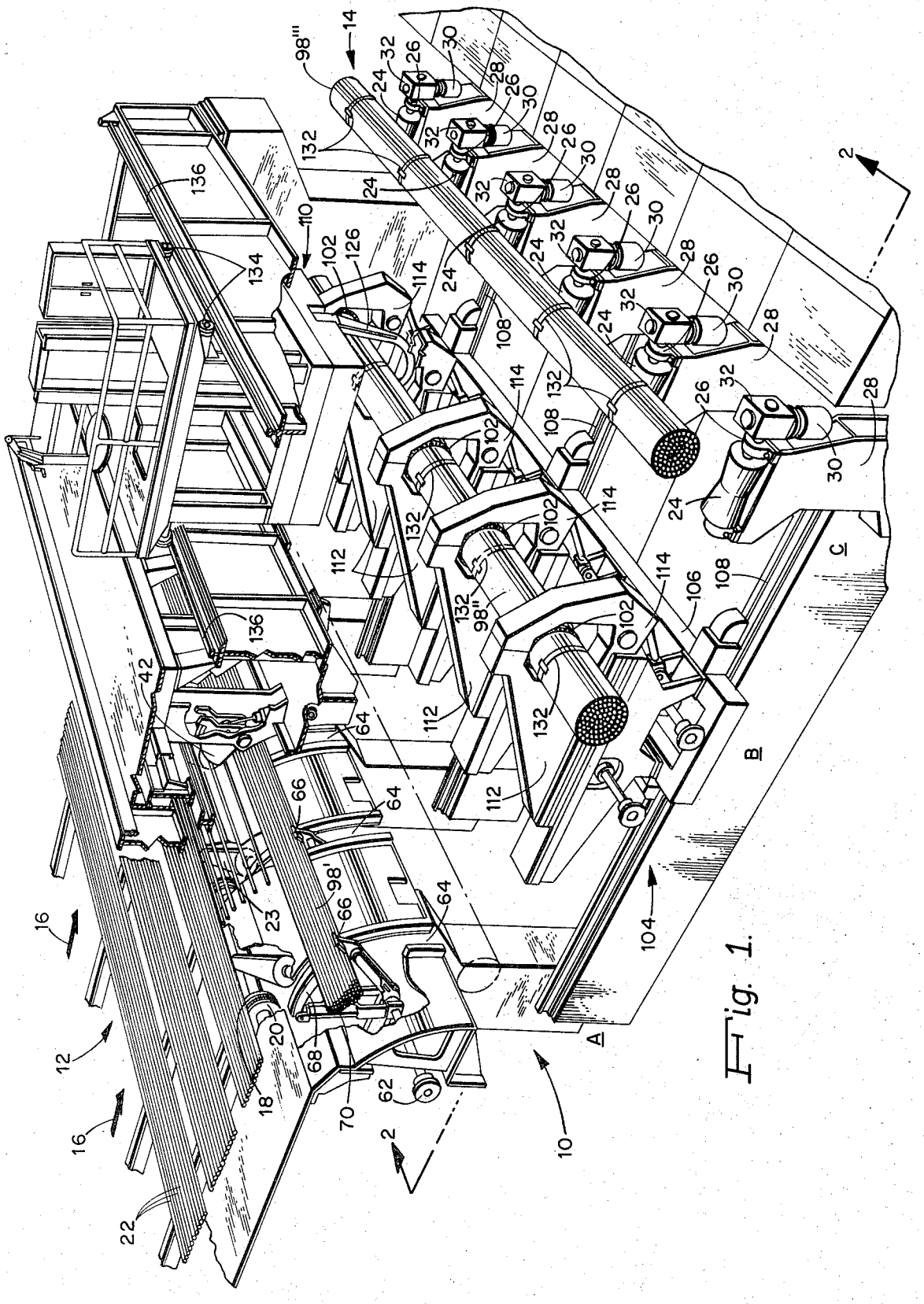

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Fig. 1.

