Nov. 14, 1939. E. B. STOUT 2,180,075

RAIL SPACING APPARATUS

Filed May 20, 1938 4 Sheets-Sheet 1

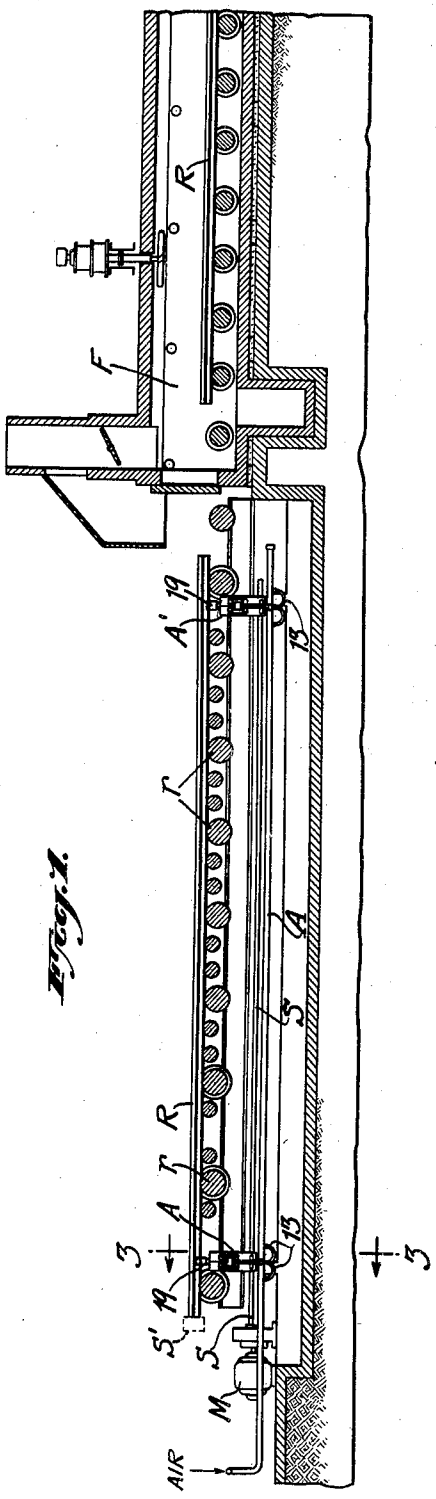


Fig. 1.

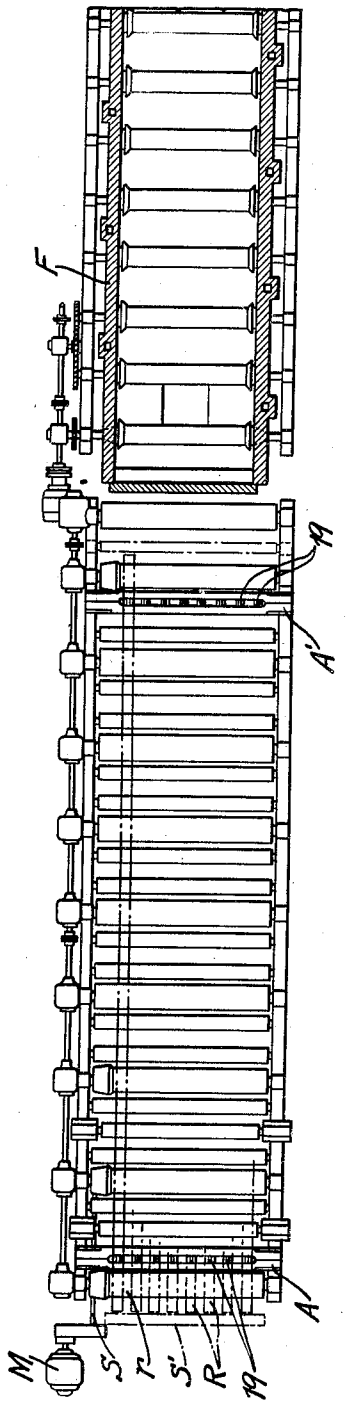


Fig. 2.

