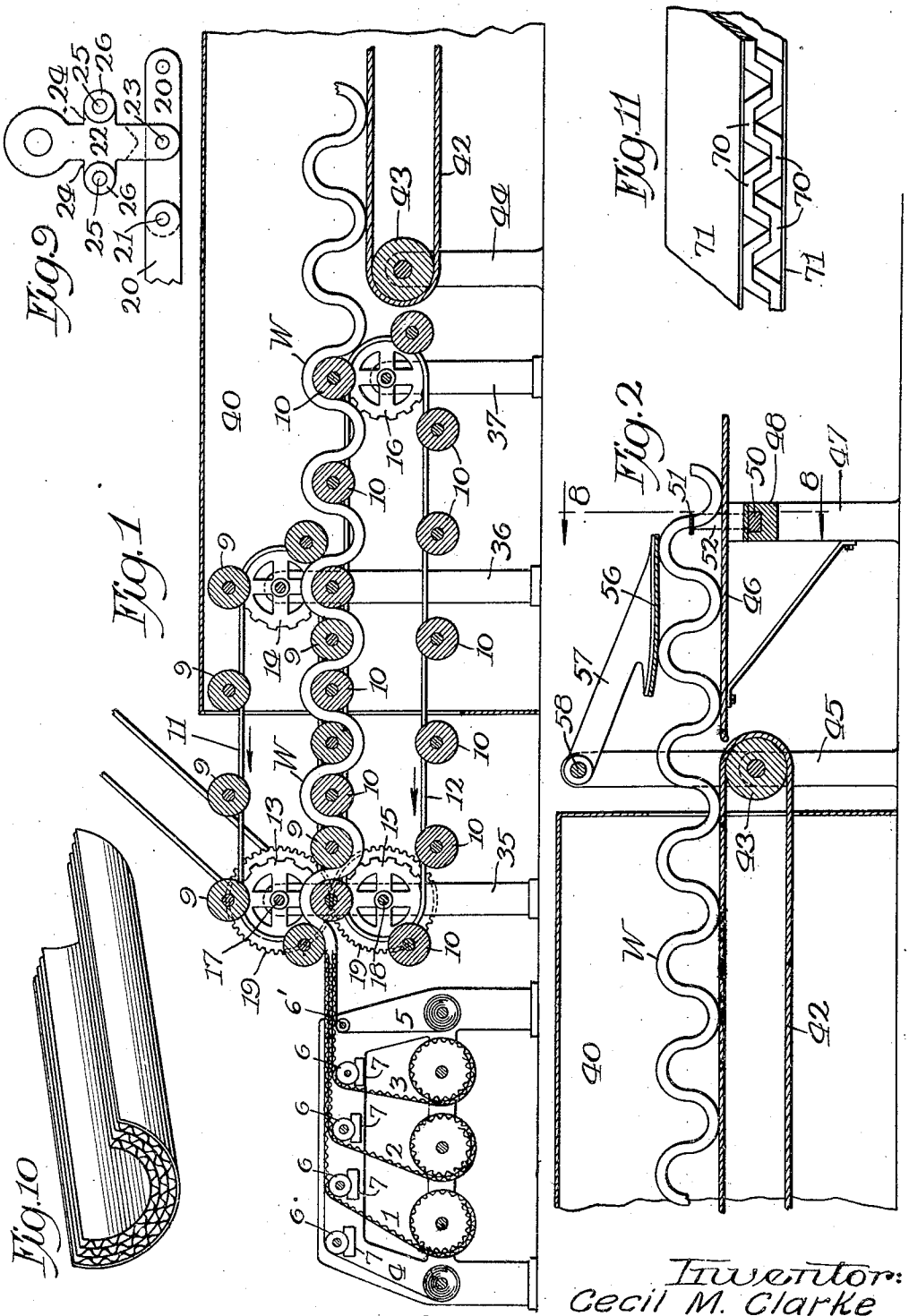
Jan. 5, 1932. C. M. CLARKE 1,839,200

METHOD OF MAKING CHANNEL BODIES

Filed Feb. 13, 1928 3 Sheets-Sheet 1



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METHOD OF MAKING CHANNEL BODIES

