

April 9, 1929.

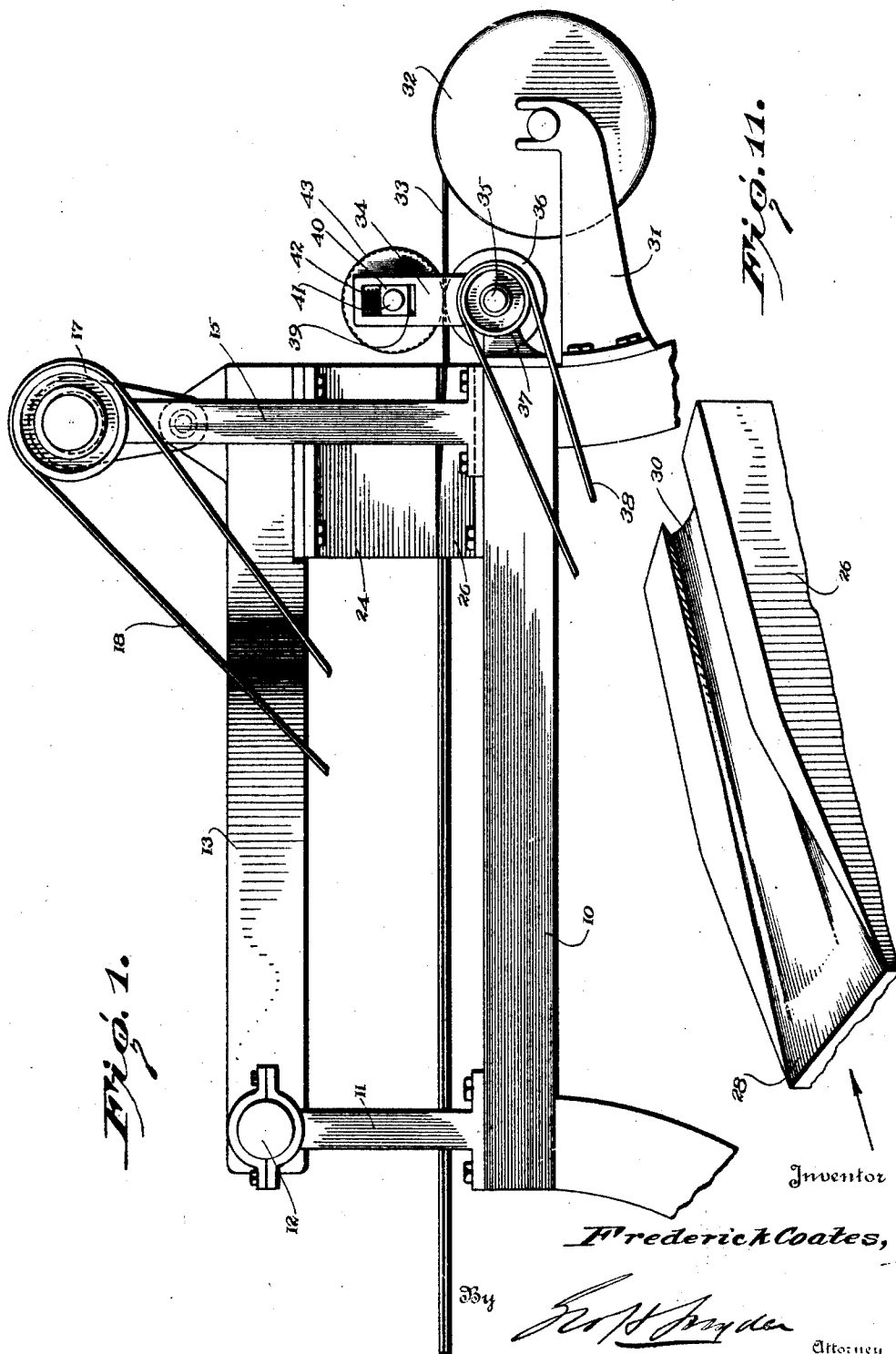
F. COATES

1,708,872

STRIP FORMING MACHINE

Filed Nov. 1, 1923

3 Sheets-Sheet 1



April 9, 1929.

