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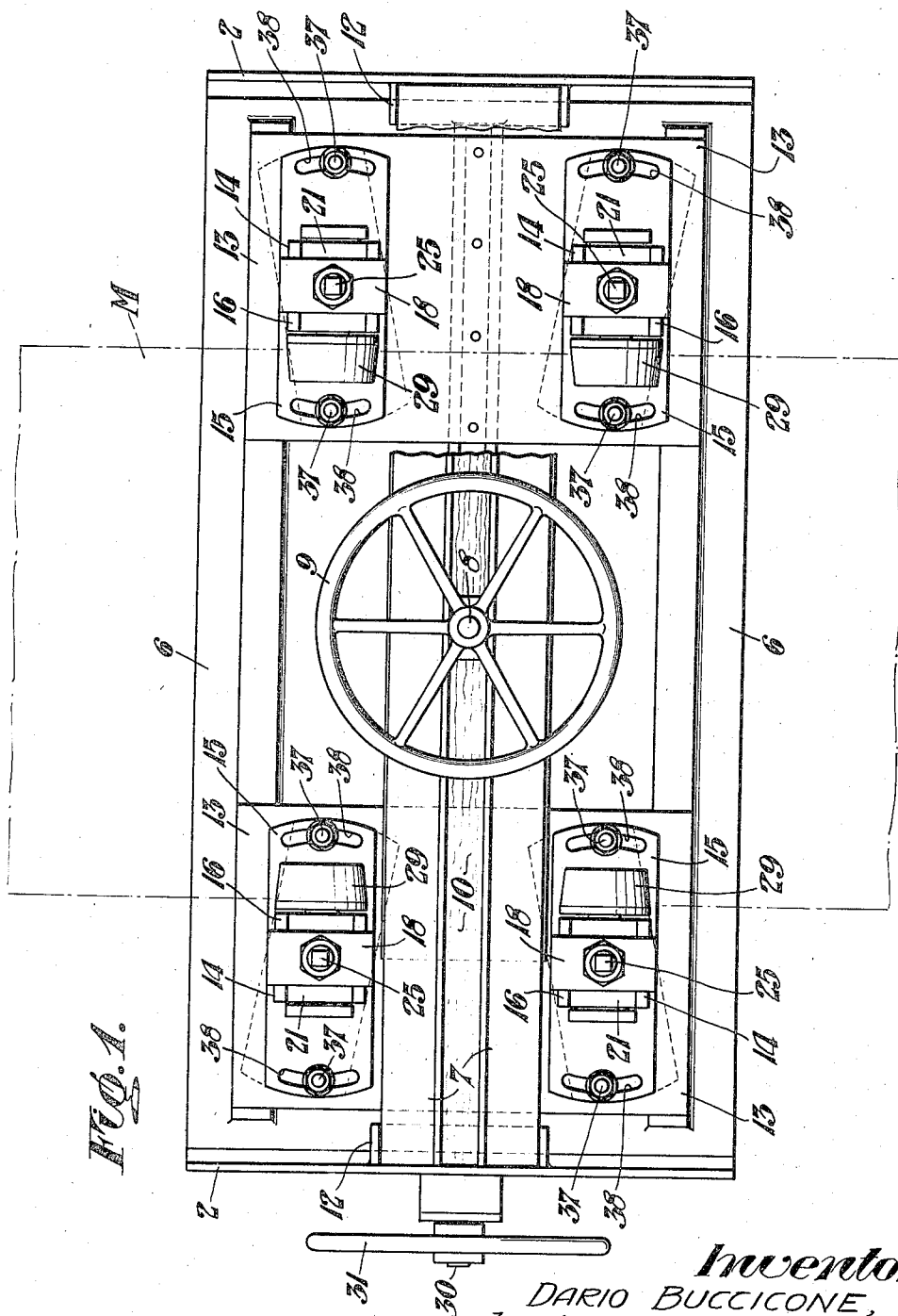
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2,071,682