Filed Feb. 13, 1928 3 Sheets-Sheet 2

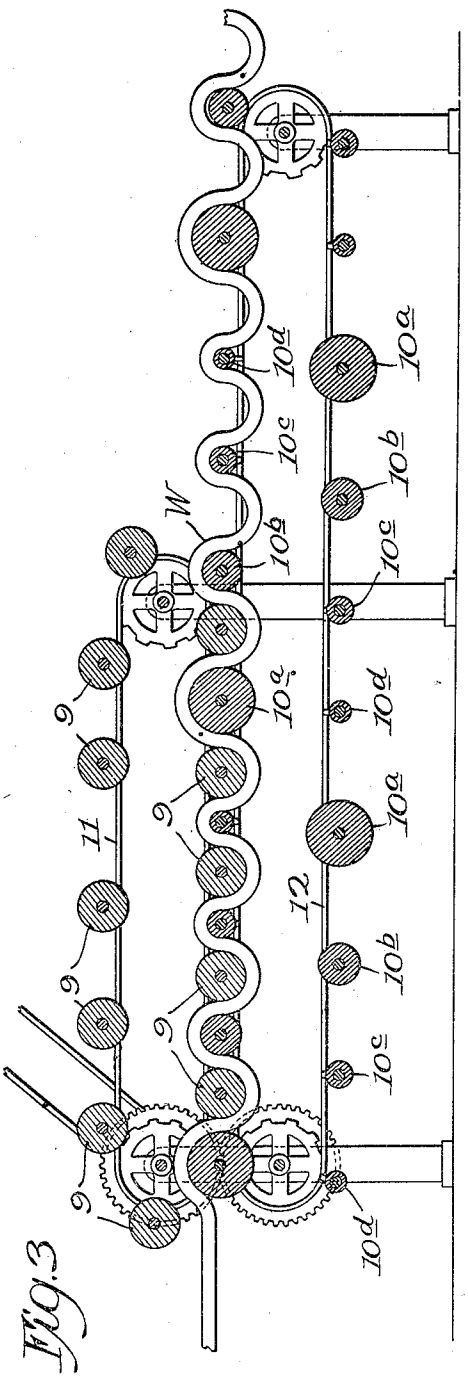


Fig. 3

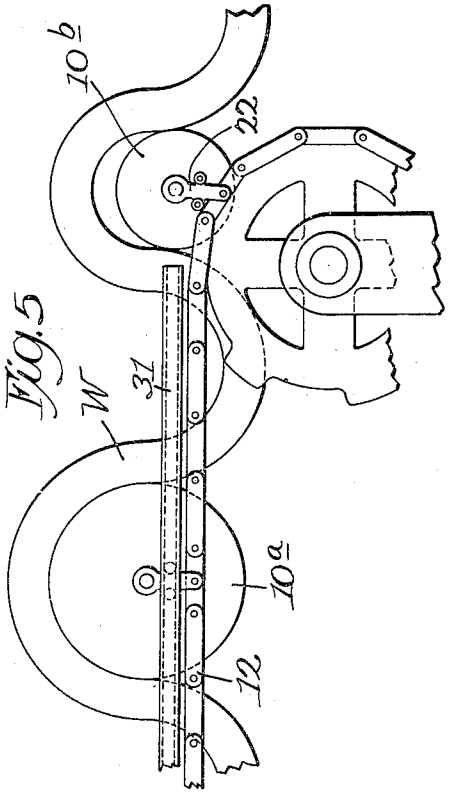


Fig. 5

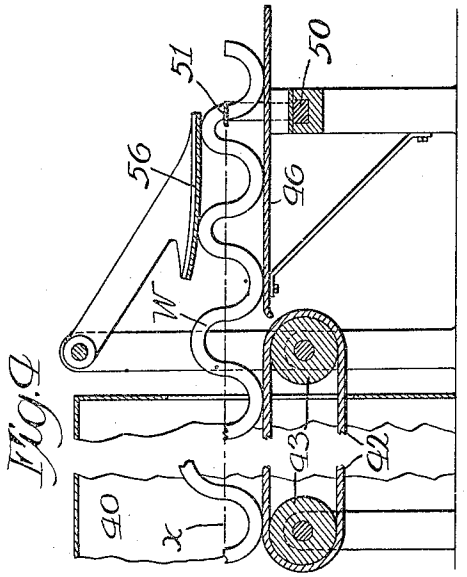


Fig. 4

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METHOD OF MAKING CHANNEL BODIES