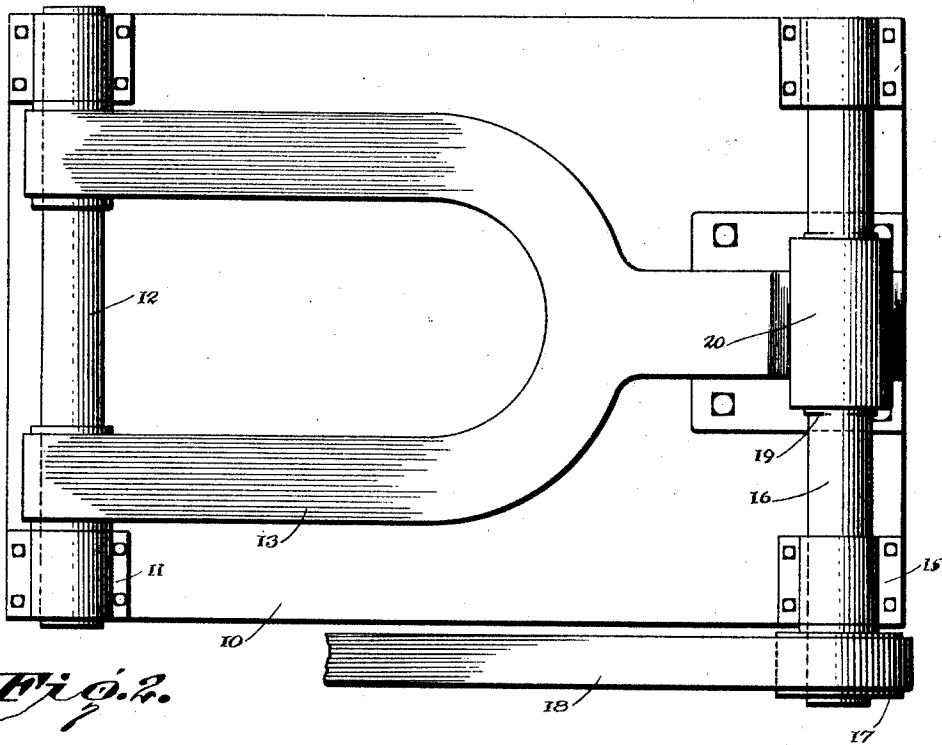
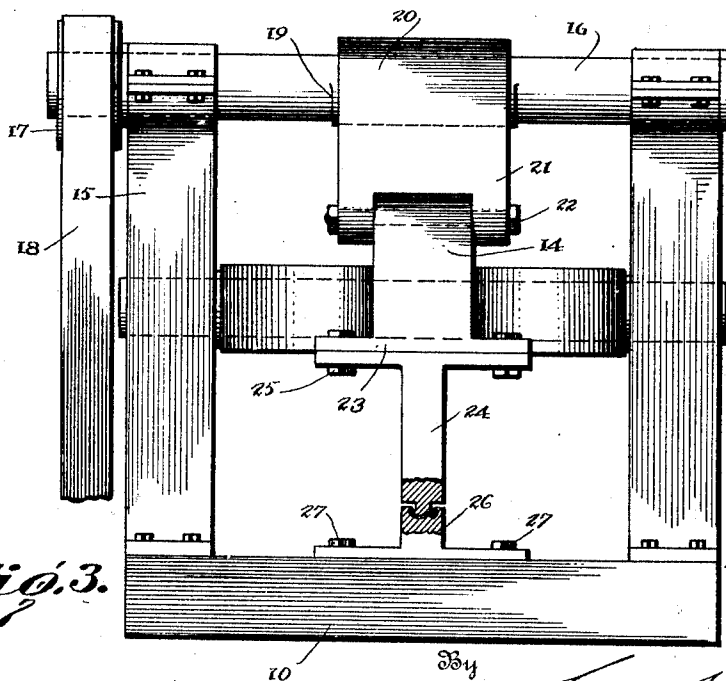
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1,708,872

STRIP FORMING MACHINE

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3 Sheets-Sheet 3

Fig. 4.

