Aug. 20, 1935. A. V. SPINOSA ET AL 2,011,661

MANUFACTURE OF BRAKE SHOE INSERTS

Filed Oct. 21, 1932 2 Sheets-Sheet 1

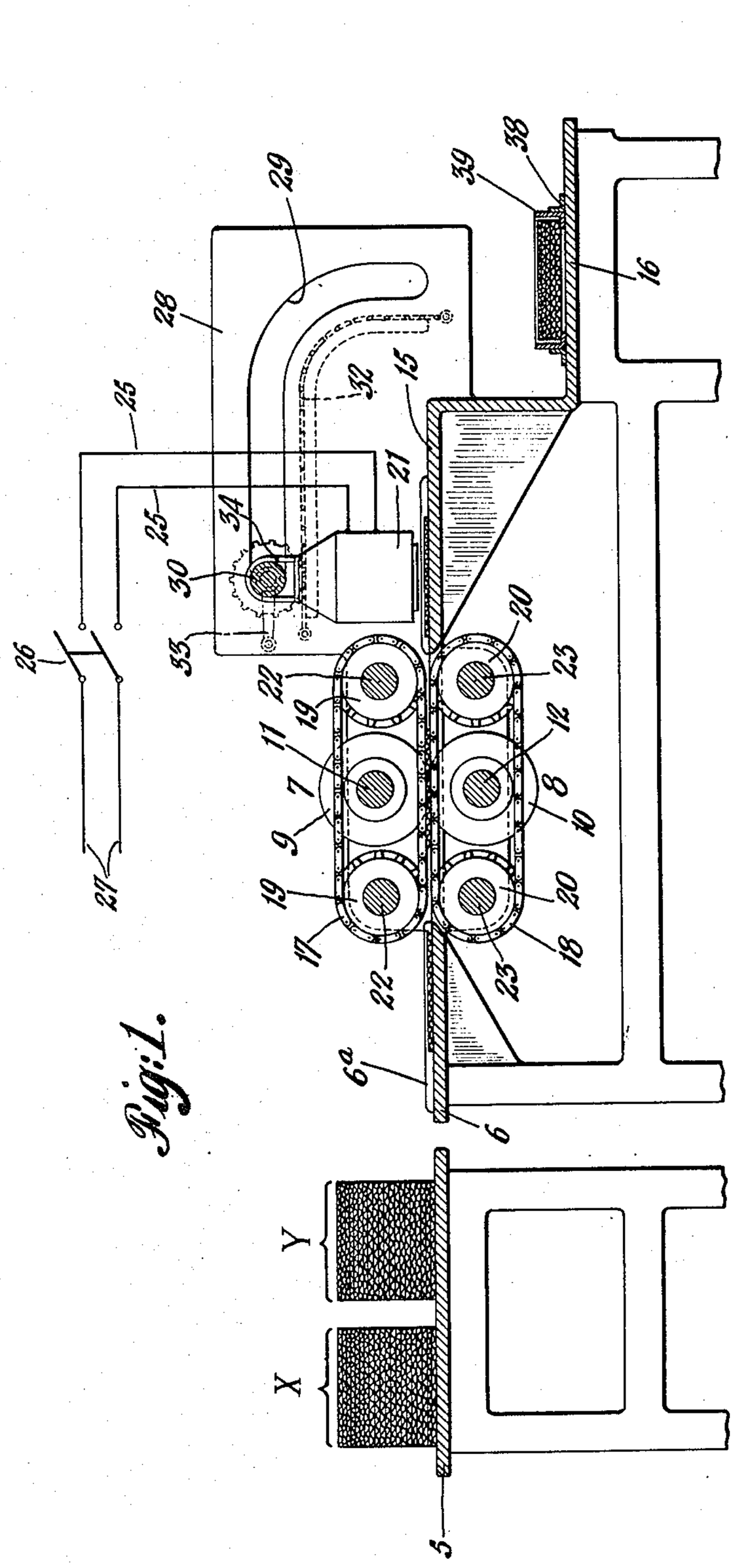

Fig. 1.

Fig. 3.