Filed Feb. 13, 1928 3 Sheets-Sheet 3

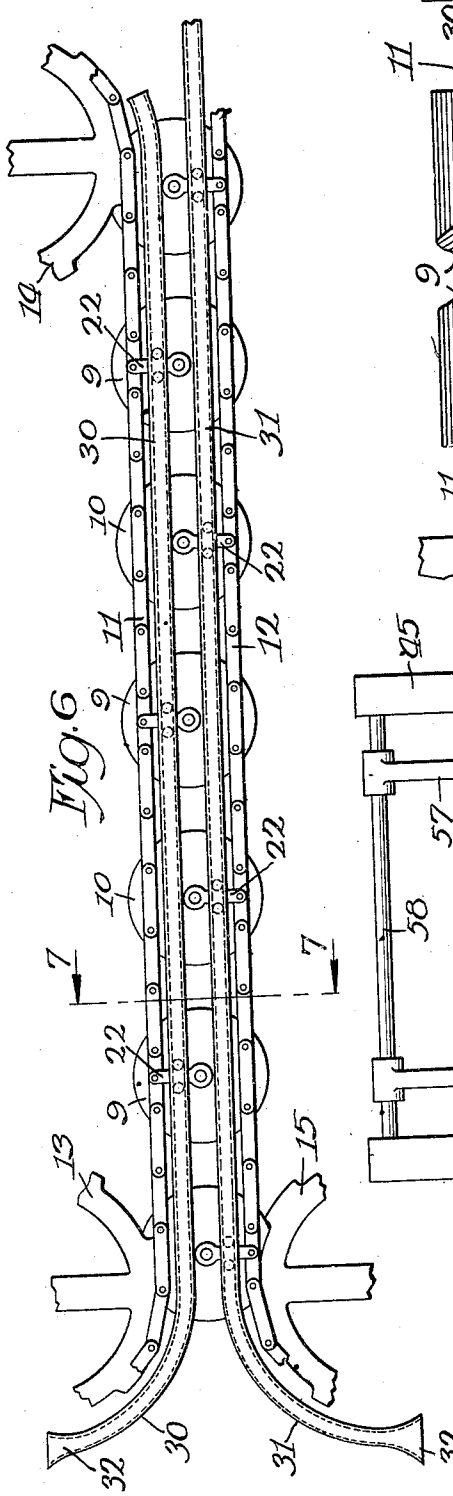


Fig. 6

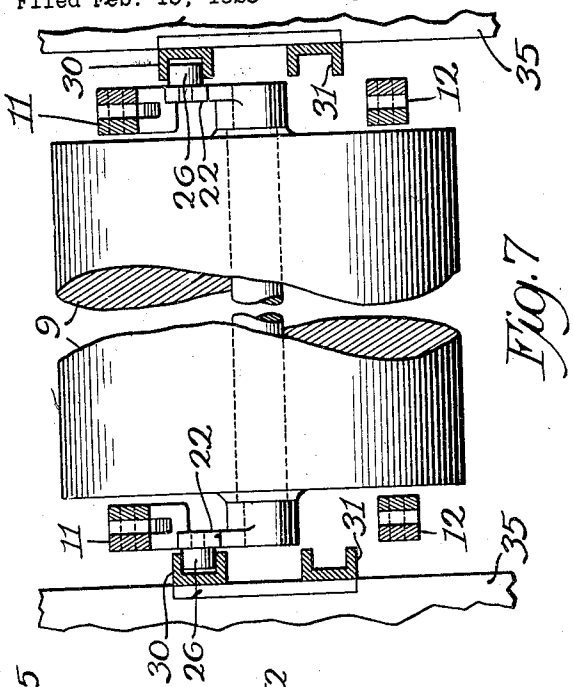


Fig. 7

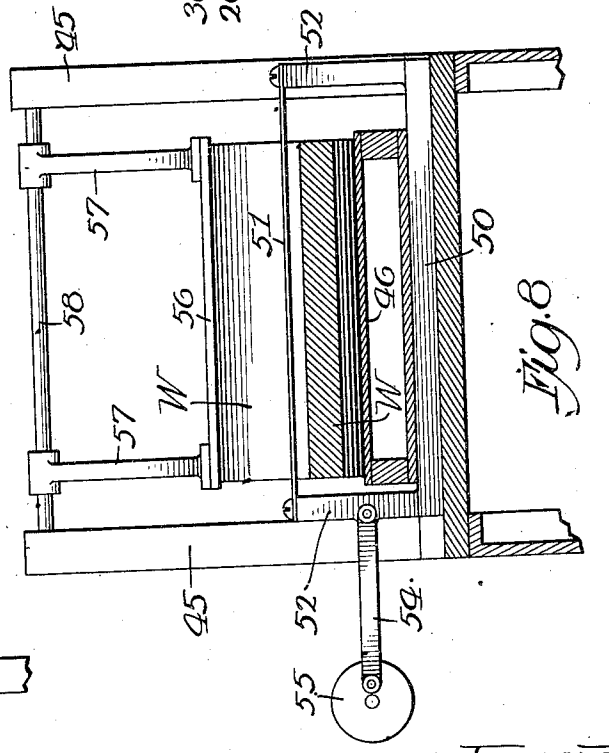


Fig. 8

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UNITED STATES PATENT OFFICE

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METHOD OF MAKING CHANNEL BODIES

Application filed February 13, 1928. Serial No. 253,805.

My present invention, whilst applicable to a variety of other uses, is more particularly designed for the production of insulating coverings for pipes. Such insulating coverings consist ordinarily of two semi-cylindrical bodies of a size adapted to snugly inclose the pipe to be insulated, the sections of the covering being ordinarily connected together by a layer of cheese-cloth, canvas or the like.

Insulating pipe coverings, particularly coverings formed of asbestos, are now commonly made by winding a sheet (usually a corrugated sheet) of asbestos around a mandrel until covering of the desired thickness is attained. After the covering is thus formed, it is dried or baked and subsequently bisected longitudinally to form semi-cylindrical halves or bodies adapted to fit about a pipe of corresponding size. In practice, various objections are found to this method of manufacturing insulating coverings. Not only is the method a slow and expensive one, but when the asbestos sheet is wound about the mandrel, there necessarily exists a "lap" or abrupt edge where the winding of the insulating sheet begins upon the interior of the covering, and a similar "lap" or abrupt edge where the sheet ends upon the outer surface of the covering, and particularly are these objections found to exist where the insulating covering is formed of comparatively thick sheets of asbestos that have been previously corrugated in order to produce air cells between the several laps of the sheets.

By my present invention, the objections incident to prior methods of forming insulating pipe coverings are avoided and not only is a superior covering produced thereby, but this is effected with simplicity and efficiency and at a very material saving in cost of manufacture.

