Feb. 6, 1934. J. R. BRODBECK 1,946,453

CONVEYING MECHANISM

Filed Aug. 18, 1933 3 Sheets-Sheet 1

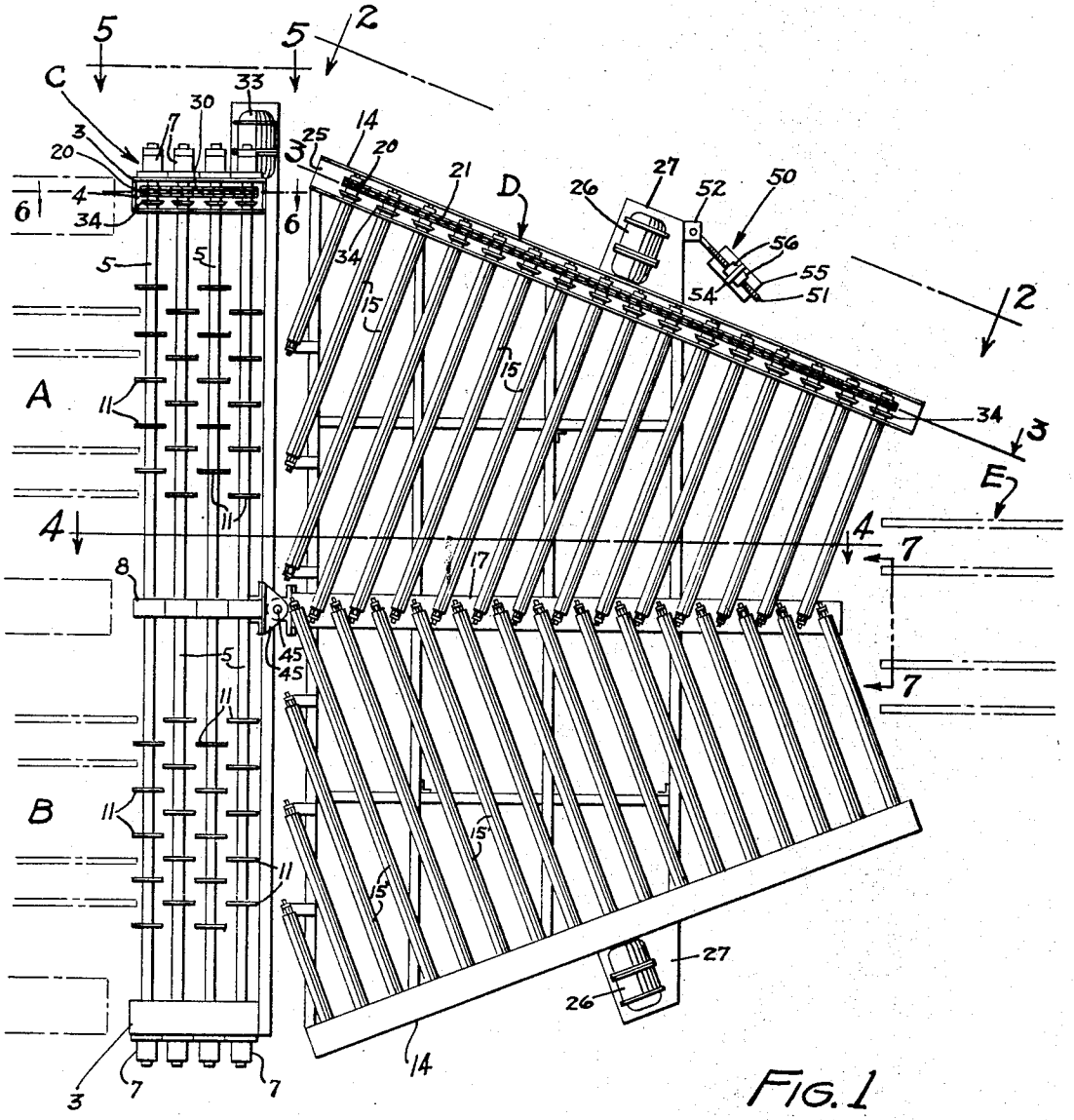


FIG. 1

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CONVEYING MECHANISM

Filed Aug. 18, 1933 3 Sheets-Sheet 2

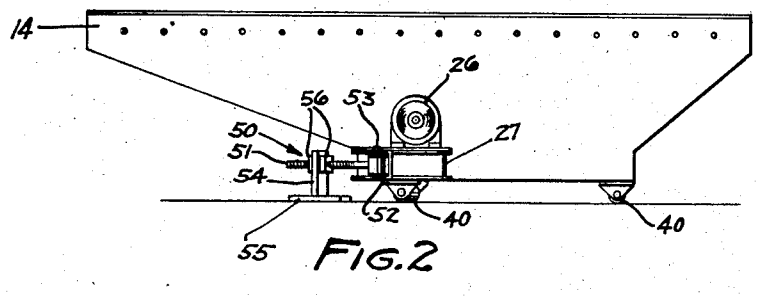


FIG. 2

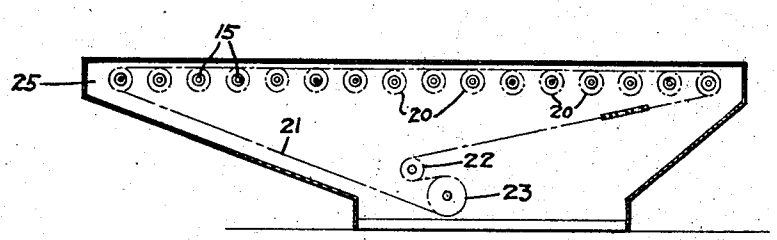


FIG. 3

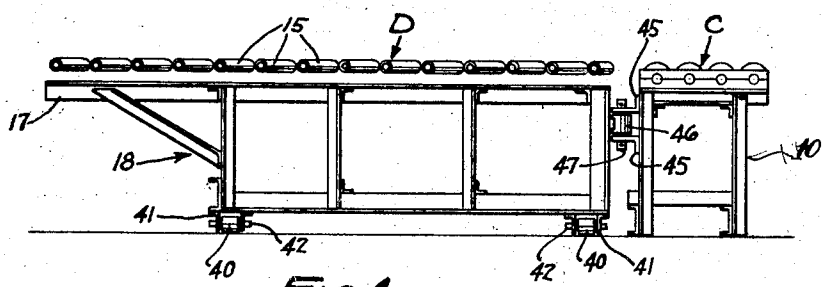


FIG. 4

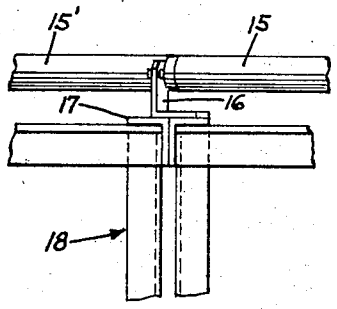


FIG. 7

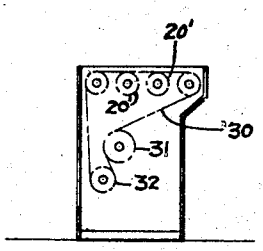


FIG. 6

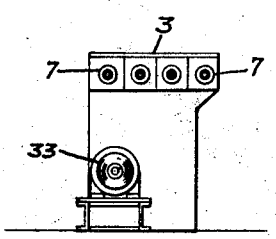


FIG. 5

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CONVEYING MECHANISM

Filed Aug. 18, 1933 3 Sheets-Sheet 3

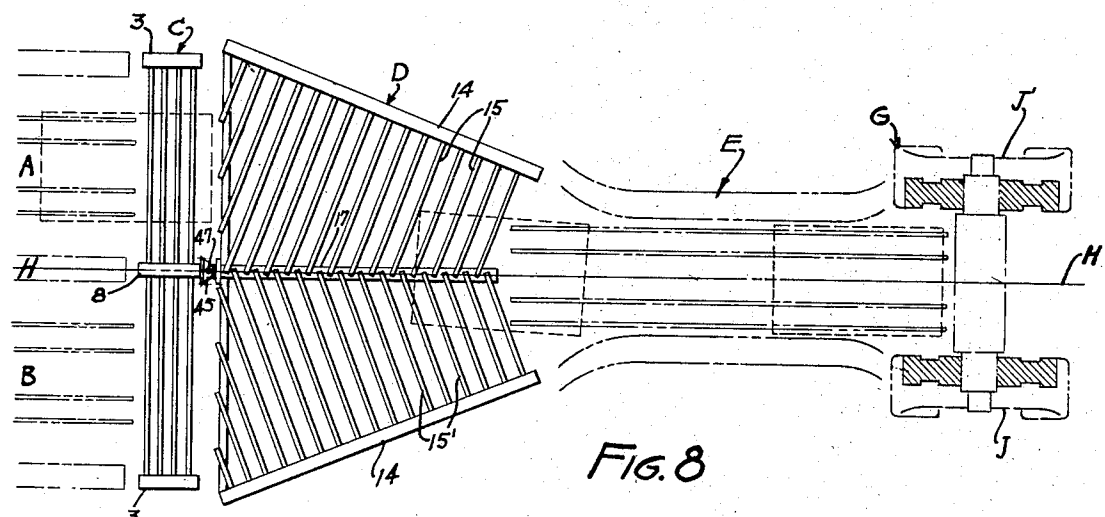


FIG. 8

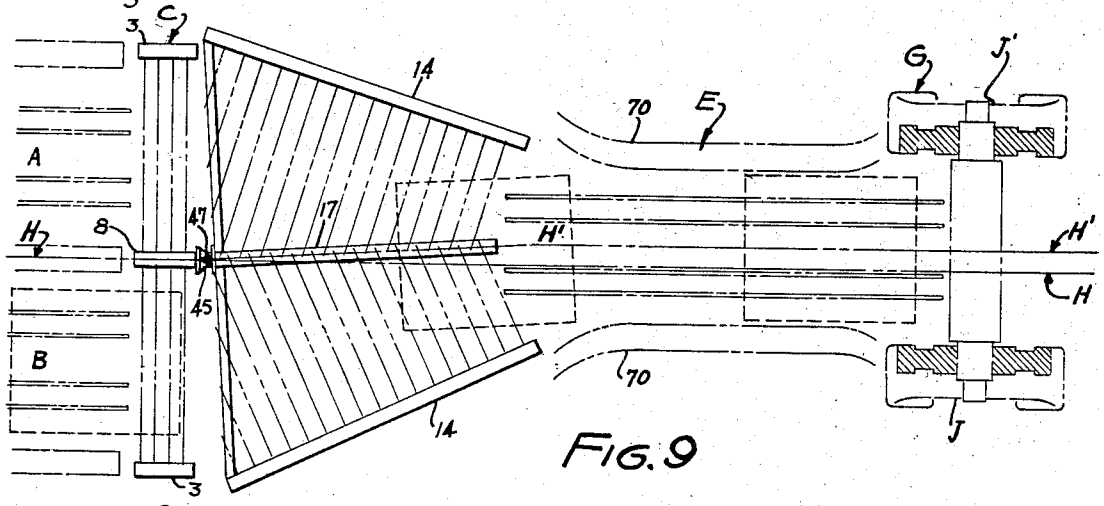


FIG. 9

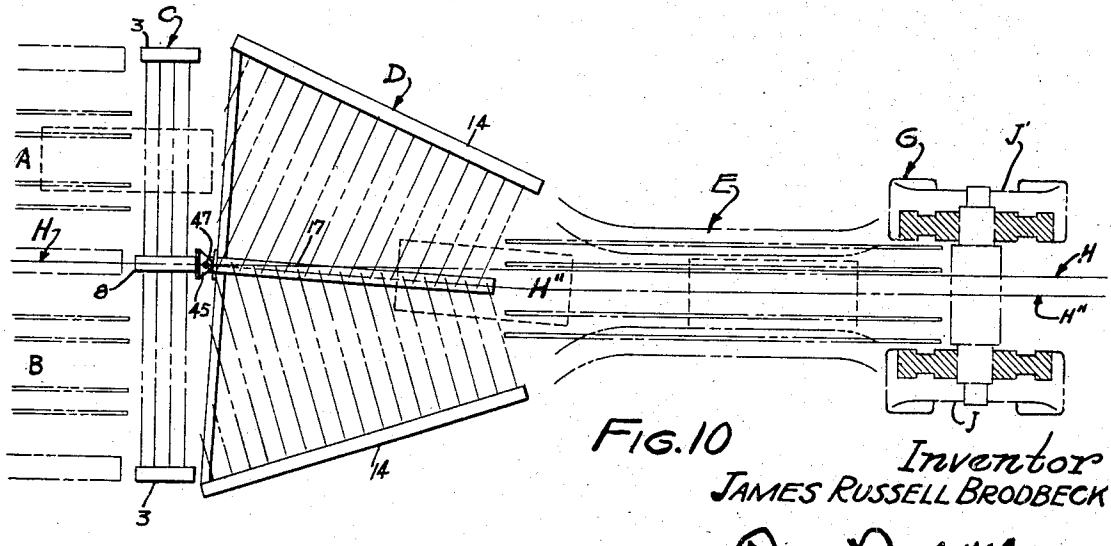


FIG. 10

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Patented Feb. 6, 1934

1,946,453

UNITED STATES PATENT OFFICE

1,946,453

CONVEYING MECHANISM

James Russell Brodbeck, Wampum, Pa., assignor to Mathews Conveyer Company, Ellwood City, Pa., a corporation of Pennsylvania

Application August 18, 1933. Serial No. 685,757

1 Claim. (Cl. 198—32)