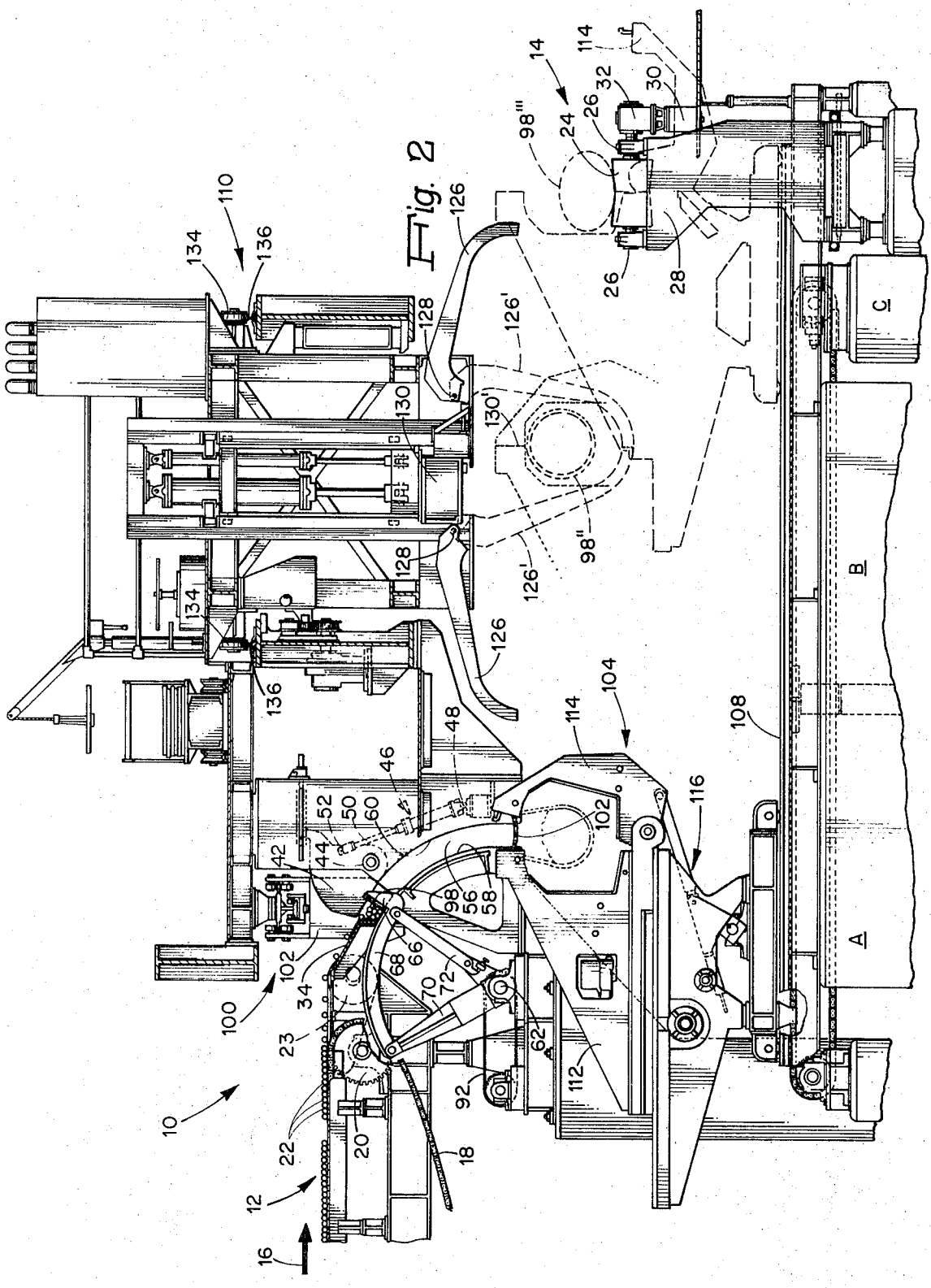

Fig. 2

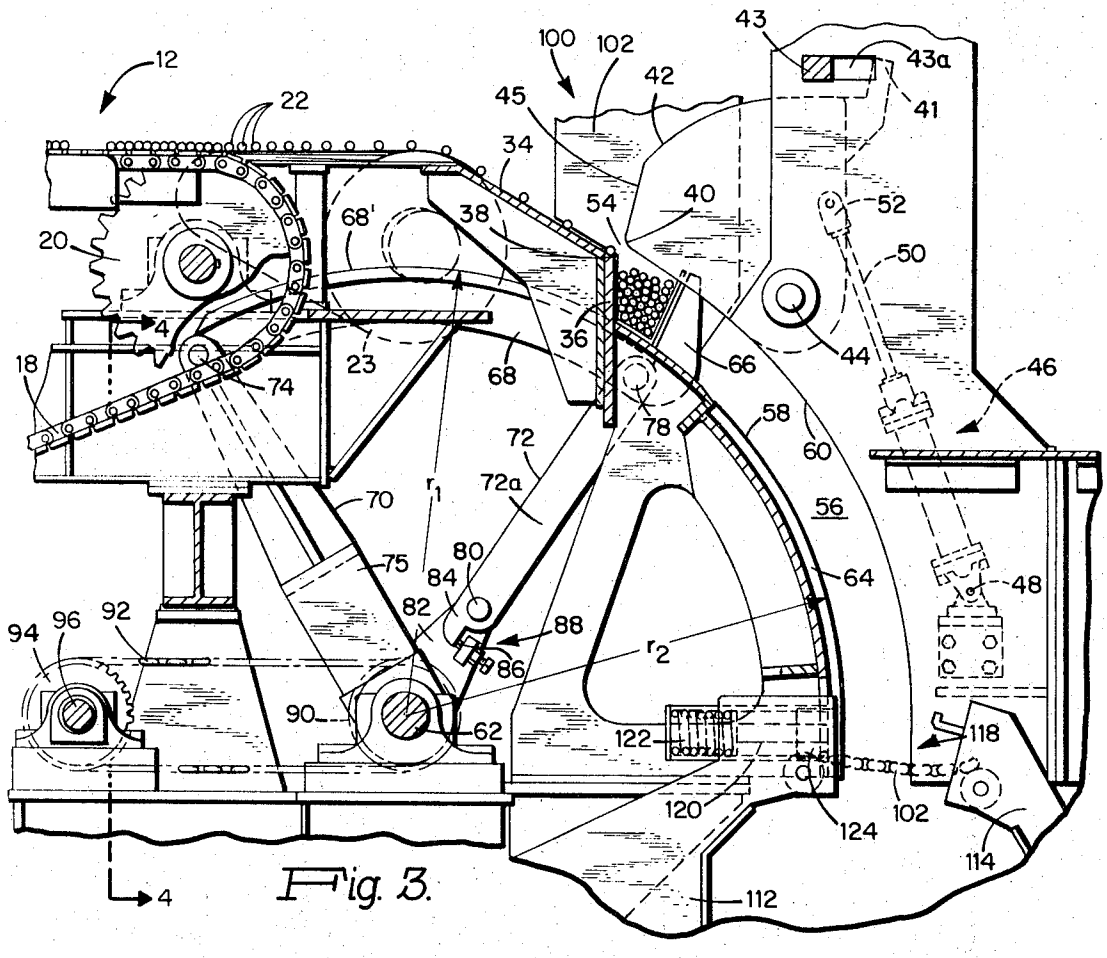
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Fig. 3.