In the particular embodiment of the invention illustrated in the accompanying drawings and hereinafter described, I have set forth an apparatus especially designed for making insulating pipe coverings, but I wish it distinctly understood that the invention is susceptible of far wider application and that the details of construction described may be varied widely without departing from the scope of the invention, and that features of the invention may be employed without its adoption as an entirety.

Referring to the accompanying drawings, Figure 1 is a view in vertical longitudinal section through an apparatus embodying my invention, and Figure 2 is a similar view showing the discharge end of the apparatus omitted from Fig. 1. Figures 3 and 4 are views similar to Figs. 1 and 2 but showing a modified embodiment of the invention. Figure 5 is an enlarged detail view showing a portion of one of the former-carrying chains and parts associated therewith. Figure 6 is a detail view in side elevation showing the guide channels for the journals of the former-rolls and parts associated therewith. Figure 7 is an enlarged detail view in vertical section on line 7—7 of Fig. 6. Figure 8 is an enlarged view in vertical section on line 8—8 of Fig. 2. Figure 9 is a detail view in elevation showing a link of one of the carrier chains and the means for supporting the former rolls thereon. Figure 10 is a perspective view showing a portion of a semi-cylindrical pipe covering adapted to be produced by my invention, and Figure 11 is a view showing a different form of channel-shaped body adapted to be produced in accordance with my invention.

In the form of the invention illustrated in the drawings, the pipe coverings are produced by superimposing in desired numbers a series of sheets or layers 1, 2 and 3 preferably of corrugated asbestos or like material, upon the inner and outer surfaces of which are imposed plain or flat sheets 4 and 5, also preferably of asbestos. The corrugated asbestos sheets 1, 2 and 3 are shown as rolls carried by suitable spindles that will be conveniently supported in manner free to revolve, and similarly the facing sheets 4 and 5 will be arranged in roll form mounted upon spindles suitably supported. Above the rolls or sheets of asbestos will be conveniently sustained cement-applying rollers 6 (revolving in tanks 7) for carrying a suitable cement, such as silicate of soda, by which the several sheets will be united together to form a com-

posite sheet W, before said composite sheet is passed into the mechanism whereby channel-shaped bodies or corrugations are formed in such composite sheet. A roll 6′ supports or guides the bottom facing sheet 5. As shown, each of the individual sheets 1, 2 and 3 of asbestos or like material is made of a corrugated sheet faced with a plain or flat sheet, the purpose of this construction being to form air cells in the finished pipe covering.

In the preferred form of the invention, the composite sheet is shaped to produce the semi-cylindrical or channel-shaped bodies adapted for pipe coverings by a series of formers or forming rolls 9 and 10 that are preferably supported by carrier chains 11 and 12 that pass over and are driven by sprocket wheels 15 and 16 for the lower carrier chains, it being understood that there will be sprocket wheels 13 and 14 and sprocket wheels 15 and 16 for the chains at opposite sides of the machine. In order to synchronize the movement of the carrier chains 11 and 12, the shafts 17 and 18 of the sprocket wheels 13 and 14 are united by suitable gears 19.

In Fig. 9 of the drawings, I have shown the preferred manner of mounting the forming rolls upon the carrier chains. By reference to Fig. 9 it will be seen that each of the carrier chains 11 and 12 is formed of a series of links 20, pivoted together as at 21, these links 20 being of proper length to be engaged by the teeth of the sprocket wheels whereby the carrier chains are supported and driven. To the links 20 of the carrier chains are pivotally mounted arms 22 (see also Fig. 7) in the free ends of which will be journaled or revolubly sustained the forming rolls 9, it being understood that the forming rolls 10 for the lower chain will be similarly supported. As shown, the arms 22 are bifurcated at their lower ends, where they straddle and are pivoted, as at 23, to the links 20 Each of the links 20 will be provided with projecting parts 24 carrying studs 25 on which are revolubly mounted friction guide wheels or sleeves 26 that are adapted to enter the guide channels 30 or 31, as shown in Fig. 6. These guide channels 30 and 31, which are designed respectively for the links of the upper and lower carrier chains, are formed as open-sided or U-shaped channels, and at their entrance ends are preferably expanded, as at 32, to permit the friction rolls or sleeves 26 to enter freely therein. When the friction rolls or sleeves 26 are within the channels, they will serve to hold the forming rolls 9 (or 10) in proper operative position, and when the friction rolls or sleeves 26 pass from the exit ends of the channels 30 or 31, the arms 22 will be free to turn upon the pivots 23 so as to prevent danger of the forming rolls 9 distorting the corrugated or channeled composite sheet. The shafts of the carrier chains will be supported by suitable standards, such as 35, 36, and 37, which will also serve to sustain the guide channels 30 and 31 secured thereto (see Fig. 7).