INVENTOR.
EARL B. STOUT.
BY John E. Jackson
ATTORNEY.

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RAIL SPACING APPARATUS

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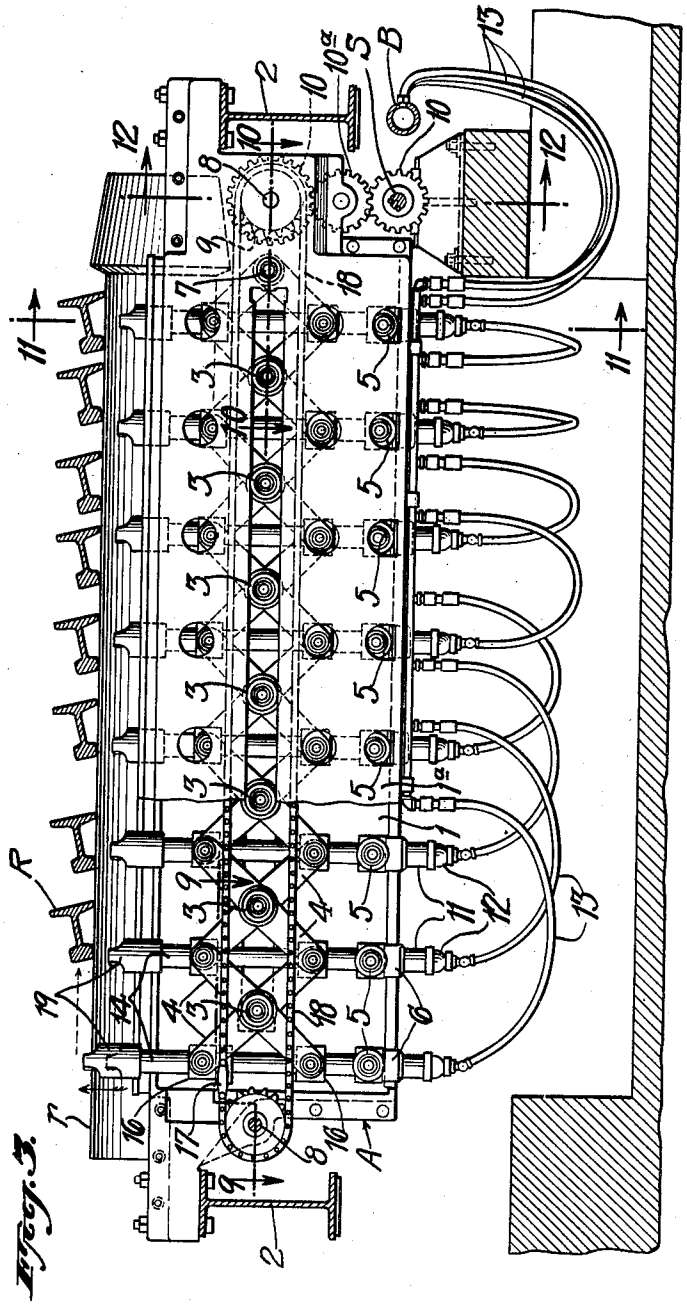


Fig. 3.

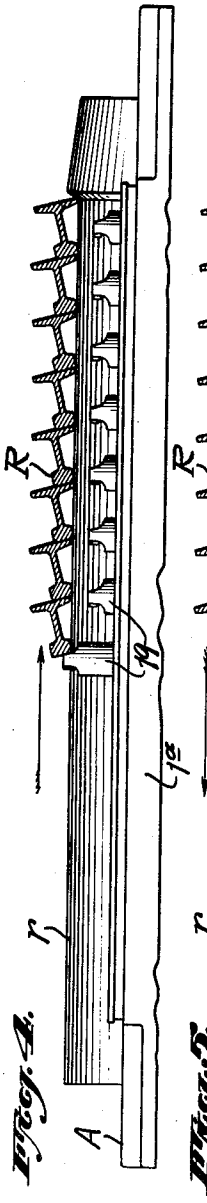


Fig. 4.