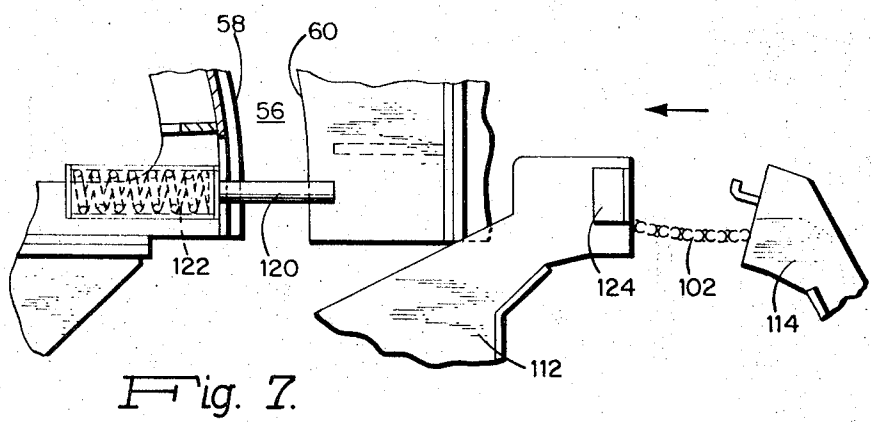
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Fig. 7.

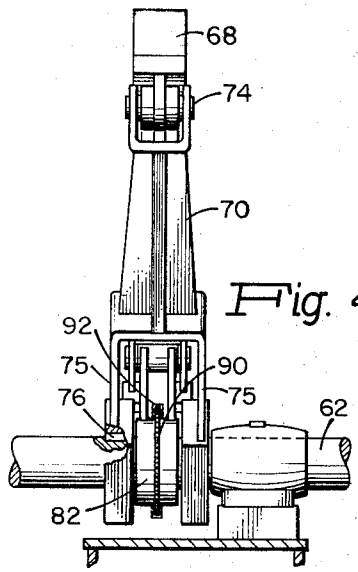

Fig. 4.

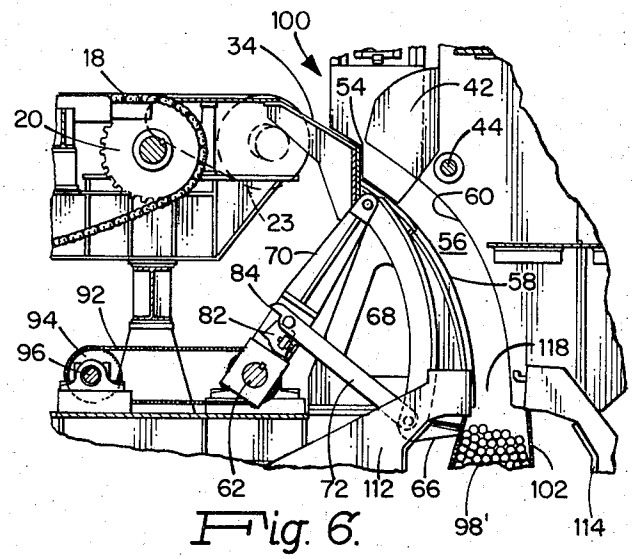

Fig. 6.