The forming rolls 9 and 10 are arranged upon their respective carrier chains and as the chains are driven in opposite direction, the former rolls will intermesh, as clearly shown in the drawings, and as the rolls thus intermesh they will form a composite sheet W, with a series of transverse channels or corrugations. Inasmuch as the rolls 9 and 10 are free to revolve upon their axes, the danger of tearing or straining the individual sheets as they pass between the rolls is avoided, since the rolls being free to revolve will tend to compensate for any inequality in the strain between the upper and the lower surface of the composite sheet as it passes laterally above and below the forming rolls 9 and 10. As the cement that unites the several individual sheets, 1, 2, etc. as they enter between the forming rolls is still wet or unset, the sheets may slip or shift slightly with respect to each other as they pass above and below the rolls, this slipping of the sheets being aided by the fact that the rolls are revolubly mounted. Preferably, the upper carrier chain 11 is shorter than the lower carrier chain 12 and both or one of these carrier chains lead into a suitable drying chamber or kiln 40 wherein the composite sheet W will be thoroughly dried or baked, causing the cement therein to set, and the channels of the sheet to retain their proper form. The drying chamber or kiln 40 will be of sufficient length to thoroughly dry the composite sheet before its exit therefrom. Preferably, the lower carrier chain 12 leads to a considerable distance within the drying chamber and as the composite sheet leads to the rolls 10 of the lower carrier chain, it will pass onto a suitable conveyor belt 42 that passes over the rollers or pulleys 43 supported by suitable standards 44 and 45. As shown, the composite sheet W, as it issues from the exit end of the drying chamber 40, is received upon a suitable table or support 46 that is sustained by convenient standards or supports 47. Beneath the table 46 extends a transverse bar 48 the ends of which are sustained by standards 47 and within a guideway formed in the top of this transverse bar is arranged the frame 50 of a saw 51 that is attached to the upwardly extending arms 52 of the saw frame. As shown, the saw frame has connected thereto (see Fig. 8) an abutment rod 54 to which reciprocating motion has been imparted from a power driven wheel 55. Obviously, if desired, a band saw might be employed instead of the reciprocating saw illustrated in the drawings.

The purpose of the saw 51 is to cut through the walls of the channels or corrugations formed in the composite sheet W and this saw will be so positioned as to accurately sever the composite sheet upon what, for con-

venience, I term the "parting line" of the sheet,—that is to say, the line on which the composite sheet is to be severed in order to insure that when the walls of the corrugations of the sheet are cut through, there will be produced the individual semicylindrical channels adapted to fit over the pipe to be insulated. In order to hold the composite sheet W down upon the table 46, there is provided a presser bar or foot 56 that may be supported by arms 57 pivoted upon a rod 58 extending between the ends of the standards 45 (see Fig. 8).