This invention relates to new and useful improvements in conveying mechanism, and more particularly to runout tables of the herringbone type such as disclosed in the pending application of Martin J. Anderson, filed December 28, 1932, Serial No. 649,202. Tables of the type disclosed in the above mentioned application are particularly well adapted for transferring sheets, packs of sheets, bars, etc., of various widths and lengths, from a plurality of heating furnaces to the feeding means of a rolling mill.

The improved table herein disclosed is particularly well adapted for use in connection with mills of the type wherein one of the mill housings is permanently secured to its supporting means or rails, while its opposite housing is adapted for relative lateral movement in either direction to adapt the mill for rolls of different lengths. It will thus be seen that each time a relatively shorter or a longer set of rolls are substituted for the ones shown in Figure 8, the centerline of the rolling mill, midway between the ends of its rolls, will change relatively to the longitudinal centerline midway between the furnace compartments. Assuming that the centerlines between the furnace compartments and through the rolling mill are alined when the mill is set up for rolling sheets of a medium width, then, if the mill rolls are changed for rolling either wider or narrower sheets, the centerline of the mill will be moved out of alinement with the furnaces, which will result in an offset relationship between the longitudinal centerlines of the furnace compartments and the rolling mill.

To compensate for such misalinement of the rolling mill and furnace, I provide means for pivotally supporting the receiving end of the converging runout table, whereby the discharge end thereof may be moved laterally to aline it with the feeder table leading to the rolling mill. By thus supporting the table, the sheets when discharged therefrom, will be longitudinally alined with the receiving means or feeder table upon which they are delivered, and which conveys them to the rolling mill.

The principal object of this invention, therefore is to provide a runout table having means for laterally adjusting its discharge end whereby it may readily be alined with a suitable receiving means such as the feeder table of a rolling mill.

Other objects of the invention will appear from the following description and accompanying drawings and will be pointed out in the annexed claims.

In the accompanying drawings there has been disclosed an improved construction designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow without departing from the invention.

In the drawings:

Figure 1 is a plan view of a power driven run out table of the herringbone type, showing the invention embodied in the construction thereof;

Figure 2 is a side elevation of the apparatus;

Figure 3 is a sectional view on the line 3—3 of Figure 1, showing the means for driving the load carrying rollers of the table;

Figure 4 is a sectional view on the lines 4—4 of Figure 1, to show the construction of the table framework;

Figure 5 is a side elevation of the stationary receiving section provided at the receiving end of the table;

Figure 6 is a detail sectional view on the line 6—6 of Figure 1, showing the driving means for the rollers of the stationary receiving section;

Figure 7 is a detail view on the line 7—7 of Figure 1, showing the means for supporting the inner ends of the load-carrying rollers; and

Figures 8, 9, and 10 are diagrammatic views illustrating the pivoted runout table interposed between a pair of furnaces and the feeder and catcher table of a rolling mill, and showing different positions to which the table is adjusted for rolling wide, medium narrow sheets.