APPARATUS FOR GUIDING AND ALIGNING STRIP MATERIAL

Filed May 20, 1936

4 Sheets-Sheet 1



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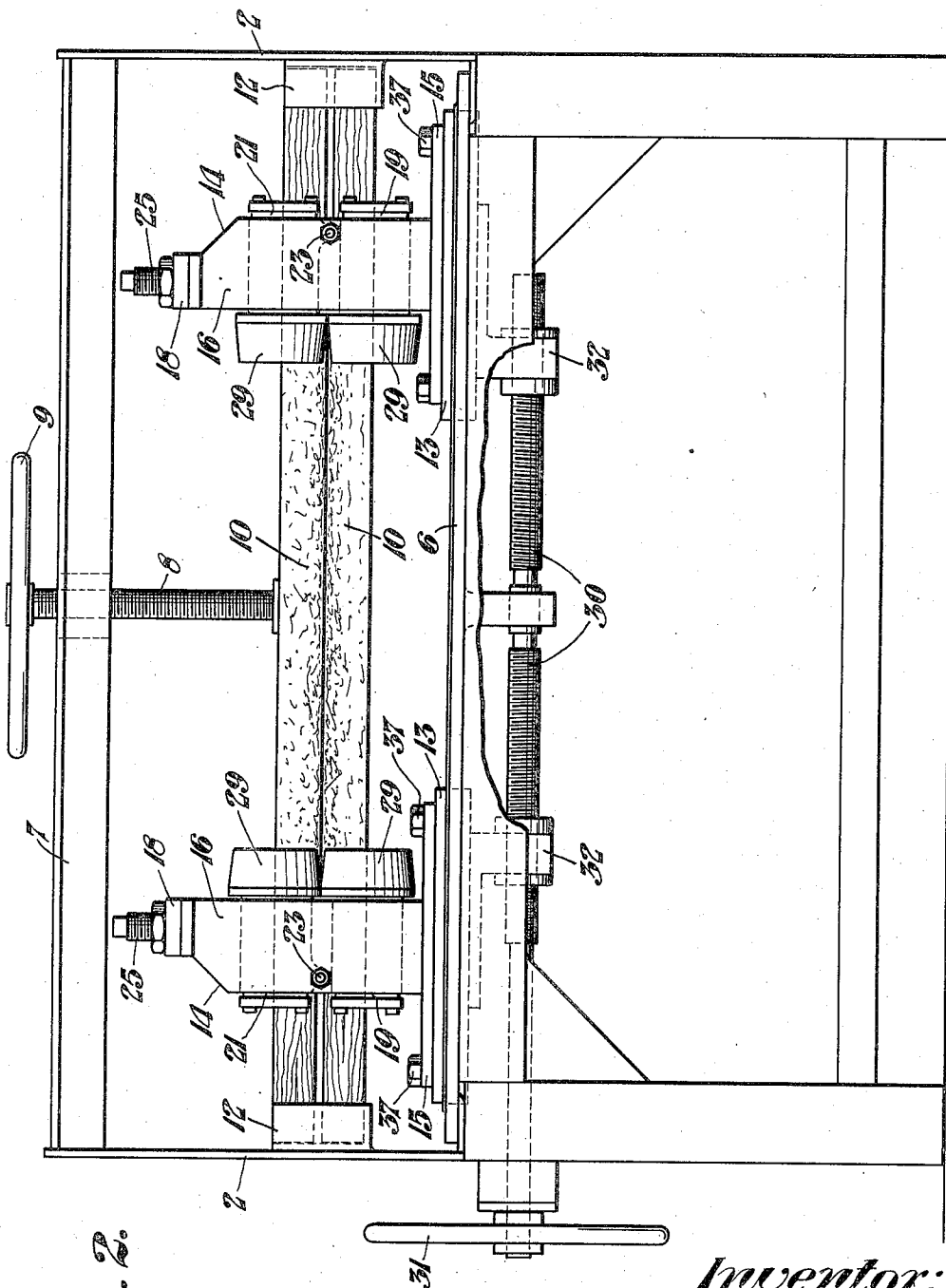
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APPARATUS FOR GUIDING AND ALIGNING STRIP MATERIAL