In the machine above described, my invention is illustrated as having forming rolls adapted to form channels or corrugations in the composite sheet W of uniform size and when the composite sheet is severed along its parting line, the semi-cylindrical channels resulting therefrom are adapted for one size of pipe only. In the preferred embodiment of my invention more particularly illustrated in Figs. 3 and 4 of the drawings, the apparatus is intended for producing channel-shaped or semi-cylindrical bodies of different sizes when the corrugated sheet is severed upon its parting line. In this form of the invention, the upper carrier chain 11 has mounted thereon, in manner hereinbefore described, forming rolls 9 of uniform diameter, while the lower carrier chain 12 has mounted thereon forming rolls 10^a, 10^b, 10^c and 10^d of different diameters. With this construction, it will be seen by reference to Figs. 3 and 4 that channels or corrugations of different sizes will be imparted to the composite sheet W, the sizes corresponding in number to the several sizes of forming rolls upon the lower carrier chain 12. Inasmuch, however, as the forming rolls 9 of the upper carrier chain are of uniform diameter, the channels or corrugations extending below the parting line of the composite sheet (as indicated by dotted line at X, Fig. 4) will be of uniform diameter so that they will rest evenly upon the carrier belt 42 and upon the table 46, while the channels or corrugations above the parting line X will be of different sizes and hence will be adapted, when the walls of the channels have been severed by the saw 51, as coverings for pipes of different sizes. By reference to Fig. 5 of the drawings, it will be seen how the pivotal mounting of the links 22 carrying the forming rolls allow these rolls to yield and lift the corrugations or channels of the composite sheet without danger of distorting the same.

In Fig. 10 of the drawings is illustrated a semi-cylindrical channel or body produced in accordance with my invention and adapted to form one-half of an insulating pipe covering and it will be seen that the pipe covering thus produced is entirely free from "laps" or abrupt shoulders either upon its inner or outer surfaces. Obviously, the invention can be employed for producing channel-shaped bodies of different forms and for various purposes. Thus, in Fig. 11 I have shown polygonal-shaped channels or bodies which when nested together and suitably connected may be used in forming building board, partition walls or the like. Each of the channels 70 shown in Fig. 11, when laterally arranged and interlocked as there shown, may be cemented together, and covering sheets 71 of heavy stock may be cemented or otherwise suitably attached to the upper and lower surfaces of the channels 70 to produce a smooth surface on the finished product.

Details of the method and apparatus above set forth may be varied, and features of the invention may be employed without its adoption as an entirety. Thus for example the feature of forming channel-shaped bodies from a sheet made of superposed plies of material cemented together by molding the sheet before the cement is allowed to dry or set, will be found advantageous regardless of the manner in which the molding or severing of the sheet is effected.

I claim as my invention:—

1. The method of making channel-shaped bodies that consists in forming a sheet with a plurality of channels therein and thereafter severing the walls of the channels.

2. The method of making channel-shaped bodies that consists in forming a sheet with a plurality of channels extending transversely of the sheet and thereafter severing the walls of the channels.

3. The method of making channel-shaped bodies that consists in forming a sheet with channels extending alternately in opposite directions from the parting line of the sheet and thereafter severing the sheet along said parting line.

4. The method of making channel-shaped bodies that consists in forming a sheet with channels of different sizes extending in opposite directions from the parting line of the sheet and thereafter severing the sheet along said parting line.

5. The method of making channel-shaped bodies that consists in forming upon one side of the parting line of the sheet channels of uniform size and upon the opposite side of said parting line channels of different size, and thereafter severing the sheet along said parting line.

6. The method of making channel-shaped bodies that consists in forming channels in a continuously moving moistened sheet, then drying the sheet, and finally severing the walls of the channels.

7. The method of making channel-shaped bodies that consists in uniting a series of superposed sheets, then forming the resulting composite sheet with channels extending from opposite sides of the parting line of the sheet, then subjecting the composite sheet to

a drying action, and finally severing the sheet upon said parting line.

8. The method of making channel-shaped bodies that consists in cementing together a series of superposed sheets, then, before the cement is set, forming the resulting composite sheet with channels, then drying the sheet, and finally severing the walls of the channels.

CECIL M. CLARKE.