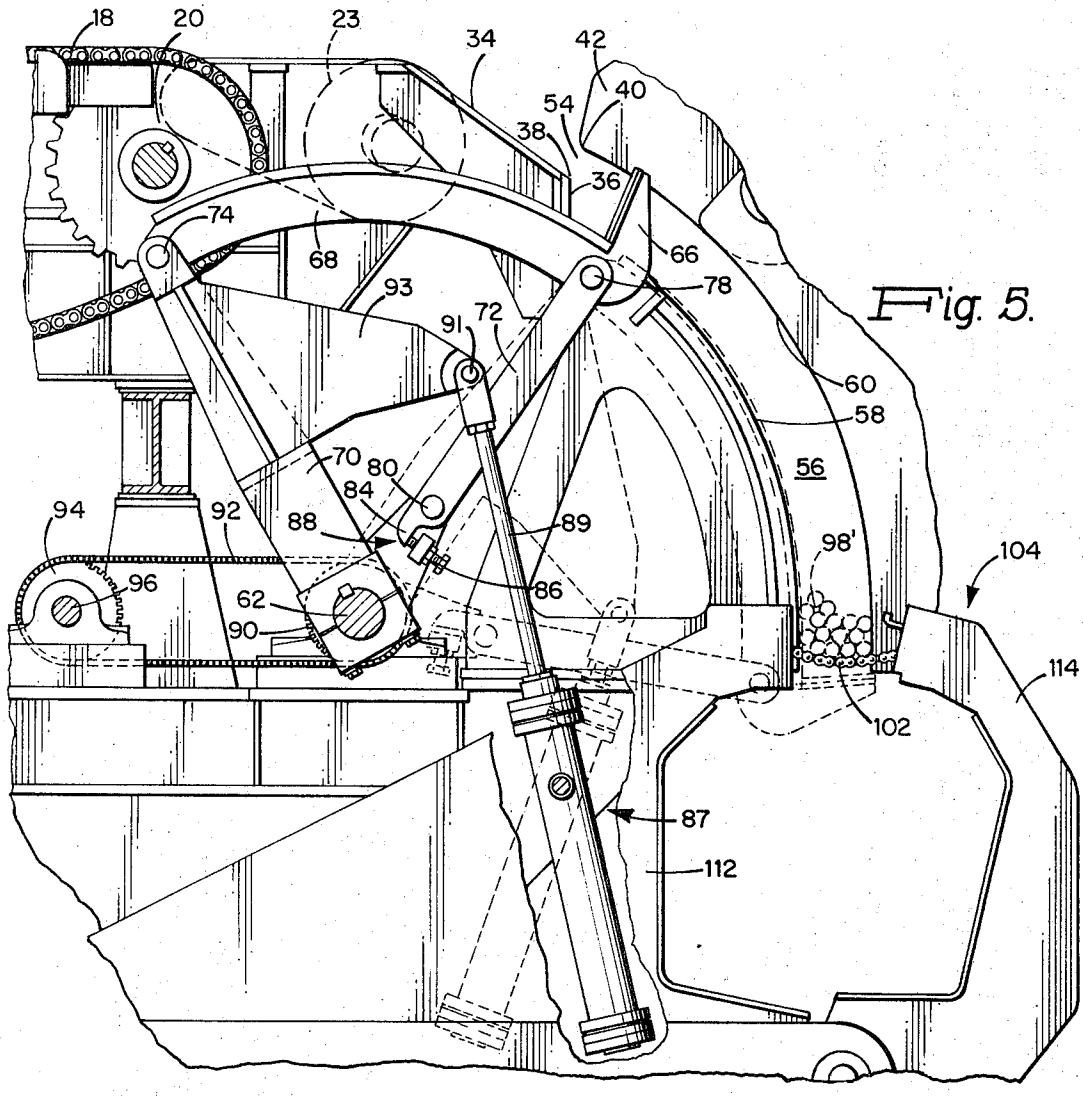

Fig. 5.

ASSEMBLY AND TRANSFER APPARATUS

DESCRIPTION OF THE INVENTION

This invention relates generally to the art of material handling, and is concerned in particular with a novel and improved apparatus for handling elongated elements, for example, bars and the like produced by a rolling mill.

In situations where elongated elements are assembled at one location and then transferred to another location for tieing or strapping into dense bundles, care must be taken to prevent the individual elements from becoming cocked at an angle relative to each other (commonly referred to as "jackstrawing") or from twisting about the longitudinal axis of the assembly (commonly referred to as "cabling"). Where a jackstrawing and/or cabling condition exists, the cocked or twisted elements may be bent or distorted by the pressure applied during the tieing or strapping operation. The cabled elements will also be difficult to extracate from the remaining elements in the bundle after the restraining straps have been cut.

The piror art devices which have heretofore been developed for assembling and transferring elongated elements have not solved the foregoing problems to the satisfaction of those skilled in the art. This is due primarily to the failure of such prior art devices to maintain adequate control over the elongated elements during the initial assembly and subsequent transfer thereof to the tieing or strapping station. For example, where elements are fed more or less haphazardly into an assembly zone, jackstrawing is likely to result. Also, where the assembled elements are allowed to move uncontrollably relative to each other during the transfer thereof to the tieing or strapping station, cabling is likely to result. Where either or both of these conditions prevails, the resulting bundles are inferior and likely to be the source of customer complaints.

It is, accordingly, an object of the present invention to provide an improved apparatus which operates to receive elongated elements at one location, to assemble the elements and to thereafter transfer the assembled elements to another location, while maintaining the elements in parallel alignment, thus avoiding any undesirable cabling or jackstrawing. To this end, the apparatus includes spaced opposed guide surfaces which define an assembly and transfer zone therebetween extending downwardly from an upper location to a lower location. Carrier members protrude into and are movable along the length of the zone. Elongated elements are fed laterally, and preferably although not necessarily singly, in a controlled manner, into the zone through an inlet at the upper location. The inlet is designed so as to prevent the bars from cocking as they enter the zone. The elements are initially retained and assembled against the carrier members at a location adjacent to the inlet at the upper end of the zone. An operating means is provided for moving the carrier members downwardly along the length of the zone, this downward movement occurring initially for the purpose of accommodating the entry of elements into the zone during the assembly thereof, and thereafter to carry the assembled elements to the lower location. The cooperative relationship of the carrier members and the opposed guide surfaces is such as to maintain the elements in parallel alignment and further to prevent or at least substantially minimize the tendency of the elements to roll, twist or move laterally in relation to each other. Accordingly, cabling or jackstrawing is effectively avoided. The carrier members are removed from the zone at the lower location to thus deposit the assembled elements onto a separately operable transfer device which carries the assembled elements laterally to a third location at which the elements are tied or strapped into dense bundles, and then on to a fourth station where the bundles are delivered to other material handling apparatus.