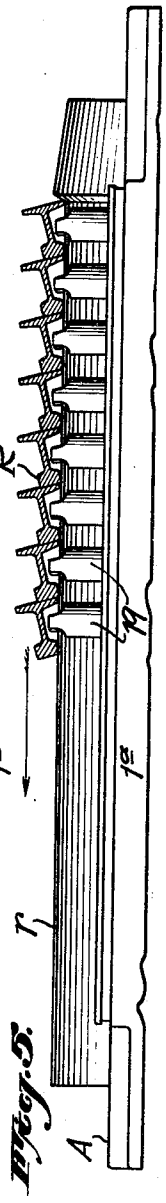


Fig. 5.

INVENTOR.
EARL B. STOUT.

BY John E. Jackson

ATTORNEY.

Nov. 14, 1939. E. B. STOUT 2,180,075

RAIL SPACING APPARATUS

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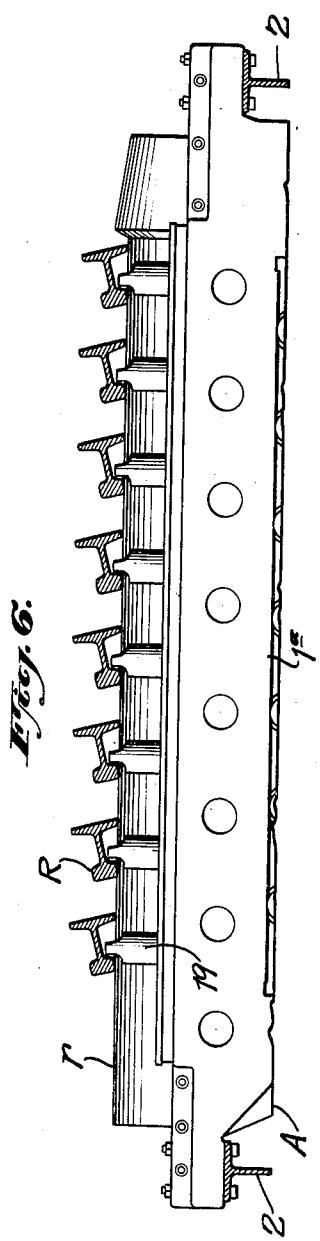


Fig. 6.

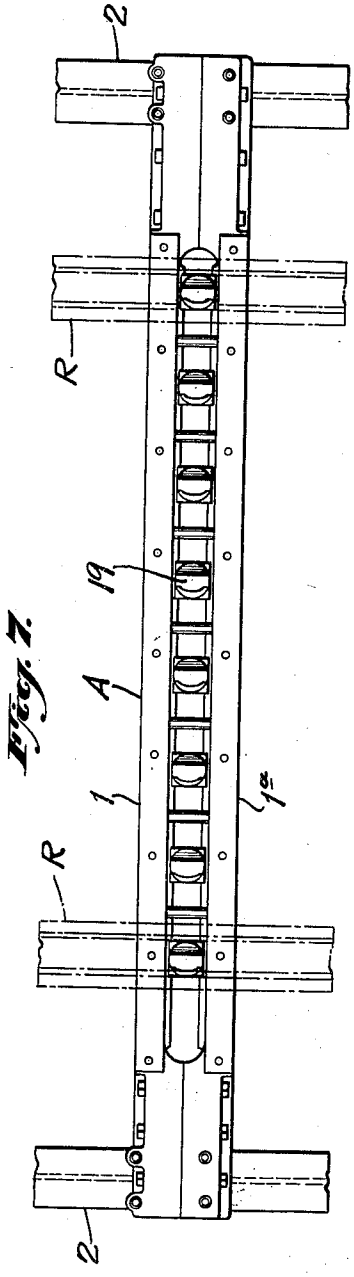


Fig. 7.