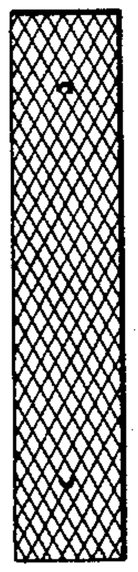

Fig. 4.

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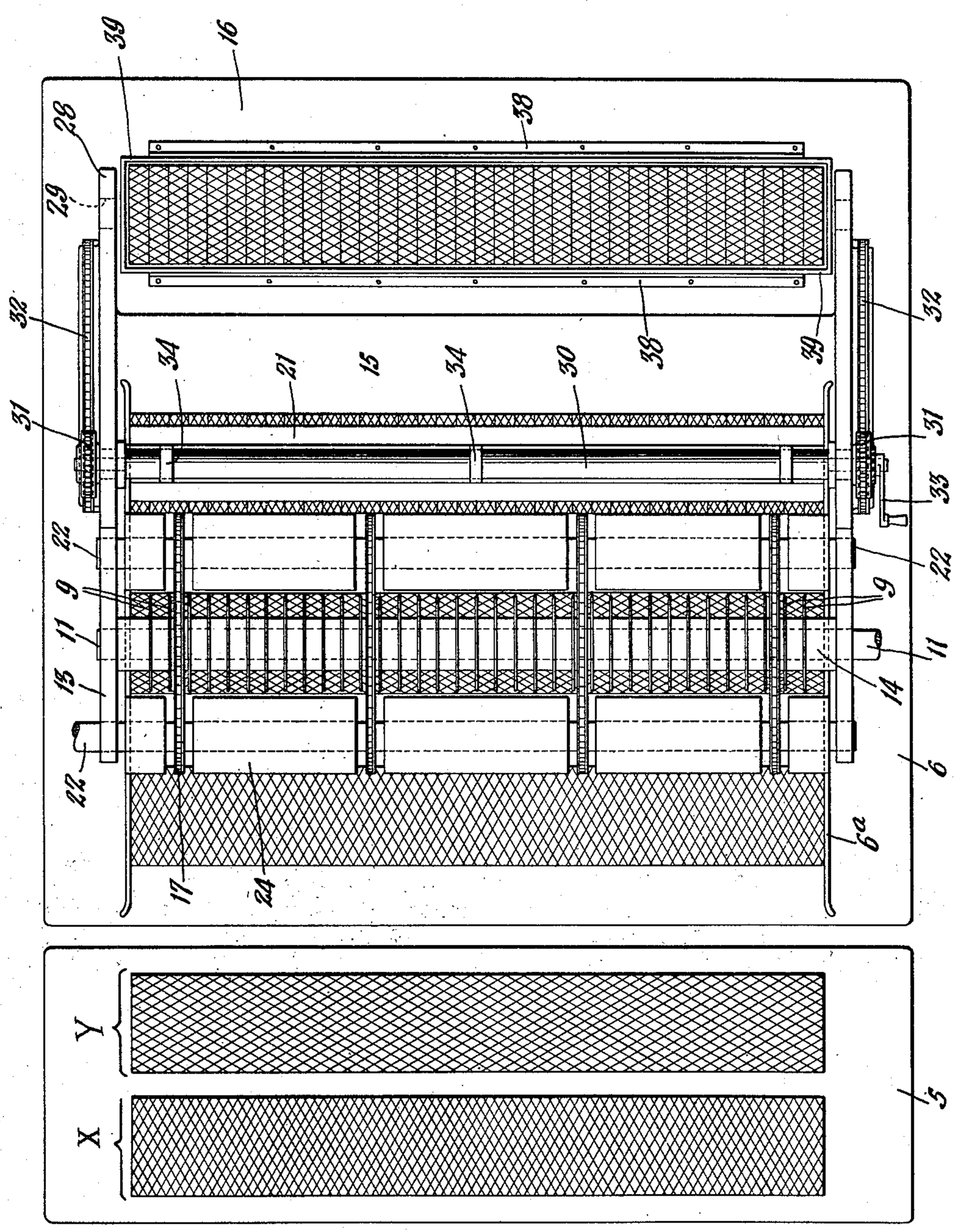

Fig. 2.

