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T. LUND

METHOD OF CUTTING SHEET MATERIAL

Filed Jan. 6, 1919

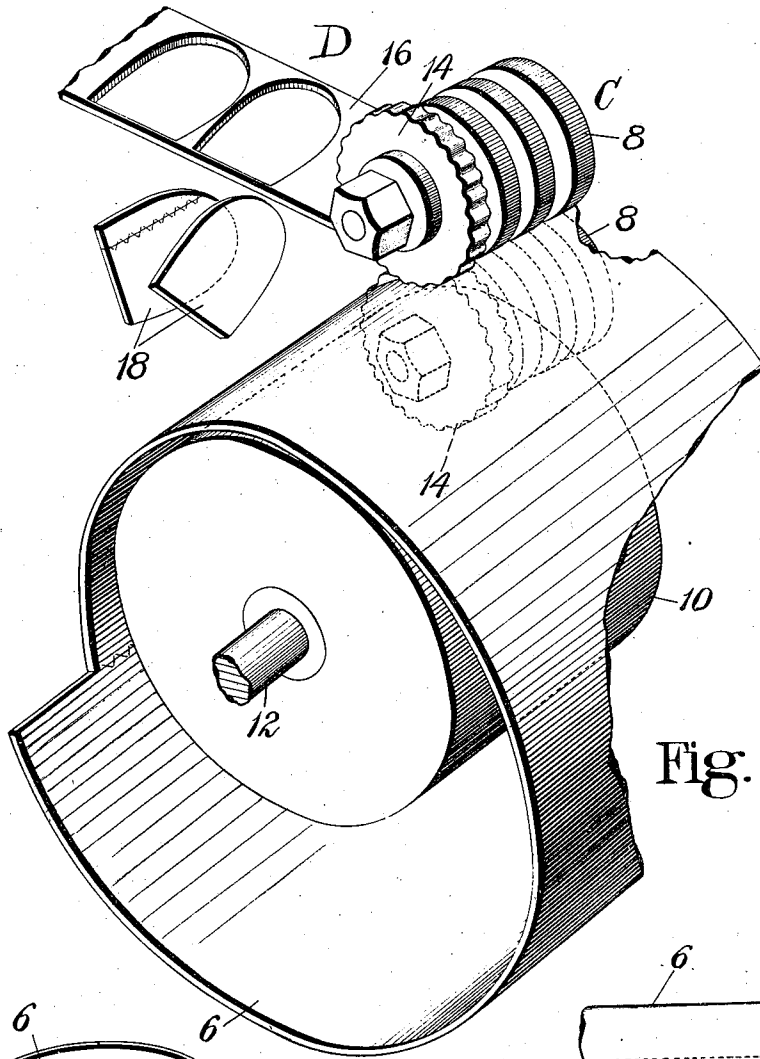


Fig. 1.

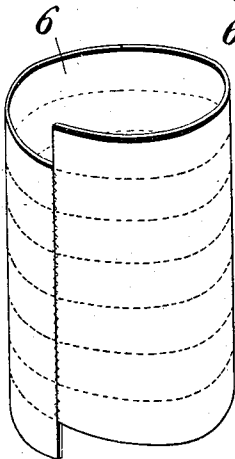


Fig. 3.

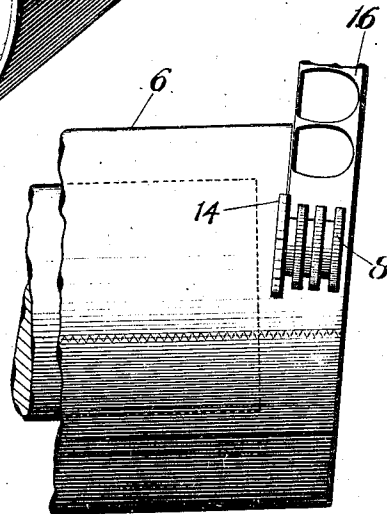


Fig. 2.

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METHOD OF CUTTING SHEET MATERIAL.

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To all whom it may concern:

Be it known that I, THOMAS LUND, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain Improvements in Methods of Cutting Sheet Material, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to improvements in methods of cutting stock. The invention is herein set forth by way of illustration with particular reference to its use in the cutting of sheet material into blanks having distinctive characteristics although the invention is not restricted to such use.