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4 Sheets-Sheet 2



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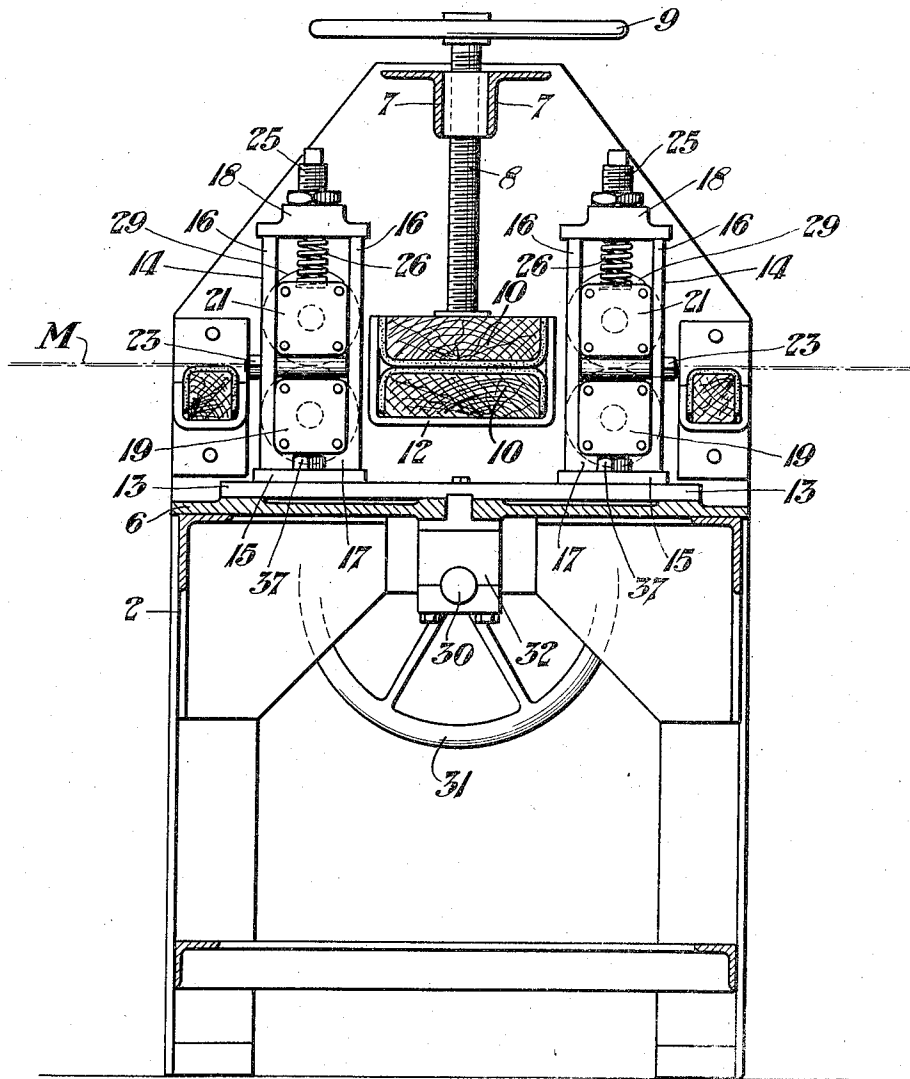
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APPARATUS FOR GUIDING AND ALIGNING STRIP MATERIAL

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4 Sheets-Sheet 3

Fig. 3.



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Fig. 5.