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2,011,661

MANUFACTURE OF BRAKE SHOE INSERTS

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6 Claims. (Cl. 29—152.1)

This invention relates to the manufacture of brake shoe inserts and is especially concerned with a method and apparatus for cutting, stacking and bundling such inserts for convenience in handling, shipping, and use.

For a complete understanding of the invention, it should be borne in mind that brake shoes of the character employed in railway vehicle brake equipment are quite commonly manufactured by a casting process in which the metal employed is moulded about a base composed of strips of expanded metal meshwork. A group of strips for a brake shoe of this type is commonly called a brake shoe insert, the purpose thereof being to increase the life and strength of the shoe and reduce cracking and breakage to a minimum.

Furthermore, the metallic meshwork from which these inserts are preferably formed ordinarily has openings or apertures therein of somewhat elongated shape, and each insert is desirably composed of a plurality of strips or pieces of expanded metal formed as a bundle or stack, with the openings in alternately stacked pieces alternately extended lengthwise and crosswise thereof. That is, one insert is preferably formed, for example, of from three to nine meshwork pieces, some of which have the long dimension of their openings extended lengthwise of the insert and others of which have the long dimension of their openings extended crosswise of the insert. The two types of pieces are preferably alternately stacked so as to improve strength, rigidity and other desirable qualities in the finished product which need not be considered in detail herein.

In accordance with prior practice, brake shoe inserts of the character referred to were commonly cut from expanded metal sheets of various different sizes and shapes. Furthermore, the procedure heretofore followed commonly included formation of a large number of insert pieces of one type (for example, with the long dimension of the meshwork openings extended lengthwise of the pieces) and thereafter formation of a large number of pieces of another type (with the long dimension of the meshwork openings differently extended) and the pieces of the two types were individually handled and stacked in alternate relation.

This prior practice has proven extremely inefficient from the standpoint of time consumed and amount of handling necessary, the excessive handling being particularly disadvantageous since the pieces always have sharp edges on which the hands of the workmen are frequently injured.

While some of the more specific objects and advantages of this invention can best be understood after consideration of the following description referring to the accompanying drawings, it should be noted at this point that, in general, the invention contemplates a highly efficient and simplified method for manufacturing brake shoe inserts and also a simple and yet effective apparatus constructed for the purpose, the method and apparatus both serving to reduce handling and time consumed and further, to ensure accurate stacking of the pieces in each insert not only as to the alternating relationship, but also as to accurate alignment of the several pieces included in each stack.

Another feature of considerable importance is involved in handling, cutting and stacking the insert pieces in such manner as to avoid warping or curling thereof and further, to prevent the formation of torn or ragged edges at the points of cutting. The curling or warping of the strips, of course, is disadvantageous, at least if it is present to a material extent, primarily for the reason that difficulties would arise from the use of such curved pieces during casting of the brake shoes. As to the torn or ragged edges, it is noted that this condition, as well as the presence of dirt particles and the like, causes blow holes in the ultimate brake shoe castings. This is undesirable, of course, since it impairs the wearing qualities of the shoes and also weakens their structure.

We have found that difficulties of the nature just referred to are at least very materially reduced by following the method and utilizing the apparatus herein disclosed.

In the drawings—

Figure 1 is a somewhat diagrammatic side elevational view of the apparatus which we prefer to employ;

Figure 2 is a somewhat diagrammatic top plan view of the apparatus shown in Figure 1;

Figure 3 is a view of a tray structure which we prefer to employ; and

Figure 4 illustrates a completed brake shoe insert.

Referring first to Figures 1 and 2, it will be seen that the apparatus includes a table 5 adapted to support stacks of meshwork sheets X and Y from which the individual pieces of the inserts are to be cut. An additional table 6, equipped with adjustable guides 6*a* to accommodate and center sheets of different widths, serves

to support the sheets X or Y as they are fed between the slitting rolls 7 and 8. The rolls include cooperating knives 9 and 10 mounted on shafts 11 and 12 which may suitably be driven as by the gearing 13. The knives 9 and 10 are preferably mounted along the cooperating rolls 7 and 8 in spaced relation so as to cut insert pieces or strips of the desired width, and the rolls themselves may be journalled as indicated, for example, at 14.