Other objects of the present invention include the provision of an apparatus of the above-described type which is capable of operating substantially automatically with minimum attention required by operating personnel, and which is easily adaptable to a wide range of product types and sizes.

These and other objects and advantages of the present invention will become more apparent as the description proceeds with the aid of the accompanying drawings, wherein:

FIG. **1** is a schematic view in perspective of a material handling apparatus embodying the concepts of the present invention;

FIG. **2** is a view of the apparatus taken generally along lines **2—2** of FIG. **1**;

FIG. **3** is an enlarged view of a portion of the apparatus shown in FIG. **2**;

FIG. **4** is a sectional view taken along lines **4—4** of FIG. **3**, with certain portions of the supporting framework omitted;

FIG. **5** is a view similar to FIG. **3**, but at a different section along the apparatus in order to show the means employed to rotate the drive shaft which operates to move the carrier members along the assembly and transfer zone;

FIG. **6** is a view similar to FIG. **3** on a reduced scale showing the carrier members retracted from the assembly and transfer zone; and,

FIG. **7** is a view on an enlarged scale showing the safety pins located at the bottom of the assembly and transfer zone.

Referring now to the drawings wherein like numbers designate the same components throughout the several views, and with initial reference to FIGS. **1** and **2**, there is generally indicated at **10** an apparatus embodying the concepts of the present invention. The apparatus is shown positioned between an element transfer table **12** and a bundle conveyor **14**. The transfer table **12** receives elongated elements which have previously been cut to length by a shear (not shown) and transfers the elements laterally in a direction indicated by the arrows **16** in FIGS. **1** and **2**. As herein shown, the table consists essentially of a plurality of driven transfer chains **18** running over sprocket wheels **20**. The elongated elements, which are herein shown for illustrative purposes as comprising round bars **22**, are deposited on the chains **18** in groups or batches, which in a bar mill, may conveniently consist of a billet length of product. As the elongated elements **22** reach the ends of the conveyor chains **18**, they are received on driven truncated conical separating rolls **23** which accelerate the lateral movement of the elements and thus produce a lateral spacing therebetween.

The bundle conveyor **14** consists of a plurality of aligned rollers **24**, each of which is supported between bearings **26** on a pedestal **28**, with each roller **24** conve-

niently being driven by a separate drive which includes a motor **30** and pinion gear assembly **32.**

As is best shown in FIGS. **3** and **4,** the apparatus **10** includes a downwardly sloping ramp **34,** the upper end of which is positioned to receive elongated elements **22** from the separating rolls **23.** The lower end of the ramp **34** cooperates with a vertically depending plate **36** to form a shoulder **38** which is opposed at selected points along the apparatus by other shoulders **40** on members **42.** Each of the members **42** is pivotally mounted on a shaft **44,** and each is pivotally adjusted by means of a piston-cylinder unit **46,** the latter being pivotally supported as at **48** and having its extensible piston rod **50** connected to the members **42** as at **52.** Extension or retraction of the piston rods **50** causes the members **42** to rotate about the shaft **44,** thereby adjusting the width of an inlet opening **54** defined between the shoulders **38** and **40.**

As is best shown in FIG. **3,** members **42** are each further provided with a nose **41** which abuts a common adjustable draw bar **43** having wedged-shaped stops **43***a* thereon. The noses **41** contact the stops **43***a*, thus insuring that all members **42** are adjusted to the same position by operation of the individual piston-cylinder units **46.** The members **42** are also provided with forward edges **45** which extend upwardly from the shoulders **40** and which are inclined oppositely to the ramp **34,** thereby cooperating with the ramp to define a V-shaped entry notch for the elements enterring the zone **56** through opening **54.**

The inlet opening **54** communicates with the upper end of an assemlby and transfer zone **56** which is defined by oppositely disposed guide surfaces **58** and **60.** Preferably, the guide surfaces **58** and **60** are equally spaced from each other, and both extend arcuately about a common axis along which extends a drive shaft **62.** The inner guide surface **58** is slotted as at **64** (See FIG. **1**) at suitable intervals along the length of the apparatus to accommodate carrier members **66** which when operatively positioned as shown in FIG. **3,** protrude through the slots **64** into and across the assembly and transfer zone **56.**

Each carrier member **66** is carried on one end of an arcuate link **68** which is in turn supported by an arm **70** and another angularly extending collapsable arm assembly **72.** The upper end of arm **70** is pivotally connected to the arcuate link **68** as at **74,** while its lower end is made up of two laterally spaced legs **75** (see FIG. **4**) keyed as at **76** to the drive shaft **62.** The arm assembly **72** is made up of a link **72***a* which is pivotally connected at one end as at **78** to the arcuate link **68,** and at the other end as at **80** to a relatively short radially exending arm on a collar **82** which is rotatably mounted on shaft **62** between the legs **75** of arm **70.** The link **72***a* is additionally provided at its lower end with a nose **84** which cooperates with an adjustable stop **86** on the collar **82** to form a toggle joint generally indicated at **88.** As is best shown in FIG. **4,** the collar **82** is additionally provided with sprocket teeth **90** which are engaged by a chian **92,** the latter also running over a sprocket wheel **94** keyed to another drive shaft **96.** The shaft **96** is rotatable in opposite directions under the influence of conventional means (not shown). As is best shown in FIG. **5,** the shaft **62** is rotatable in opposite directions under the influence of a piston-cylinder unit **87,** the extensible piston rod **89** of which is pivotally connected as at **91** to an arm **93** extending laterally from one of the arms **70.** Although only one such drive arrangement has been shown in the drawings, it will be understood that several may be employed at spaced locations along the length of the apparatus.