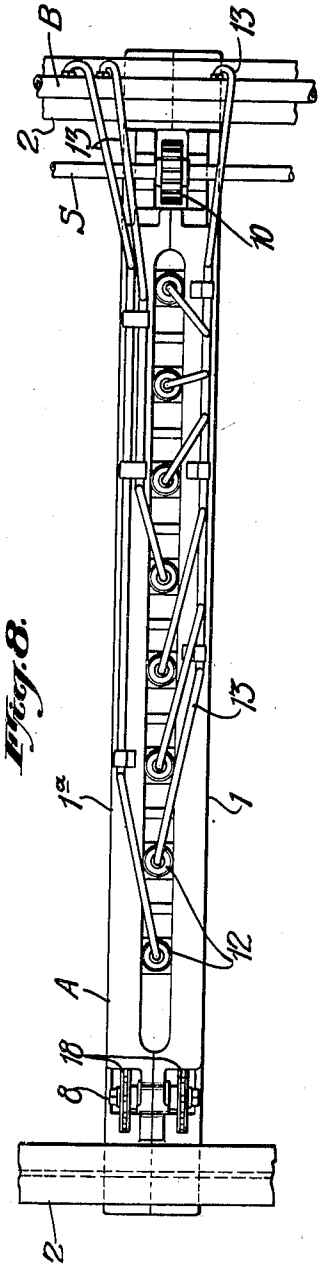


Fig. 8.

INVENTOR.

EARL B. STOUT.

BY John E. Jackson

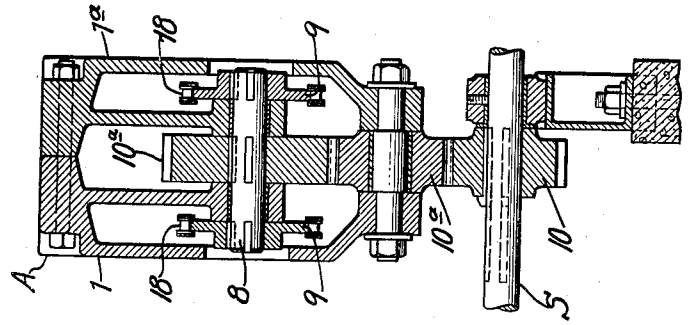
ATTORNEY.

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RAIL SPACING APPARATUS

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Fig. 12.



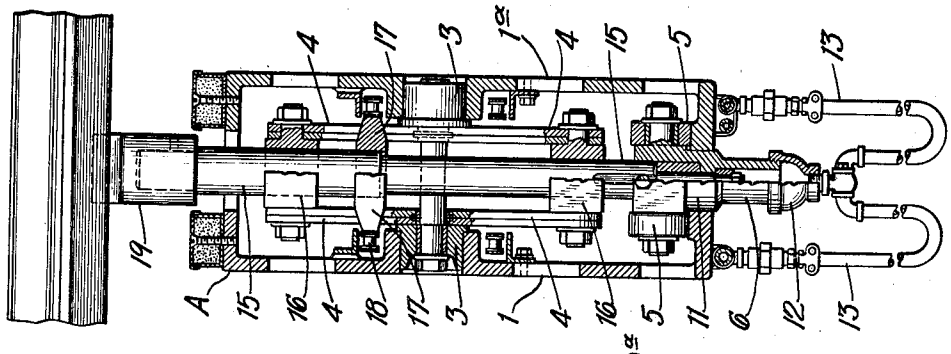


Fig. 11.

Fig. 9.