A third table or support 15 serves to receive the strips cut from each meshwork sheet, while the table 16 is adapted to receive the tray structure shown in Figure 3 which will be described more fully hereinafter.

Turning again to the slitter mechanism, it is noted that the type of device employed includes upper and lower cooperating feed chains 17 and 18 mounted on sprockets 19 and 20 which, in turn, are carried by shafts 22 and 23. The chains 17 and 18 are arranged at spaced intervals along the length of the cutting rolls and are disposed between the knives 9 and 10 so as to grip the sheets during the time they are being cut into the insert pieces. The shafts 22 and 23 also carry cooperating roller surfaces 24 which further serve to prevent curling of the sheets, at both sides of the slitting knives, during their movement through this part of the apparatus. However, the specific structure of this slitter mechanism need not be considered in detail herein since it forms no part of the present invention per se. The slitter mechanism, however, cooperates with the remainder of our improved apparatus in carrying out the method of the present invention, especially in the matter of avoiding curling of the sheets and also in ensuring proper feed of the slitted pieces away from the cutter knives and on to table 15, subsequently to be picked up by the magnet 21 and transported thereby to tray 39 on table 16.

The structure of the magnet includes either a plurality of relatively closely spaced magnet elements across the entire width of the apparatus or some other suitable arrangement of magnetic elements of the "electro-magnet" type. The electrical connections to the magnet include leads 25—25, through flexible cord or the like, and a switch 26 for the purpose of connecting and disconnecting the leads 25—25 from the power source 27—27.

For the purpose of moving the magnet from a position overlying table 15 to the position for depositing the insert pieces in tray 39, we preferably employ a pair of side plates or members 28 provided with grooves 29 through which project the opposite ends of the supporting shaft 30. This shaft carries sprockets 31 at its ends which cooperate with chains 32 mounted in a curved path substantially conforming to the curvature of slots or grooves 29. Additionally, a crank lever 33 is carried at one end of shaft 30 in order to rotate the shaft and thus cause the sprockets to advance along chains 32 and thereby carry shaft 30 along the guide grooves 29. The magnet 21 is preferably hung from the shaft 30 by suitable straps or bearing devices 34 so that it always hangs downwardly from shaft 30.

At this point, it should be noted that the guide grooves 29 and the associated mechanisms are arranged (see Figure 1 particularly) in such manner that the insert pieces picked up by the magnet may be positively placed in the tray and not dropped thereinto from a point above the tray. This is desirable in order to avoid derangement of the several pieces cut from each sheet.

In the preferred arrangement, we also construct the supporting table 16 with generally upright guides 38 extended crosswise of the apparatus to receive a tray structure generally indicated in Figures 1 and 2 at 39, and shown in more detail in Figure 3. This tray and the operating mechanism for the magnet 21 are so relatively positioned as to permit withdrawing tray 39 laterally during operation of the machine for purposes which will be described more fully hereinafter.

Referring now to Figure 3, the tray structure (shown in Figure 3 in perspective) includes upright side and end walls 40 and 41, respectively, and also a marginal flange 42 at its bottom preferably arranged so as to leave a relatively large opening or aperture 43. The dimensions of the tray structure, as best seen in Figure 2, are such as to accommodate or fit expanded metal sheets X or Y, with the edges of the sheets resting on the marginal flanges 42.

In carrying out the operation, we first prepare and expand, by means of any suitable known machines, two different groups of sheets (X and Y) both of which preferably have the same overall dimensions but which differ from each other in that one type (X in Figure 2) is cut with the major axis of the meshwork openings extended transversely of the sheet, while the other type (Y in Figure 2) is cut with the major axis of the meshwork openings extended lengthwise of the sheet. By way of example, the sheets may measure about 13 inches by about 91 inches, the smaller dimension preferably being equal to the length of the particular brake shoe inserts to be manufactured.