The live roller runout table featured in this invention is of the general character disclosed in the pending Anderson application, hereinbefore referred to. The present embodiment, as disclosed in Figure 1, comprises a stationary live roller conveyer section C onto which the sheets or bars are delivered from either of the furnace compartments A or B. From the conveyer section C, the sheets are fed onto a herringbone runout table D, comprising a plurality of angularly disposed load-carrying rollers 15 and 15', over which the sheets or bars are transferred to a single receiving means E, here illustrated as being the feeder table of a feeder catcher unit associated with a rolling mill G, but which may be a receiving table onto which sheets are received to be manually fed into the rolling mill in mills where a feeder catcher unit is not employed.

The stationary conveyer section C as shown

in Figs. 1, 4, 5, and 6, comprises side members 3—3, preferably box shaped in cross section, to provide a chamber 4, and supporting a plurality of rollers 5. The ends of the rollers 5 are rotatably supported in bearings 7 secured to the outside plates of the side members 3—3, and their intermediate portions are supported by suitable bearings 8, which bearings are secured to a suitable supporting structure designated generally by the numeral 10. The rollers 5 may each comprise a hollow shaft or seamless tube, each of which is shown having a plurality of discs 11 welded or otherwise secured thereto. The discs 11 are directly engaged by the sheets being transferred over the section C, and have the distinct advantage of providing sufficient radiating surface for the dissipation of heat emanating from the furnaces. They also have the advantage of permitting the adjacent ends of the furnace conveying means to be brought into closer relationship with the rollers 5, thereby reducing to a minimum the portions of the sheets which may be unsupported in their delivery from the furnaces to the section C. If desired, the ends of the rollers 5 may be provided with suitable pipe connections, not shown, for the circulation of water therethrough for cooling purposes.

The converging section or herringbone runout table D, is here shown as comprising side members 14—14, preferably box shaped in cross section, upon which the load carrying rollers 15 and 15' are arranged in separate rows, disposed with their axes at an angle of substantially 90° from their respective side members 14. The two sets or rows of rollers 15 and 15' constitute the carrying bed of the table, and are angularly disposed with relation to each other so that the axes of one row of rollers are arranged obliquely to the axes of the rollers of the opposite row. The rollers 15 and 15' may be rotatably supported upon through type axles, the outer ends of which are supported in suitable apertures provided in the outside plates of the side members 14. The inner ends of said axles are shown supported by angle clips 16 secured to a center beam 17 which forms part of the supporting structure of the runout table, generally indicated by the numeral 18, as best shown in Figures 4 and 7.

The two sets of load-carrying rollers 15 and 15' are shown as being power driven, and as the drives for the two sets are alike, but one will be described. As shown in Figures 1 and 3, each roller 15 is provided at its outer end with a suitable sprocket 20. These sprockets are driven by the upper run of a chain 21, diagrammatically illustrated in Figure 3. The lower run of the chain is supported by a drive sprocket 22 and a snubbing sprocket 23. The purpose of the sprocket 23 is to guide the chain 21 a sufficient distance around the drive sprocket 22 to provide a good driving connection. The sprocket 23 may be mounted in a suitable manner to be moved either closer to or away from the drive sprocket 22 to provide ease in assembling the chain around the sprockets, and also whereby the chain may be properly tensioned. The sprockets 20, 22, 23 and the drive chain 21 are all alined in the same vertical plane and are disposed within a chamber 25 provided in the side member 14.

The sprocket 22 is secured to the slow speed shaft of a combination motor and speed reducer unit 26. Such units comprise a motor and a speed reducer assembled to form a single unit, and are well known, and it is therefore thought unnecessary to show and describe the same in detail. The slow speed shaft of the unit 26 extends through the outside plate of the side member 14, into the interior of the chamber 25, and has the drive sprocket 22 secured thereto. Obviously, operation of the motor reducer unit 26 will cause all of the rollers 15 on one side of the table to be rotated simultaneously through the sprockets 22, 23, and 20, and the drive chain 21. The unit 26 is shown supported upon a suitable base 27 extending outwardly from the side member 14, as best shown in Figures 1 and 2.