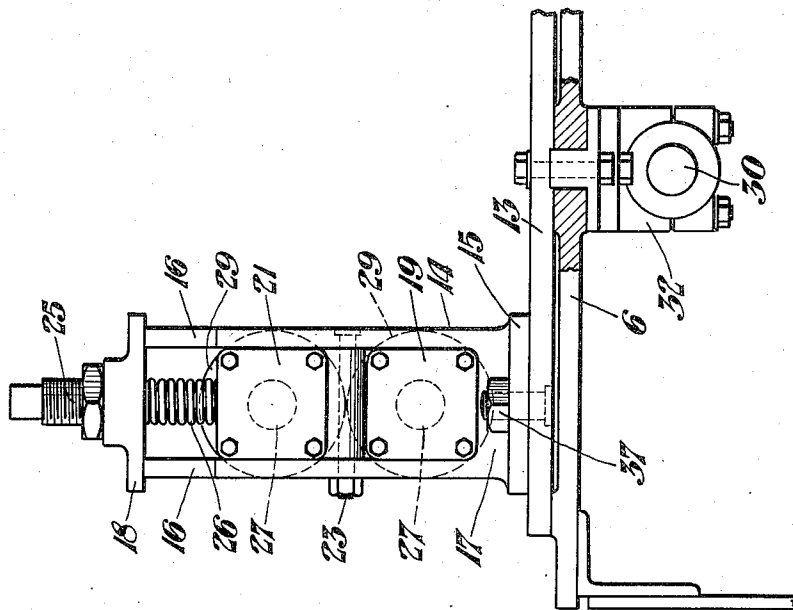
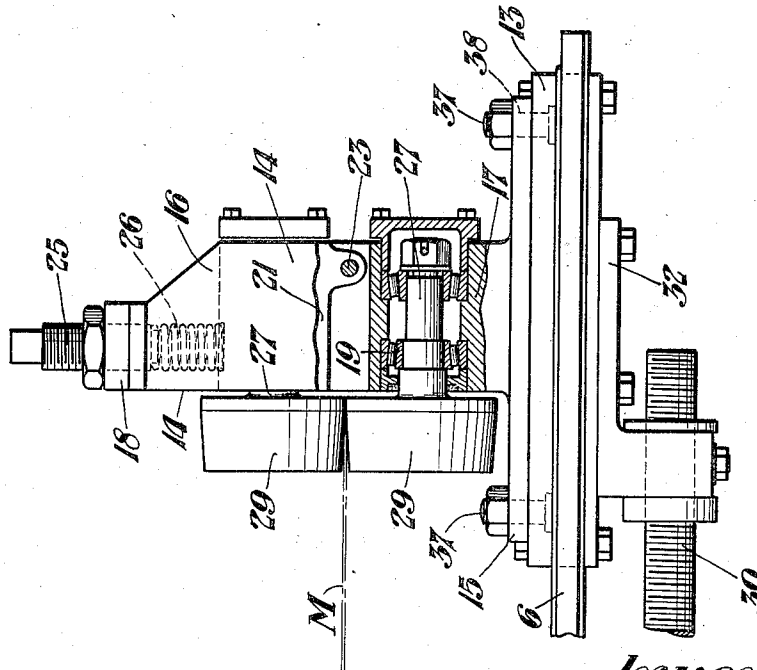


Fig. 4.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR GUIDING AND ALIGNING
STRIP MATERIAL

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Application May 20, 1936, Serial No. 80,913

8 Claims. (Cl. 271-2.6)

This invention relates to an apparatus for handling strip metal in long lengths and specifically relates to the alignment of the material prior to its further processing such as side trimming, slitting, shearing into short lengths or wrapping into coils thereby expediting production.

An object of the present invention is to provide means whereby the strip material, which is being fed through the present apparatus, is properly aligned by guiding means which may be in tandem relation or oppositely disposed or both and which is capable of adjustable relation one to the other, and also includes means to take care of irregularities in the thickness of the material being fed therethrough as well as providing the required tension on the strip material.

Another feature of the present invention is to provide means which is portable and interchangeable with any of the present strip processing apparatus.

With these and other advantages which will become apparent as the disclosure proceeds, Figure 1 is a plan view of the present embodiment of the invention; Figure 2 is an end view partly in elevation; Figure 3 is a side view showing the tandem arrangement of the guiding mechanism; Figure 4 is an end view of one unit of the guiding mechanism; and Figure 5 is a side view thereof.

In view of the increased demand for flat rolled products in the form of strip steel, the problems of handling such metals in widths ranging up to 90 inches and in thicknesses from .037 inch and lighter in continuous lengths, are constantly increasing. Various apparatus have been developed for handling the strip which is to be coiled or uncoiled, especially if the material has been reduced to the desired gauge. One of the main problems confronting the continuous feeding of strip material of large or small widths is the difficulty of keeping the material in proper alignment when traveling at high speeds.

The present invention affords a means for overcoming such difficulties and comprises a frame structure including oppositely disposed housing members 2 suitably supported by the usual leg-and-standard braces. For securing these housing members and supporting elements rigidly together there is provided a plate 6 known as a "slide" which is slotted through its central portion to permit transverse shifting of the guide mechanism hereinafter described.