Also, by way of example, sheets of these dimensions may be cut into approximately thirty-six pieces by means of the cooperating knives 9 and 10, so as to produce individual insert pieces approximately 2½ inches by 13 inches. Different cutting rolls or different spacing of the knives carried thereby, of course, may be employed where it is desired to produce insert pieces of different width.

To proceed with the operation, therefore, assume that sheets X and Y have been prepared in accordance with the foregoing discussion and that piles of these sheets are brought to the mechanism for slitting purposes, the attendants or operators alternately feed sheets X and Y to the slitting mechanism. Upon discharge of the group of strips (for example, 36) from the slitting rolls, they rest upon table 15, and the electro-magnet 21 is moved by means of the crank lever 33 to a position overlying the pieces on table 15. The switch 26 is then actuated to close the power circuit for the magnet and the magnet picks up the entire group of strips in the form of a single sheet and carries it to a point overlying a tray 39. It will be noted that the final movement of the magnet is downward, in view of which the pieces are positively placed in the tray 39 and, upon reaching this point, the switch 26 is opened in order to de-energize the magnet and leave the pieces carried thereby in the tray.

The succeeding group of strips discharged from the cutting mechanism, of course, will be of the type having its meshwork openings oppositely arranged, and this group will also be picked up by the magnet 21 in the manner already described and transported thereby to

be placed in tray 39. When the desired number of layers or stacked sheets has accumulated in one tray, this tray may readily be removed by an attendant laterally from between the guides 38 and another tray immediately inserted in order to receive the following slitted sheets.

With respect to the use of trays 39, it should be noted that they are of advantage not only in permitting handling of a plurality of brake shoe inserts as a unit, but further in facilitating bundling of the pieces comprising each insert.

Upon filling of one tray, it is removed to a suitable work table or the like at which a workman is engaged in wiring the pieces of each insert together, so that proper alignment of the strips in each insert will be maintained. With respect to this matter it should be noted that the inserts are retained in the tray structure until after the entire group has been wired. Thus, in contrast to prior practice, the pieces incorporated in each insert are accurately aligned in the tray and are maintained in neat stacks until the wiring is completed. Much more uniform and even inserts are therefore produced. Unnecessary handling and also injury to workmen's hands are substantially eliminated, since the pieces need not be individually placed together and stacked nor manually held in stacked position until wired.

Following the wiring of the individual inserts, if desired, they may further be bundled in groups, for example, approximately 13 inches in each direction, to facilitate further handling, shipment and the like.

Thus, in accordance with the present invention, we have provided novel and highly desirable means as well as method for producing brake shoe inserts including any desired number of layers of meshwork. Differences in size and shape of the inserts being made may also be readily compensated for by employing cutters of different spacing and handling trays of different dimensions.

Still further, while reference is made to the manufacture of brake shoe inserts from expanded metal having meshwork openings of greater length in one direction than in another (this being the type of material at present best suited to the purpose), it should be understood that expanded metal having meshwork openings of modified or different configuration may also be employed and prepared in elongated sheets with the meshwork openings differently arranged in different sheets, so as to increase rigidity or strength. Thus, the method and apparatus of this invention may readily be accommodated to carry out the production of brake shoe inserts from substantially any desired material.

In considering the method and also the meshwork employed, it is to be understood that while we prefer to stack each insert from pieces alternately of long and cross cut openings, this may not always be essential, and at least numerous features of this invention are equally applicable where the inserts are made of strips having the same meshwork arrangement.

In conclusion, it is to be observed that the method and apparatus of the present invention provides for very accurate stacking of the pieces cut from each sheet, since these pieces are not dropped by the magnet but are positively placed in the tray structure by the downward movement thereof in the latter part of the guideways 29.

We have also found, and this is of very great importance for reasons referred to hereinbefore, that by following the foregoing method of producing brake shoe inserts and employing the apparatus shown and described, the insert pieces produced are practically free of torn or ragged edges and are also substantially flat. Blow holes and the like in the brake shoe castings are therefore materially reduced.