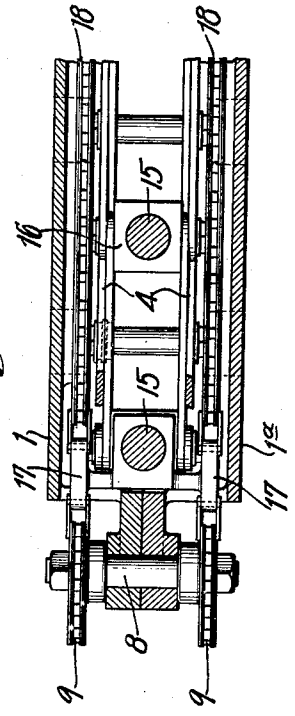
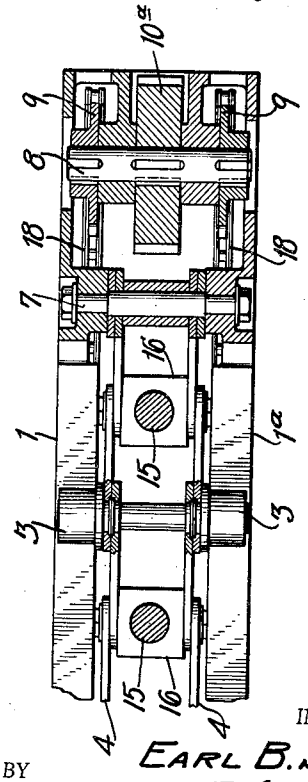


Fig. 10.



INVENTOR.
EARL B. STOUT.
BY John E. Jackson
ATTORNEY.

Patented Nov. 14, 1939 2,180,075

UNITED STATES PATENT OFFICE

2,180,075

RAIL SPACING APPARATUS

Earl B. Stout, Gary, Ind.

Application May 20, 1938, Serial No. 209,123

6 Claims. (Cl. 198—34)

This invention relates to rail spacing means and apparatus and more particularly to means and apparatus for quickly relocating a group of rails on a hot bed or roller table in desired and determined side spaced relation. In co-pending applications Serial Nos. 209,127 and 209,128 filed May 20, 1938, and May 20, 1938, now Patent Nos. 2,160,610 and 2,167,922, respectively, there is described and claimed apparatus and means adapted for the practice of the rail treatment process described and claimed in Brunner Patents Nos. 1,896,572 and Re. 19,884, issued Feb. 7, 1933, and Mar. 10, 1936, respectively.

In the said co-pending applications a plurality of rails grouped in side spaced relation are fed endwise into an elongated roller bottom furnace wherein they are to be heat-treated and are progressively moved therethrough and discharged therefrom at the heat-treating temperature onto a delivery roller table whereon the rails are aligned endwise by means of a stop. In accordance with the process of Brunner Patent Re. No. 19,884, above identified, it is desired to harden the heads of the rails at and adjacent each end by rapidly cooling these portions through the so-called transformation temperature while the remainder of the rail cools normally in freely moving air. This rapid cooling of these portions of the rail must be accomplished as soon as possible after the rail has been discharged from the furnace and before the temperature of the rail has dropped below the so-called upper critical temperature of the steel comprising the rail. It is preferable to accomplish this rapid cooling by means of compressed air, and to accomplish this the cooling hood apparatus and means described and claimed in co-pending application Serial No. 227,602 filed August 30 1938 has been devised. In this said co-pending application, a plurality of the air cooling hoods described and claimed therein are located in determined spaced relation on the delivery table in a position adjacent opposite rail ends and means are provided to move the said hoods into a position adapted to permit the hood to engage the rail end.

One of the objects of the present invention is to provide means adapted to locate the rails on the delivery table in side spaced relation and in a position adapted to permit the end cooling hoods to engage the ends of the rails when moved into position for this purpose.

Another object is to provide means to position rails and similar elongated articles in determined side spaced relation upon supporting means such as skids, roller tables, hot beds and the like.