The apparatus thus far described operates in the following manner; initially, the carrier members **66** are positioned as shown in FIGS. **2, 3** and **5.** This is accomplished by rotating both the drive shaft **62** and the collars **82** in a counterclockwise direction as viewed in the drawings, thereby positioning the arms **70** and **72** and the arcuate links **68** at the extreme left end of their travel, with the toggle joints **88** closed to fully extend the arms **72.** The members **42** are also adjusted through operation of the piston-cylinder units **46** to adjust the width of inlet opening **54** so as to control the lateral feeding of elongated elements **22** therethrough into the upper end of the assembly and transfer zone **56.** The transfer chains **18** and the separating rolls **23** are then operated to deliver elements **22** laterally to the downwardly sloping ramp **34.** The elements roll or slide (depending on their cross-section) down the ramp **34** and enter through the inlet opening **54** into the zone **56** where they are assembled against the carrier members **66** and between the opposed arcuate guide surfaces **58** and **60** at a location indicated generally at **98** in FIG. **2.**

The cooperative guiding action of the shoulders **38** and **40** serves to prevent the elements from cocking or jackstrawing as they pass singly through the opening **54.** At this point, it might also be appropriate to mention that as the elements **22** move laterally down the ramp **34** and into the upper end of the zone **56** to assemble at **98,** their ends are aligned by an end alignment apparatus only partially shown and generally indicated at **100.** This apparatus, which includes opposed face plates **102** operating in a reciprocating manner to push the end of the elements into lateral alignment, is described and claimed in a separate application Ser. No. 346,640 which is being filed concurrently herewith and which is assigned to the same assignee as that of the present application.

The carrier members **66** are gradually moved away from the vertical end plate **36** by rotation in a clockwise direction of both the drive shaft **62** and collars **82,** thereby providing an increasing space for additional elements as they are received in the zone **56.** Rotation of the shaft **62** is accomplished through the piston-cylinder unit **87** shown in FIG. **5,** and rotation of the collars **82** is accomplished by rotation of drive shaft **96** and the sprocket wheels **94** keyed thereto, the latter in turn acting through the chains **92.**

The arrangement and operation of the components which contribute to the continued confinement and transfer of the elements along the assembly and transfer zone **56** will now be described. As indicated diagrammatically in FIG. **3,** the radial distance r_1 between the arcuate outer edge **68'** of link **68** and the rotational axis of drive shaft **62** is slightly greater than the radial distance r_2 between the inner guide surface **58** and the same rotational axis. Thus, as the carrier members **66** move in a clockwise direction away from the vertical end plate **36** and down the zone **56,** the outer edges **68'** of the arcuate links **66** will protrude slightly into the zone **56** through slots **64.** Accordingly, it will be seen that during the initial movement of the assembled elements **98** along zone **56,** the elements will in effect be carried by a series of aligned moving notches defined

by the outer edges 68' of the arcuate links 68 and the carrier members 66. This will avoid any tendency that the elements might otherwise have to roll, slide or shift laterally in relation to each other if they were being allowed to roll or slide down a stationary guide surface, and hence jackstrawing or cabling of the elements is prevented.

As the carrier members 66 move progressively further along the zone 56, the confining action of the outer guide surface 60 will gradually become effective in opposed cooperative relationship with the outer edges 68' of the arcuate links 68. This confining action will essentially be radial, and since the guide surface 60 is spaced equally from and parallel to the edges 68', the combined effect will be a continued confinement of the moving assemlby of elements 98 without changing the effective cross-section of the assembly, which in turn maintains the parallel "as placed" relationship of the elements, thus avoiding jackstrawing or cocking.

As soon as a selected number of elements have been accumulated at 98 at the upper end of zone 56, operation of the transfer chains 18 is temporarily interrupted. Rotation of drive shaft 62 and the collars 88 continues, however, until the combination of the carrier members 66, arcuate links 68 and the arms 70 and 72 are located in the positions indicated in dotted in FIG. 5. At this stage, although the assembled elements which have now been transferred to the position indicated in dotted at 98' are still confined between the outer edges 68' of the arcuate links 68 and the outer guide surface 60, the carrier members have dropped away from the elements 98' and the latter are now supported on the laterally extending restraining chains 102 of a transfer apparatus generally indicated at 104. The transfer apparatus 104 is described and claimed in another separate application which is also being filed concurrently herewith, and which is also assigned to the same assignee as that of the present invention.