In the practice of methods heretofore employed for cutting blanks from sheet material it has been necessary to shift the material relatively to the knife or die or other cutting means a plurality of times and in various directions, and most commonly in directions at right angles to each other, in order to cut from all portions of said material. This has necessitated the provision, in automatic machinery, of more or less complex mechanisms designed to control the feeding of the sheet so as to cut from all parts thereof, or, in practising said methods with the aid of simple mechanisms, the constant attention of the operative to the sheet feeding and cutting operations has usually been imperative, thus adding materially to the cost of the operations. Moreover, since sheets of leather, of fibre, of leatherboard, and of compositions for various purposes, are ordinarily of relatively moderate dimensions, it follows that the amount of scrap from a given weight of material may be relatively high because of the waste around the borders of each sheet and because of the difficulty of properly positioning for cutting the last end portion of each sheet as it is being cut.

An object of the present invention is to devise a method of cutting stock as such sheet material which will eliminate these and other disadvantages attendant upon the use of such mechanisms constructed and used to insure, for example, the feeding of the end portions of the sheets or strips being cut, and the practice of which will be generally

more satisfactory and economical than methods heretofore employed.

In one aspect, the present invention contemplates the positioning of the sheet material in such a way that it may be moved constantly in one direction throughout the cutting operations, thus making it possible to avoid the necessity of shifting the work and the cutting means relatively to each other in various directions as has heretofore been necessary in changing the form of the sheet material, for example, in reducing sheets to a plurality of blanks, and further making it possible to relieve the operative from constant attention upon the cutting operations whereby cutting operations at a plurality of stations may be attended to by one operative. In practice each sheet will be positioned with its ends temporarily or permanently secured together, the sheet being in the form substantially of a hollow cylinder, and the sheet material will then be fed constant in the same direction to a blank cutting mechanism of ordinary construction until the whole of the sheet has been converted into a plurality of blanks of the kind desired.

A marked advantage of the invention resides in the reduction of waste of material to the very minimum. In cutting sheets into blanks by the methods heretofore practised, the sheets were ordinarily cut into strips either before or simultaneously with the cutting of the blanks with the result that waste pieces were left at both ends of each strip. By the present invention, the sheet becomes actually or in effect one long strip, of a width corresponding to one dimension of the desired blank, from which blanks may be cut most economically. For some uses to which the blanks may be put, it is immaterial that an occasional blank will be intersected by the line of union between the original attached ends of the sheet, and in these cases the amount of utilizable material reaches a very high percentage of the total.

Other objects and features of the invention will be apparent from the following detailed description and will be pointed out in the appended claims.

In the drawings;

Fig. 1 is a perspective view, partly in section, of parts of a cutting mechanism, including a work holder, which may be used

in the practice of the method herein described, the said figure illustrating also certain steps of the method;

Fig. 2 is a plan view of the devices shown in Fig. 1; and

Fig. 3 is a view in perspective of a sheet of material formed into a hollow cylinder.

The mechanism shown is illustrative merely of one type of mechanism which may be utilized in practising the herein disclosed method of cutting sheet material. While this improved method of cutting sheet material into blanks has wide application in various arts, it is here related more particularly to processes involved in the manufacture of shoe parts as, for example, heel lifts for boots and shoes. The practice of my invention may vary somewhat with the characteristics of the work and the nature of the results desired. For instance, the sheet material to be operated upon may conceivably be furnished in the form of hollow cylinders, especially in those cases in which the material consists of paper, paperboard, leatherboard, or compositions of various kinds which are rolled out from material in a soft or plastic condition. Assuming, however, that the work comes in the form of substantially flat sheets, the first step in the cutting of such sheet material consists in rolling a sheet, such as sheet 6, into substantially cylindrical form with its ends brought into abutting relation and temporarily or permanently secured together. Ordinarily the securing means may consist of stitches which will afford a continuous line of attachment between the abutting edges, though staples or other metallic fastenings may be used, an alternative arrangement comprising the beveling of the ends so that they may be overlapped and secured by cement or any other well-known attaching means. Preferably and as shown, the ends of the sheet 6 are offset laterally of each other a distance corresponding to one dimension of the strip or blank that it is desired to cut from the sheet. This hollow cylinder of sheet material may then be introduced into a cutting machine which may comprise as its principal features feeding rolls 8 arranged practically in vertical alinement and adapted to engage on two sides of the sheet material to grasp the same firmly and to feed it constantly in one direction. In order to assist in supporting the cylinder of sheet material there is provided a roller 10 idly mounted upon a shaft 12. When the cylinder of sheet material is introduced into proper position on its support 10 and into position to be gripped by the feed rolls it will be noted that the longitudinal axis of the paper or leatherboard cylinder is parallel with the axis of the shaft 12 and at an angle with respect to the axes of the feed rolls 8, this arrangement being for the pur-