Another object is to provide means associated with a roller line, hot bed, or similar apparatus to rapidly locate or move rails and similar elongated articles disposed thereon into desired or determined side spaced relation, one to the other.

Still another object is to provide a roller table, hot bed and the like rail supporting means with a pantograph or lazy-tongs device adapted to position rails and similar elongated articles located thereon in desired side spaced relation.

Other objects and advantages will be apparent as the invention is more fully disclosed.

In accordance with the above objects, I have devised the rail spacing apparatus illustrated in the accompanying drawings. Referring to the drawings—

Fig. 1 is a side elevation in section illustrating the operative relation of the present invention with other apparatus associated therewith;

Fig. 2 is a top plan view of the same;

Fig. 3 is a section along plane 3—3 of Fig. 1;

Fig. 4 is a fragmentary view along the same section illustrating one operative position of the present invention;

Fig. 5 is a similar view illustrating a second operative position;

Fig. 6 is a similar view illustrating a third operative position;

Fig. 7 is a top view of the present invention in the operative position of Fig. 6;

Fig. 8 is a bottom view of the present invention in the operative position of Fig. 6;

Fig. 9 is an enlarged section of one end of the present invention along plane 9—9 of Fig. 3;

Fig. 10 is an enlarged section of the opposite end of the present invention along plane 10—10 of Fig. 3;

Fig. 11 is a section along plane 11—11 of Fig. 3; and

Fig. 12 is a section along plane 12—12 of Fig. 3.

As indicated in the drawings, the rails R are discharged endwise from the heat-treating furnace F onto transverse rollers *r* of the delivery roller table and are moved endwise by the said rollers *r* along the table until the forward end of the rails engage an aligning stop S' which assures the end of each rail being located in the same plane transverse to the rail axis.

The rail spacing apparatus of the present invention consists of a pantograph or lazy-tongs means supported below the rollers *r* operative to first bunch the plurality of rails in close side spaced relation and then to engage each rail separately and to move the plurality of rails sideways along the rollers into determined spaced relation-

ship. In the specific embodiment of the present invention illustrated in the drawings I provide two pantograph means, A—A', one adjacent each end of the rail, each operative from a common drive shaft D actuated by a prime mover M, such as a reversible electric motor. As each said pantograph means A—A' is structurally identical, I will describe but one said means.

Referring to the drawings, the pantograph means of the present invention consists of a plurality of rollers 3 engaging in horizontally disposed tracks or guideways formed by parallel spaced housing 1—1a spanning the roller table and supported beneath the rollers r of the table by girders 2. Rollers 3 carry pantograph levers 4 and also rollers 5 engaging a horizontally lower trackway formed by housing members 1—1a. Finger lifting air jacks 6 are dependingly supported by rollers 5.

Housing 1—1a also provides a support for the fixed pin 7 of the pantograph and for the bushed shafts 8 carrying the chain sprockets 9 and driving gears 10 of the mechanism.

The cylinder 11 of air jack 6 is preferably a forging with trunnions for the rollers 5 and closed at the bottom with a pipe reducer 12 to which a flexible metallic air hose 13 is connected, the opposite end of air hose 13 being connected to compressed air supply line or main B. The middle part of the cylinder 11 is made square and slides in the bottom slot of the housing 1—1a, thus preventing the cylinder from twisting. The lifting finger or plunger 14 of air jack 6 is bolted at the lower end to a piston 15 which fits in the cylinder 11, thus providing the lift of the rod from below to above the roller line r which is essential for the purposes in view. Over the upper end of the plunger, a cap 19 fits loosely. Two dowel pins hold the cap in a fixed position relative to the plunger 14.