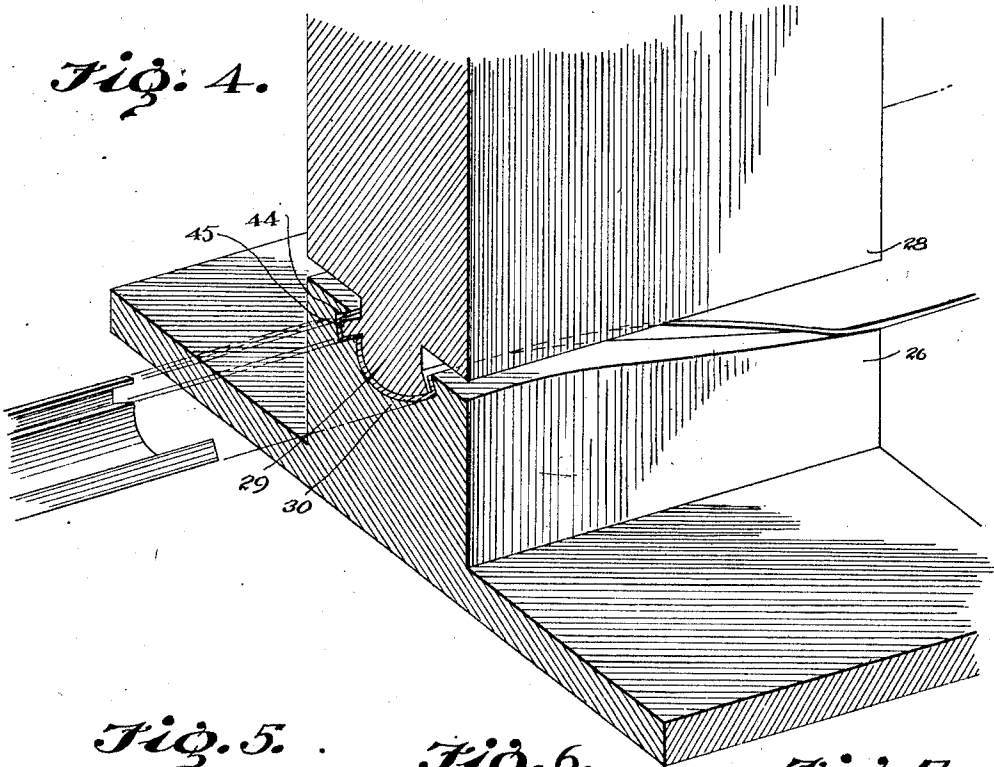


Fig. 5.

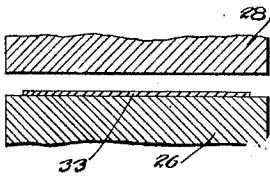


Fig. 6.

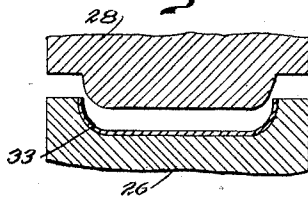


Fig. 7.

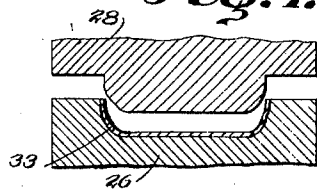
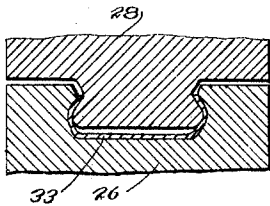


Fig. 8.

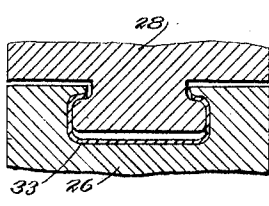


Fig. 9.

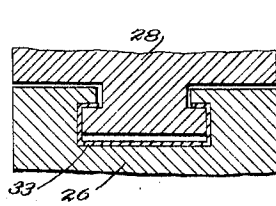


Fig. 10.

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UNITED STATES PATENT OFFICE.

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STRIP-FORMING MACHINE.

Application filed November 1, 1923. Serial No. 672,126.

This invention relates to the art of forming sheet material, and has special reference to apparatus for forming strips of sheet material into tubular or partially tubular shape wherein one or more edges overhang the body of the strip, the invention relating particularly to the dies for this purpose and the method of operating them.

Heretofore whenever it was desired to form strip material into a tubular or partially tubular shape, one method was to run the material through a die and over a mandrel, the space between the die and mandrel being of the desired shape at the exit end and gradually merging from that shape into a flat or nearly flat hood for receiving the strip. Such dies and mandrel are stationary and the bending is accomplished by either forcibly feeding the material through or forcibly drawing it through the die.

A second method quite commonly used is to subject the material to a pressing between two long dies for a primary formation in which the strip of material is partially bent, and then producing the overhang on one side or another by means of a second or third set of dies, one of which supports the material while the other operates sideways to bend in the overhanging portions. Sometimes this requires, in certain shapes, a very considerable number of operations.

The present invention has for its primary and principal object the utilization of short dies which combine a pressing and hammering operation with a drawing or feeding operation and which produces the overlapping form with one passage of the strip of material through the dies. It will be noted that in the first method above described, the material would necessarily have to be of considerable strength and stiffness thus rendering this method of formation inapplicable for thin material, or for material which would be apt to tear or break, such as cardboard or the like.