Secured between the housing members 2 at the top thereof is a member 7 forming a brace, the

central portion of which carries a threaded opening through which is positioned a vertically adjustable screw member 8. A hand-wheel 9 mounted on the screw member 8 controls the space between strip tensioning members 10, the latter being secured to the housing members by supports 12. The space between the tensioning members is adjusted to accommodate the various thicknesses of the sheet material and constitutes the center line of travel for the strip material passing between the housings 2 and tends to hold the same in a substantially flat position. Suitable material may be provided upon the faces of the tension members 10 to prevent the strip from being marred or otherwise damaged due to this frictional contact.

Mounted on the plate 6 and capable of transverse movement relative to the line of travel of the strip material, are bearing plates 13, each of which normally lies adjacent the housing members 2. Secured upon these bearing plates are bearing housings 14, each consisting of a base plate 15, side walls 16, end wall 17 and a cap 18. The open end walls of the respective bearing plates face each other. The end wall 17 is provided, at its lower extremity, with an opening adapted to receive one end of a bearing unit 19 while the upper portion thereof is provided with means to receive a similar bearing unit 21, the latter being swiveled at 23 between the side walls 16. This provides a pivot means for the upper bearing unit which permits expansion of the two bearing units when an irregular thickness of the strip material passes therethrough. The upper bearing member is normally moved downwardly by means of a spring 26 surrounding a screw bolt 25 which permits the tension desired on the upper bearing member.

Within each bearing housing there is provided a rotatable shaft 27 having an enlarged end portion terminating in a roller 29 exterior of said bearing housing. These rollers 29 taper downwardly from the housings so that there is provided two superimposed normally contacting rollers having tapered faces to provide a substantially V-shaped opening into which one edge of the strip material engages. This roller guiding means for the material includes two roller units superimposed within a single bearing housing and there is provided one or more of these units arranged either in tandem and on opposite sides of the material or both, if so desired. These guiding rollers 29 may be moved toward and away from each other by means of the screw shaft 30 operated by a hand-wheel 31 which controls the

movement of the brackets 32 extending upwardly from the screw member and which are adapted to slide in the slots formed in the plates 6 and be secured to the bearing plates 13.

5 These guide rollers 29 in addition to being moved toward and away from the strip material and each other when oppositely disposed, through the means above described, are also capable of changing their angular relation with
10 respect to each other and to the material being fed through the apparatus. This is accomplished by providing the base plate 15 of the bearing housing 14 with arcuate slots 38 and by manipulation of the screw bolts 37, the housing unit
15 may be shifted laterally in one direction or the other as shown by the dotted lines in Figure 1 of the drawings.

20 These guide roller units may or may not be arranged in tandem on one side of the line of travel of the strip material or if desired, may be oppositely disposed on each side of the strip material so as to have the strip tensioning means positioned therebetween. The operating mechanism
25 for the guide roller units is exactly the same regardless of their position with respect to the strip material. If they are oppositely disposed, the screw shaft 30 simultaneously operates these units toward or away from the edges of the
30 material as the case may be and each unit will be capable of the independent angular adjustment.

35 In operation, each pair of guide rollers are adjusted toward or away from the edges of the strip material by rotating the hand-wheel 31 for moving the screw shaft 30 in the desired direction so as to position the edges of the strip material between the guide rollers, thus permitting the
40 majority of each face of each of the V-shaped roller units to hold the edges of the strip transversely taut and straight at the center line of travel. While in the majority of cases, the horizontal angle of contact of strip and rolls is in a
45 transverse line between opposite guide units they may be equally shifted so as to be at any desired angle by slightly turning them toward the entrance end of the device so that the guide rollers
50 will have a slight tendency to push both edges of the strip material toward the center of the strip, or if set at an angle slightly toward the exit end (Figure 1) will have a tendency to pull the edges outwardly and away from the center
55 line of pass. In this latter case, the guide rollers will not only guide the strip material but at the same time will also remove from the edges of the strip material any rough or burred sections which would otherwise remain thereon.