The plungers 14 are held in a vertical position through two guide blocks 16 to which the pantograph links 4 are attached. The end plunger fits loosely in a pulling link 17 to which both ends of two chains 18 are bolted. The chains run over sprockets 9 actuated by driving gear 10. Power is applied to the driving gear 10 by means of a reversible motor driven line or drive shaft S through speed reducing gears 10a, the length of travel back and forth of the pantograph being governed by suitable limit switches (not shown in the drawings, but common to the art as a necessary part of any traveling device actuated by an electric motor).

The compressed air to the cylinders is distributed from the air main B to two or more pipe lines depending on how many cylinders it is found desirable to have to function separately to perform the first stage of operations. Ordinarily it is sufficient to have the cylinder 6 nearest the center thus separated, but the drawing shows also the cylinder 6 fourth from the end with a separate connection to enable the handling of a smaller number of rails than what ordinarily is rolled from one ingot and normally compose one batch.

The operations of the spacing units are as follows:

The average side spaced relationship of the rails, as charged into the heat-treating furnace prior to delivery onto the rollers R of the roller table is more or less maintained as the rails progress through the furnace and are discharged from it onto the rollers R. This spacing is less than the desired final spacing for air quenching. When a batch of rails has been discharged onto the rollers R and have been lined up lengthwise against a disappearing stop (not shown), an operator turns the air on the end cylinder 6 raising the plunger 14 up above the roller line, and then starts the chain drive for the pantograph, catching the outside rail with the plunger cap or finger 19 and moving the rails against each other until the flange of the outside rail is brought up against the collar on the two rollers nearest the spacing unit. When the number of rails is equal to the number of cylinders in service (which normally is the case), the operator then lowers the plunger in the end cylinder 6 and moves the pantograph an additional distance necessary to bring the plunger 14 underneath the rail. With equal numbers the spacing of the finger lifting jacks or cylinders 6 will then equal the height of the rails and each plunger 14 will be located in a position below the roller line and immediately below a rail. The air is then turned on all the jacks 6 actuating the plungers 14 to engage each rail and the pantograph is set in reverse motion by rotation of drive shaft S in the direction necessary to spread the rails apart the full spread of the pantograph operating to locate each rail in exact and desired spaced relation and in a position relative to the air quenching hoods to be engaged thereby upon movement of the hoods by the means described and claimed in co-pending application Ser. No. 227,602 above identified.

After the several rails are located in the desired side spaced relation by the pantograph means of the present invention, the air supply to the jacks 6 is cut off and pistons 14 retracted. The rails then may be moved off from the roller table following the positioning of the said end cooling hoods thereon and the completion of the end cooling operation therewith by any convenient means common to the art.

From the above description of the present invention it is apparent that many modifications may be made therein without departing essentially from the nature and scope of the same and all such modifications and departures are contemplated as may fall within the scope of the following claims.

What I claim is:

1. Spacing means for elongated articles located on horizontally disposed skidways lying transverse to the longitudinal axis of said articles, said means comprising an extensible and contractible pantograph or lazy-tongs mechanism horizontally sustained below said skidways in parallel relation thereto, said mechanism carrying in spaced alignment thereon a plurality of lifting jacks, the moving plunger element of each said jack being located in a vertical position and the end of each said plunger being provided with means adapting said end to engage with an elongated article, means to actuate said pantograph mechanism to extend or to contract the same, and means to actuate said lifting jacks separately or collectively, each said actuating means being operative independently of the other.

2. Rail spacing means comprising in combination horizontally supported skids adapted to sustain a plurality of rails disposed thereon, the longitudinal axes of said skids being transverse to the longitudinal axes of said rails, and extensible and contractible pantograph means horizontally supported below said skids but in substantially parallel spaced relation thereto in a position adjacent the opposite ends of rails located on said skids, each said pantograph means consisting of a plurality of pantograph levers with a plurality

of air lifting jacks disposed thereon in spaced relation, means to extend and contract each said pantograph means horizontally, said means being operative from a common power source, a vertically sustained plunger for each said lifting jacks operatively associated therewith to be vertically raised and lowered by said jack, means to actuate said lifting jacks individually and collectively, and means to actuate each said pantograph means independently of the actuation of said lifting jacks.