The rollers 5 of the stationary section C are driven in a manner similar to the rollers of the converging section D, each roller having secured thereto near one end a sprocket 20' (see Figs. 1 and 6). The sprockets 20' are driven by the upper run of a chain 30, the lower run of which has running connections with a pair of sprockets 31 and 32. The sprocket 31 is used for snubbing the chain around the drive sprocket 32, and the latter sprocket is secured to the slow speed shaft of a motor and speed reducer unit 33, so that operation of said unit will rotate all of the rollers 5. Oil may be introduced in the chambers 4 of the stationary section C, and also in the chambers 25 of the converging section D, and may be maintained at a level that will cause the lower run of the chain to pass through the oil, whereby the chains and sprockets will be adequately lubricated. The rollers 5, 15 and 15' are provided at their outer ends with cup-shaped members 34 to prevent leakage of oil through the apertures provided for the rollers in the inside plates of the side members 3 and 14.

In some sheet metal mills, various widths of sheets are rolled in the same rolling mill. This usually necessitates changing the rolls in the mill as, for example, short rolls are used for rolling narrow sheets, and relatively longer rolls for wider sheets, the lengths of the rolls being determined by the widths of the sheets to be rolled. In such mills, one of the side housings J of the mill is usually permanently secured to its foundation or supporting means, while the opposite housing J' is adjustably supported whereby it may be moved towards or away from the fixed housing J, depending upon the length of the rolls to be used. When thus varying the width of the rolling mill, its longitudinal centerline is laterally shifted with respect to the longitudinal centerline of the furnaces, and it is therefore desirable that means be provided whereby the discharge end of the runout table D may be laterally shifted to aline it with the feeder table E of the rolling mill.

To thus laterally shift the discharge end of the runout table D, it is shown supported upon suitable rollers 40 secured to the bottom of the supporting structure 18, by such means as brackets 41, secured to the frame structure 18 and spaced apart to receive the rollers 40, rotatably mounted on axles 42 journaled in apertures provided in the bracket members 41. The table D is pivotally connected or coupled to the stationary conveyer section C by bracket members 45 secured to the supporting structure 10 of the stationary conveyer section C. The horizontally disposed legs of the brackets 45 are spaced apart to receive an eye or bearing 46, secured to the supporting structure 18 of the table. A pin 47 is received in a bore in the member 46 and suitable apertures provided in the bracket members 45, and is retained therein by such means as cotter pins. By thus pivotally coupling the converging table section D to the stationary section C, and by sup-

porting the table D upon the rollers 40 which rest upon the mill floor or a suitable foundation, the discharge end of the converging section D may be moved in an arcuate path to align it with the receiving means or feeder table E.

Means is provided to facilitate swinging the discharge end of the converging section D, and is here shown consisting of an adjusting device 50, comprising a screw member 51, one end of which is pivotally connected to a bracket 52 secured to the motor supporting base 27. The bracket 52 is preferably forked to receive a hub formed on the end of the screw 51, and said hub is pivotally connected thereto by a pin 53 which passes through alined apertures in the bracket 52 and hub of the screw 51. The screw 51 is adjustably supported in an upright member 54, shown having a suitable base plate 55 which may be secured to the mill floor. Suitable adjusting nuts 56 are provided on the screw 51 whereby it may be secured to the member 54 in adjusted positions. By pivotally mounting the converging runout table D as above described, the discharge end of the table may be conveniently moved about from side to side in an arcuate path to properly aline it with the feeder table E, as clearly illustrated in Figures 8, 9, and 10.

Figure 8 diagrammatically illustrates a rolling mill G provided with rolls of suitable length for rolling sheets of medium width. In the arrangement here shown, the rolling mill is positioned with its centerline coincident with the longitudinal centerline H—H of the furnaces, said line H—H being drawn midway between the furnace compartments A and B. When thus arranged, it will be noted that the converging runout table D is positioned symmetrically about the centerline H—H.