The present method is also of very great importance since it eliminates numerous handlings of the insert pieces and thereby avoids the accumulation or picking up of dirt particles which have heretofore so frequently impaired the strength and wearing qualities of the shoes on account of the blow holes resulting.

We claim:—

1. The method of manufacturing brake shoe inserts from expanded metal meshwork which includes forming sheets of expanded metal with elongated meshwork openings therein, said sheets being of considerably elongated shape and substantially uniform dimensions, some of said sheets having the long dimension of the meshwork openings extended lengthwise thereof and some of said sheets having the long dimension of the meshwork openings extended crosswise thereof, symmetrically cutting sheets of each type into a plurality of insert pieces, and alternately stacking said sheets after cutting thereof.

2. The method of manufacturing brake shoe inserts from expanded metal meshwork which includes forming sheets of expanded metal with elongated meshwork openings therein, said sheets being of considerably elongated shape and substantially uniform dimensions, some of said sheets having the long dimension of the meshwork openings extended lengthwise thereof and some of said sheets having the long dimension of the meshwork openings extended crosswise thereof, symmetrically cutting sheets of each type into a plurality of insert pieces, alternately stacking said sheets after cutting thereof, whereby to form a plurality of inserts each including a plurality of pieces alternately stacked, and bundling the inserts independently whereby to facilitate separate handling thereof.

3. The method of manufacturing brake shoe inserts from metal lath having elongated openings which includes forming elongated expanded metal sheets from which insert pieces are to be cut, with the openings in some sheets extended lengthwise thereof and with the openings in other sheets extended crosswise thereof, alternately cutting sheets of the two types referred to into a plurality of strips, the cutting being effected cross-wise of the elongated sheets of both types whereby to produce insert pieces having the large dimension of their openings also extended in different directions as between groups of strips cut from a sheet of one type and groups of strips cut from a sheet of the other type, and alternately stacking a plurality of sheets of different types after cutting thereof.

4. The method of manufacturing brake shoe inserts from metal lath having elongated openings which includes forming elongated expanded metal sheets from which insert pieces are to be cut, with the openings in some sheets extended lengthwise thereof and with the openings in other sheets extended crosswise thereof, alternately cutting sheets of the two types referred to into a plurality of strips, the cutting being effected crosswise of the elongated sheets of both types whereby to produce insert pieces having the large dimension of their openings also extended in different directions as between groups of strips cut from a sheet of one type and groups of strips cut from a sheet of the other type, and

alternately stacking a plurality of sheets of different types after cutting thereof in a tray adapted to receive groups of strips of each type.

5. The method of manufacturing brake shoe inserts from metal lath having elongated openings which includes forming elongated expanded metal sheets from which insert pieces are to be cut, with the openings in some sheets extended lengthwise thereof and with the openings in other sheets extended crosswise thereof, cutting sheets of the two types referred to into a plurality of strips, the cutting being effected crosswise of the elongated sheets of both types whereby to produce insert pieces having the large dimension of their openings also extended in different directions as between groups of strips cut from a sheet of one type and groups of strips cut from a sheet of the other type, stacking a plurality of sheets of different types after cutting thereof in a tray adapted to receive groups of strips in superimposed relationship, and bundling the superimposed strips received in said tray to form a plurality of brake shoe inserts each including a plurality of strips having their openings extended in different directions.

6. The method of manufacturing brake shoe inserts from metal lath having elongated openings which includes forming elongated expanded metal sheets from which insert pieces are to be cut, with the openings in some sheets extended lengthwise thereof and with the openings in other sheets extended crosswise thereof, alternately cutting sheets of the two types referred to into a plurality of strips, the cutting being effected crosswise of the elongated sheets of both types whereby to produce insert pieces having the large dimension of their openings also extended in different directions as between groups of strips cut from a sheet of one type and groups of strips cut from a sheet of the other type, alternately stacking sheets of different types after cutting thereof in a tray adapted to receive groups of strips of each type in superimposed relationship, and bundling the superimposed strips while they are positioned in the tray to form a plurality of brake shoe inserts each including a plurality of alternately arranged strips having their openings extended in different directions.

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