3. A pantograph means for moving rails into determined side spaced relation on a roller table, hot bed and the like apparatus which are provided with rail supporting skids extending transversely to the length of rails located thereon, said pantograph means comprising an extensible and contractible pantograph mechanism consisting of a plurality of pantograph levers, means to horizontally support said pantograph mechanism below the rail supporting skids in a plane parallel to said skids but in the space between the said skids, said supporting means providing for the anchoring of one end of the pantograph mechanism at one side of the table and for the horizontal support of the said pantograph mechanism in all positions of extension and contraction, means to extend and contract said pantograph mechanism, a plurality of finger lifting jacks, means to fixedly locate said jacks on said pantograph mechanism with the moving element of the jacks in a position to be raised above the level of the said skids, and means to actuate said jacks individually and collectively.

4. In combination, a roller table having a plurality of rollers adapted to horizontally support railroad rails located thereon, and means to sidespace said rails in determined spaced relationship on said table, said means comprising a pantograph mechanism adjacent each end of the said table and means coupling each said mechanisms to a common drive shaft to obtain simultaneous movement of the mechanisms in extending or contracting directions, each said mechanism comprising an extensible and contractible pantograph or lazy-tongs, means to sustain said tongs horizontally below said rollers but in a plane parallel thereto, a plurality of lifting jacks located in desired spaced relation on said tongs with the lifting plunger of the jacks disposed to move in vertical up and down directions, means on the end of each plunger to engage a rail, means to actuate said lifting jacks individually or collectively into and out of rail engaging position, means to actuate said common drive shaft in forward and reverse directions to thereby extend and contract said pantograph mechanism, said two actuating means being independently and separately operable.

5. A roller table located adjacent the outlet opening of a furnace in a position to receive a plurality of railroad rails discharged endwise from the furnace and to carry them endwise away from the furnace, a stop member located adjacent the end of said table to align the forward ends of said rails, means to group the sidespaced rails together in close sidespaced relation and means to space the rails apart in determined sidespaced relation, said last two mentioned means comprising an extensible and contractible pantograph mechanism disposed inwardly from but adjacent each end of the roller table in a horizontal plane below the rollers of said roller table, each said pantograph mechanism carrying a plurality of lifting jacks having the moving plunger disposed in a position to move vertically upward and downward, means on the end of each said plunger to engage a rail when moved vertically upward, means to anchor one end of each said pantograph mechanism, means to simultaneously expand and contract each said pantograph mechanism, means to limit the extent of expansion of each said pantograph mechanism to thereby obtain a determined position of said lifting jacks at each expansion of said mechanism, and means to independently actuate said lifting jacks singly or collectively irrespective of the actuation of said pantograph mechanism.

6. In combination, an elongated roller table having a plurality of horizontally sustained rollers, the roller axis of each being disposed in a plane at right angles to the length of said table, means to actuate said rollers to convey elongated articles fed endwise thereon at one end of the table to the opposite said end, a stop member disposed at the said opposite end in a position to engage the forward ends of said elongated articles thereby to end align the said articles, and an extensible and contractible pantograph means disposed horizontally in a position below the horizontal level of said table, said pantograph means being provided with a plurality of fluid actuated lifting jacks located thereon in determined spaced relation with the movable plungers thereof disposed in a position to move vertically up and down on actuation of said jacks, the ends of each plungers being provided with means thereon to engage the said articles on the said table, means to actuate said pantograph means to extend and contract the same, and means to actuate separately and collectively the said lifting jacks to move the said plungers thereof vertically up and down into and out of article-engaging position, and means to control the operation of said last two said means thereby to move the said end aligned elongated articles sideways on the said roller table first into relatively close side spaced relation and then into determined spaced apart side spaced relation.

EARL B. STOUT.