Figure 9 illustrates an installation wherein the rolling mill G is provided with relatively longer rolls to adapt it for rolling relatively wider sheets than those shown in Figure 8. When longer rolls are thus used in the rolling mill, its movable housing J' is relatively adjusted to widen the spacing between the housings J and J' for the relatively longer rolls. Because of only one of the mill housings being adjustable to widen the spacing between said housings, the longitudinal centerline H'—H' of the rolling mill is laterally moved or shifted out of alinement with the centerline H—H of the furnace, whereby the center of the rolling mill becomes disalined with the centerline of the furnace. To take care of such disalinement, the discharge end of the runout table D is laterally shifted from the position shown in Figure 8 to that shown in Figure 9, wherein it will be noted that it is substantially alined with the receiving end of the feeder table E, whereby the sheets discharging from the runout table will be delivered directly onto the center of the feeder table, as clearly illustrated by the dotted lines in Figure 9.

In Figure 10, there is shown an installation wherein the rolling mill is adapted for handling narrow sheets, in other words, sheets which are relatively narrower than the ones shown in Figure 8. When such narrow sheets are to be rolled, relatively shorter rolls are used in the rolling mill, which necessitates moving the adjustable housing J' inwardly towards the fixed housing J to reduce the spacing between said housings to adapt it for the relatively shorter rolls. When using such short rolls, the centerline of the rolling mill may be shifted to the opposite side of the centerline H—H of the furnaces, as indicated by the broken line H''—H'', shown in Figure 10, thereby necessitating that the discharge end of the runout table D be relatively adjusted to aline it with the centerline H''—H'' of the rolling mill.

The feeder table E may be mounted for lateral movement so that it may be alined with the rolling mill, and it is shown provided with suitable guide rails or members 70, which are movable towards and away from each other to vary the spacing therebetween so as to accurately guide the sheets into the rolling mill.

It will be observed that when the run-out table D is moved about its pivot, the longitudinal axis of the table is at an angle to the longitudinal axis of the furnace. When such is the case, one set or row of rollers 15 will be disposed at a greater angle to the furnace axis than the opposite row of rollers. Therefore, sheets fed from one furnace onto its row of rollers will be moved laterally toward the center line or longitudinal axis of the receiving table faster than sheets fed from the other furnace onto its row of rollers. This action occurs automatically with the swinging of the table about its pivot. However, sheets from both furnaces, when the table is swung to an angular position with respect to the furnaces, will be properly aligned with the axis of the table by the time they reach the discharge end thereof due to the arrangement of rollers in the table.

From the foregoing, it will readily be seen that the unique mounting of the converging runout table D makes it possible to laterally shift the discharge end of said table whereby it may be quickly alined with the receiving means or feeder table E of a rolling mill which is not adapted to be alined with the longitudinal centerline H—H of the furnace, by the simple manipulation of the adjusting nuts 56 of the positioning device 50. The sheets delivered onto the runout table D from the furnaces A and B will thus be accurately delivered to the feeder table E so that the sheets will be substantially alined with the longitudinal centerline of the rolling mill regardless of the width of the sheets being rolled.

In the drawings, I have shown a runout table of symmetrical design and have diagrammatically illustrated its use in connection with a rolling mill for transporting hot sheets from the furnace thereto. It is to be understood, however, that the invention may be applied to tables of unsymmetrical design and to tables adapted to be used for other conveying purposes.

I claim as my invention:

In a conveying mechanism for transferring hot sheet metal from a plurality of furnaces to a common point of operation, a frame having a plurality of load carrying rollers arranged in adjacent rows, the rollers in one row being arranged obliquely to the rollers in the other row, means for pivotally connecting the receiving end of said frame to a stationary support adjacent said furnaces, and means for moving the discharge end of said frame laterally in an arcuate path to align it with the common point of operation and cause each of said rows of rollers to automatically assume different angular positions with respect to said furnaces, to thereby feed the sheets on one row of rollers laterally toward the center line of said roller frame faster than the sheets on the other row of rollers.

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