The transfer apparatus 104 extends the length of the apparatus and is comprised basically of a carriage assembly 106 which is mounted for movement laterally along rails 108 between a receiving station A underlying the bottom end of zone 56, a strapping station B underlying a strapping apparatus generally indicated at 110, and a delivery station C adjacent to one side of the bundle conveyor 14. The transfer apparatus 104 includes a plurality of fixed arms 112 extending upwardly from the carriage assemlby 106, and a plurality of cooperatively arranged pivotal arms 114 also carried by the carriage assembly 106 and operated by linkage arrangement generally indicated in FIG. 2 at 116. Each set of arms 112 and 114 has one of the previously mentioned chains 102 extending therebetween. The chains 102 run over sprockets wheels (not shown) carried by the arms 112 and 114, and the ends of the chains are connected to an operating mechanism (not shown) which operates to either slacken or tighten the chains.

When the transfer apparatus 104 is at the receiving station A, as indicated by the solid lines in FIG. 2, the pivotal arms 114 are opened slightly to define a gap 118 across which the chains 102 extend. Thus as previously indicated, when the carrier members 66 are lowered to the positions shown in dotted in FIG. 5, the elements 98' are deposited on the chains 102. Thereafter, the drive shaft 96 is rotated in a counterclockwise direction while maintaining the drive shaft 62 stationary. This causes the collars 82 to rotate in a counterclockwise direction relative to the drive shaft 62, thereby breaking the toggle joints 88 and causing the arms 72 to collapse with the result that the carrier members 66 are retracted from beneath the bottom end of the zone 56. Once this has been accomplished, and the apparatus is in the condition shown in FIG. 6, the chains 102 are slackened to form slings into which the assembled elements 98' descend between the arms 112 and 114 of the transfer apparatus 104.

As this is occurring, the carrier members 66 are returned to their initial operating positions as shown in FIGS. 2, 3 and 5. This is accomplished by rotating the drive shaft 62 in a counterclockwise direction while also operating drive shaft 96 to rotate th collars 82 in the same direction. This maintains the arms 72 in a collapsed condition and thus causes the carrier members 66 to be pivotally raised in an arc about shaft 62 along a path outside of zone 56. Once the arms 72 have been returned to the positions shown in FIG. 3, the drive shaft 96 is rotated in a clockwise direction to readjust the collars 82 to the positions shown in FIG. 3, thereby closing the toggle joints 88 and again extending the arms 72 with the result that the carrier members are reinserted in the zone 56. Once this has been accomplished, operation of the transfer chains 18 is continued and assembly of the next batch of elements is begun.

After the assembled elements 98' have been received by the transfer apparatus 104, the latter is shifted laterally along rails 108 to station B underlying the strapping apparatus 110. With reference to FIGS. 3 and 7, it will be seen that axially movable pins 120 are located at the bottom end of zone 56. The pins are urged towards the outer guide surface 60 by means of springs 122. When the transfer apparatus 104 is at station A, the pins are engaged by brackets 124 on the fixed arms 112 and thus held in a retracted position as shown in FIG. 3. As the transfer apparatus 104 moves laterally away from station A towards station B, the pins follow brackets 124 until they are operatively extended as shown in FIG. 7. The pins 120 provide a safety measure which insures that the bottom end of zone 56 is always closed when the transfer apparatus is at a station other than station A.

As the transfer apparatus 104 moves to station B, the arms 114 are closed and latched, and the chains 102 are tightened to form the collected elements into a densely packed bundle, as indicated in dotted at 98'' in FIG. 2. Cooperating pairs of strap guides 126, which are pivotally mounted as at 128, are then lowered to their operative positions as indicated in dotted at 126' in FIG. 2. Strapping heads 130 are also lowered to their operative positions indicated in dotted at 130'. The strapping heads 130 cooperate in a known manner with the strap guides 126 to encircle the elements 98'' with retaining straps 132 which are tightened, crimped and cut. The entire strapping apparatus 110 is movable on wheels 134 along rails 136 and may thus be moved lengthwise in relation to the elements 98'' to apply as many straps are required. Once this has been accomplished, and the strapping heads 130 and strap guides 126 have been returned to their raised inoperative positions as shown by the solid lines in FIG. 2, the transfer apparatus 104 is shifted laterally to station C. The chains 102 are loosened, and the arms 114 are pivoted downwardly as shown at 114', thereby depositing the strapped bundles 98''' on bundle transfer table 14. The

driven rollers **24** are then actuated to axially remove the bundle **98'''** to another location, which the transfer apparatus **104** is returning to station A to receive the next batch of assembled elements.

In light of the foregoing description, it will now be appreciated by those skilled in the art that the present invention embodies a unique combination of advantageous features not available in known prior art constructions. For example, the cooperative action of the adjustable inlet **54,** the carrier members **66,** the arcuate links **68** associated therewith, and the guide surfaces **58** and **60** which define the assembly and transfer zone **56** serve to initially assemble the elongated elements **22** and to thereafter transfer the assembled elements downwardly in a controlled manner which avoids jackstrawing or cabling. The transfer apparatus **104** thereafter operates to carry the assembled elements through a strapping operation and then on to the bundle conveyor **14** without disturbing the axial alignment of the assembled elements. The members **42** may be pivotally opened to provide access to the elements being accumulated in zone **56,** and also to clear the way for adjustment of the spacing between the face plates **102** of the end alignment apparatus **100.** The entire operation may be operated remotely, and if desired, automatically, with a minimum of attention by operating personnel. A wide range of types and sizes of products may be handled, and bundles of varying sizes and weights may be produced.

It is our intention to cover all changes and modifications of the embodiment herein chosen for purposes of disclosure which do not depart from the spirit and scope of the invention.