60 Referring specifically to Figure 1, if the sheet is traveling toward the right of the drawings and in the same plane thereof, all of the roller units may assume the dotted line position shown by the roller units on the left hand side of the drawings or if the sheet is travelling toward the left
65 of the drawings, all of the roller units may assume the dotted line position of the right hand roller unit. Such an action tends to hold the edges straight and taut. However, occasionally, there are instances requiring the sheet to be urged toward the center line of travel, in which
70 instance, all the roller units will assume the reverse angular position as mentioned above.

75 Thus in Figure 3 the strip material M is fed into and between previously adjusted pairs of roller-guides and then into and between the strip tensioning members 10. The hand-wheel 9 is

then set to apply pressure to the members 10 to maintain the strip under the desired tension. The edges of the strip are in the meantime fed between the adjusted guide roller units on the exit end of the apparatus (Figure 3) and thence
5 to any processing device such as edge trimmers, slitters, shears or recoiling drums. In the case of recoiling the strip, I have found that the guiding mechanism provides a coil whose ends are not only smooth but the convolutions are
10 aligned so as to give a straight smooth edge highly desirable for the sake of appearance in cases where the coil is to be wrapped or where uneven or overhanding edges would not be tolerated if the coil was to be heat-treated or stood on end.
15

The rapidly moving strip material is guided by virtue of being held securely at its edges between
20 freely rotating rolls any tendency to travel laterally or side-creep is opposed by the V-shaped opening between the rollers. Thus, if the strip starts to travel laterally, the edge of the strip encounters opposition as it tends to force itself
25 further into the narrowing and tapering groove between the rolls with the result that its lateral shift is resisted and furthermore, due to the rotating surface of the rolls, the sheet is urged toward its center line of travel. This self-aligning
30 feature prevents the strip from contacting any side guides which would, in most cases, burr or roughen the edges of the strip and necessitate stopping its movement in order to get the strip back on its center line of travel.

35 By swiveling the top roller of the guide unit, any abnormal edge thickness, to the extent of a doubled or bent over edge, is allowed to pass without damaging the guide rolls as the top roll swivels upwardly only for the length of time the abnormally thick edge is present.

40 While I have shown and described one specific embodiment of my invention, it will be understood that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of my invention, as defined by the following claims.

I claim:

45 1. An apparatus for guiding strip material comprising a support, strip tensioning means mounted on said support, and guiding means movable on said support, said guiding means including a housing provided with superimposed
50 roller units therein with one of said roller units movable relative to the other.

55 2. An apparatus for guiding strip material comprising a support, tandem guiding members adjustable on said support, strip tensioning means and means adapted to independently change the angular position of any one of said guiding members relative to the other.

60 3. An apparatus for guiding strip material including a support, guiding means mounted on said support in tandem relation, means adapted to adjust said guiding means toward and away from each other and means to vary the angular relation of said guiding means one to the other.

65 4. In an apparatus for self-aligning strip material, means for guiding and aligning said strip material consisting of oppositely disposed roller units having a substantially V-shaped passage, means for adjusting said units toward and away
70 from each other and means for varying the angular relation of said roller units.

75 5. In an apparatus for continuously feeding strip material, means for guiding said material consisting of tapered roller members arranged in

tandem, a bearing housing supporting said roller members, means for regulating the tension on the strip material, and means for pivotally connecting one of said roller members to said bearing housing.

6. In an apparatus for self-aligning strip material, means for guiding said material consisting of oppositely disposed and tandemly arranged rotatable members each having a substantially V-shaped passage, said rotatable members provided with means adapted to individually adjust the angular relation of one member with respect to the other, and means adapted to move said members toward and away from each other.

7. An apparatus for guiding strip material comprising a support, adjustable guiding mem-

bers on said support, strip tensioning means and means for independently adjusting the angular position of any one of said guiding members relative to the other.

8. An apparatus for self-aligning strip material comprising a support, pairs of superimposed guiding rollers provided with tapered surfaces mounted on said support, strip tensioning means on said support, means simultaneously moving said guiding rollers toward and away from the strip material, a housing for each pair of guiding rollers including means for pivotally supporting the upper roller and means adapted to vary the angular position of said roller units with respect to the line of travel of the strip material.

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