pose of securing not only a rotative movement of the work but also a lateral shifting movement of the same so that any given point on the leatherboard cylinder moves in a helical path. Mounted preferably on the same shafts with the rolls 8 are cutters 14 which co-operate to cut a continuous strip 16 from the cylinder simultaneously with the feeding thereof as will be evident from the disclosure in Fig. 1 of the drawings. The feeding and slitting of the material which takes place at station C will ordinarily be intermittently performed in order that blanks 18 may be cut from the strip at station D by the operation of any well-known dieing-out mechanism comprising relatively reciprocable die and cutting block members. Obviously the blank cutting may be carried out by continuously operating cutting means in which case the feeding and slitting at station C may also be continuous. From this disclosure it is clear that the sheet of material in cylinder form may be fed constantly in one direction without the necessity of providing complex mechanisms for causing relative movements of the work and of the die in different directions to effect the cutting of the sheets into blanks and that the work when once introduced into proper relation with the feeding means requires no further attention on the part of the operator, thus making it possible for one operative to attend a number of machines. As heretofore pointed out, in cutting blanks from sheet material according to methods heretofore practised there was always considerable waste at both ends of the strips or sheets of the material being operated upon. According to the present method, the sheet is cut helically so that it is the equivalent of one continuous strip from the starting to the ending point. Hence there is a very marked saving of material and in those cases in which it is immaterial whether or not the blank cut therefrom is intersected by the line of union between the original attached ends of the sheet the utilization of material reaches a very high percentage of the total. Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. That improvement in methods of cutting sheet material into blanks which comprises shaping sheet material into a hollow substantially cylindrical form having ends provided with offsets facing in opposite directions, moving the cylinder rotatively in one direction and along a helical path, cutting the material of the cylinder, progressively with its movement along said path, into a single strip of the width of said offsets, and cutting blanks from the strip progressively with the formation thereof.

2. That improvement in methods of cutting sheet material which comprises shaping

a sheet of material into substantially cylindrical form, securing the ends of the sheet together with the ends offset laterally of each other a distance corresponding to a dimension of the strip to be cut therefrom, slitting a continuous strip from said cylinder of the width of said offset, and cutting said strip into blanks progressively with the slitting thereof.

3. That improvement in methods of cutting sheet material into blanks which comprises forming the sheet substantially into a hollow cylinder with the ends thereof secured together and offset laterally of each other a distance corresponding to a dimension of the desired blank; turning the cylinder constantly in one direction and simultaneously therewith cutting the cylinder into one continuous strip, and cutting blanks from said strip beginning with the offset portion.

4. That improvement in methods of cutting sheet material which comprises shaping a sheet of material substantially into the form of a hollow cylinder with its ends laterally offset, turning said cylinder in one direction and along a helical path, and progressively cutting blanks from the material beginning with the offset portion.

5. That improvement in methods of cutting sheet material into blanks which comprises shaping a sheet of material substantially into the form of a cylinder with the ends of the sheet secured together and offset laterally with respect to each other a distance corresponding to the width of the blank to be cut therefrom, slitting the material continuously in a helical direction along the cylinder, thus converting the ma-

terial into a single relatively narrow strip and cutting blanks from the strip progressively with the slitting thereof.

6. That improvement in methods of cutting sheet material into blanks which comprises shaping a sheet of material substantially into the form of a cylinder with the ends of the sheet secured together and offset laterally with respect to each other a distance corresponding to the long dimension of a blank to be cut therefrom, slitting the material continuously in a helical direction along the cylinder to form a strip, and cutting blanks from the strip simultaneously with the slitting operation.

7. That improvement in methods of cutting sheet material into blanks which comprises shaping a given sheet of material into the form substantially of a cylinder with the ends of the sheet secured together, and subsequently slitting the material into a strip and simultaneously dieing out blanks from the strip progressively with a turning movement imparted to the cylinder.

8. That improvement in methods of cutting sheet material into blanks which consists in shaping a given sheet of material into the form substantially of a cylinder with the ends of the sheet offset relatively to each other a distance corresponding to a dimension of the proposed blank, securing the ends of the sheet together, and then dieing out blanks from the material of the cylinder.

In testimony whereof I have signed my name to this specification.

THOMAS LUND.