We claim:

1. An apparatus for laterally receiving elongated elements at an upper first location, for assembling the elements thus received, and for transferring the assembled elements to a lower second location, said apparatus comprising: spaced opposed guide surfaces defining an assembly and transfer zone which extends downardly from the first location to the second location; inlet means communicating with said zone at the first location, said inlet means being operative to control the lateral feeding of elongated elements into said zone; carrier means extending laterally across said zone, said carrier means cooperating with said guide surfaces to confine and assemble the elements being laterally fed into said zone through said inlet means; and operating means for moving said carrier means along said zone from an upper position adjacent to the first location to a lower position at the second location, whereby elongated elements fed laterally through said inlet means into said zone will be assembled at the first location and thereafter transferred downwardly to the second location.

2. The apparatus as claimed in claim **1** further characterized by means for adjusting said inlet means in order to maintain the elements passing laterally therethrough in parallel alignment.

3. The apparatus as claimed in claim **2** wherein said inlet means is comprised of a downwardly sloping ramp terminating at its lower end in a fixed shoulder which defines one side of an opening, the oppostie side of siad opening being defined by another shoulder on at least one member mounted for pivotal movement relative to said fixed shoulder, the said means for adjusting said inlet means being operative to adjust the spacing between said shoulders by pivotally manipulating said member.

4. The apparatus as claimed in claim **1** wherein said operating means includes a collapsible arm which is positioned outside of said zone and which is operative to move said carrier means into and out of said zone.

5. The apparatus as claimed in claim **1** further characterized by said guide surfaces extending arcuately about a common axis which is parallel to and spaced laterally from said inlet means, the innermost guide surface having a slot therein to accommodate movement of said carrier means along said zone.

6. The apparatus as claimed in claim **5** wherein said operating means is comprised of a drive shaft journalled for rotation about said axis, intermediate means connecting sais drive shaft to said carrier means, and means for rotating said drive shaft in opposite directions.

7. The apparatus as claimed in claim **6** wherein said intermediate means is comprised of a first arm means connected at one end to said drive shaft for rotation therewith, said first arm means extending radially from said drive shaft and being pivotally connected at its opposite end to an arcuate link, said carrier means being mounted on and protruding laterally from the outer edge of said arcuate link, and a collapsible second arm means rotatably mounted on said drive shaft and extending radially therefrom, said second arm means being pivotally connected to said arcuate link.

8. The apparatus as claimed in claim **7** wherein said collapsible second arm means is comprised of a first link rotatably mounted on said drive shaft, a second link pivotally connected to said arcuate link, said first and second links being pivotally joined at a toggle joint, and means for collapsing said second arm means to withdraw said carrier means from said zone.

9. The apparatus as claimed in claim **8** wherein said means for collapsing said second arm means comprises means for rotating said first link relative to said drive shaft.

10. The apparatus as claimed in claim **7** wherein said means for rotating said drive shaft in opposite directions is comprised of an arm extending radially from and fixed relative to said drive shaft, and a pivotally mounted piston-cylinder unit having a piston rod operatively connected to said arm, whereby extension and retraction of said piston rod will impart rotation in opposite directions to said drive shaft.

11. The apparatus as claimed in claim **10** wherein said first and second arm means are of approximately equal length, and wherein the radial distance between said axis and the outside edge of said arcuate link is greater than the radial distance between said axis and the innermost guide surface.

12. The apparatus as claimed in claim **4** further characterized by transfer means beneath the lower second location for receiving the assembled elongated elements from said zone when said carrier means is retracted from said zone, said transfer means being movable to a third location at which further operations are performed on the assembled elements, and closure means movable from an inoperative position outside of said zone to an operative position extending across said zone at said second location, said closure means being movable between said operative and inoperative positions in response to movement of said transfer means

into and out of its element receiving position beneath the lower second locaton.

13. The apparatus as claimed in claim **12** wherein said closure means is comprised of a plurality of spring-actuated pins.

14. The apparatus as claimed in claim **3** wherein said member is further provided with a forward edge which extends upwardly from said other shoulder and which is inclined oppositely to said ramp to cooperate therewith in defining a U-shaped notch.

15. The apparatus as claimed in claim **3** wherein a plurality of said members are provided, each being separately adjustable to abut against wedge-shaped surfaces on a common adjustable stop member.

16. An apparatus for laterally receiving elongated elements at an upper location, for assembling the element thus received, and for transferring the assembled elements to a lower location, said apparatus comprising: opposed inner and outer arcuate guide surfaces spaced to define an arcuate zone therebetween which extends downwardly from the upper location to the lower location, said guide surfaces being disposed radially in relation to a common axis, said inner guide surface having a slot extending along substantially the entire length thereof; inlet means communicating with said zone at said upper location; means for adjusting said inlet means to feed elongated elements laterally and singly into said zone; carrier means protruding through said slot into said zone, said carrier means cooperating with said guide surfaces to confine and assemble elements being fed laterally into said zone through said inlet means; operating means for moving said carrier means along said zone from an upper position adjacent to said inlet means and a lower position at the lower location, whereby elongated elements fed laterally through said inlet means into said zone will be assembled between said guide surfaces on said carrier means and thereafter transferred donwwardly to the lower location; and means associated with said operating means for retracting said carrier means from said zone.

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