A second important object of the invention is to provide a strip forming apparatus having dies peculiarly shaped and operated to enable strips of very thin or flexible and weak material to be formed without danger of distorting or otherwise injuring the material.

With the above and other objects in view, as will be hereinafter apparent, the invention consists in general of certain novel details of construction and combinations of parts hereinafter more fully described, il-

lustrated in the accompanying drawings and specifically claimed.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:

Figure 1 is a side elevation of a forming machine constructed in accordance with this invention.

Fig. 2 is a partial plan view thereof.

Fig. 3 is an end view thereof partially in section.

Fig. 4 is a detail sectional perspective through a pair of dies such as are used in connection with this invention.

Figures 5 to 10 are sections through portions of the dies showing the successive changes produced by the dies in the bending up of a typical form of the invention, the same being preliminary to the formation of a complete tube as illustrated in my copending application Serial No. 672,127, filed November 1, 1923 (Patent No. 1,661,108, dated February 28, 1928).

Fig. 11 is a perspective of one of the die faces.

In carrying out the invention there is provided a stand or table 10 having at one end a pair of standards 11 wherein, at the top thereof, is journaled a shaft 12. Projecting forwardly from this shaft is a yoke arm 13 having at its forward end an upstanding lug 14. At the front of the table 10 is a pair of standards 15 and a shaft 16 is journaled at the upper ends of these standards, being provided at one end with a belt pulley 17 driven by a belt 18 from some suitable source of power. Fixed on or formed integrally with the shaft 16 is an eccentric 19, and carried by this eccentric is an eccentric strap 20 having an arm 21 extending downwardly therefrom, and slotted at its lower end to receive the lug 14, a pivot bolt 22 connecting said lug and the arm 21. At the underside of the front end of the yoke arm 13 there is provided an attaching plate 23 to which is attached an upper die 24 by means of suitable bolts 25. Cooperating with this upper die is a lower die 26, which is held by bolts 27 on the front end of the table 10. These dies have at the front end a mouth or receiving portion 28, and from this end the shape of the die gradually changes until at the rear thereof the two dies are shaped in cooperating male and female portions 29 and 30 having space between them corresponding with the shape of the finished

strip. It is to be observed that the male die fits loosely in the female die so that the action of the cam or eccentric 19 may raise and lower the die, and further it will be noted that the dies are spaced further apart at the mouth portions 28 than at the rear end. Extending forwardly from the table are brackets 31 which support a roll 32 whereon is wound a strip of sheet material 33. Between the roll 32 and the dies 24 and 26 there is provided a pair of standards 34 at the lower ends of which is journaled a shaft 35 having fixed thereon a feed roll 36. On this shaft is also provided a driving pulley 37 which is driven by a belt 38 from some suitable source of power. The upper ends of the standards 34 are slotted as at 39, and in these slotted upper ends are mounted vertically movable bearings 40 supporting a shaft 41, and pressed downward by means of springs 42. On the shaft 41 is fixed a corrugated feed roller 43.

In operation the material 33 is fed through the feed rollers in its flat form and passes into the mouth of the dies one of which is rapidly oscillated by the eccentric. Thus the material receives hammer blows corresponding to the action of a helve hammer, while at the same time it is gradually changed from its flat form to the finished form by the passage through the dies. It will be obvious that with dies constructed so as to have overhanging portions such as are shown in Fig. 4 at 44 and 45, the dies will be assembled by a sliding movement, and that the material towards the finishing end of the dies will not only be subject to downward blow from the upward die, but also to an upward blow. Thus the material is fed through the dies in the same manner as in the drawing dies, while receiving the ham-

mering effect of hammering or pressing dies and is thus gradually changed from its flat shape to its finished shape without producing undue stress or tearing at any part.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is wished to include all such as properly come within the scope claimed.

Having thus described the invention, what is claimed as new, is:

In a strip forming machine, a pair of complementary forming dies formed at one end to conform to the strip to be passed therethrough and formed at the opposite end to conform to a cross section of the required shape, said dies merging gradually from the first formation to the second, one of said dies having adjacent the last mentioned end at least one inwardly extending portion to form a channel, the other of said dies having an outwardly extending portion projecting beneath the inwardly extending portion of the first die and of less thickness than the height of the channel to be formed in the metal strip whereby to permit oscillation of one die with respect to the other, means to rapidly oscillate one of said dies relative to the other, and other means to mechanically feed the strip through the dies continuously during the oscillation.

In testimony whereof I affix my signature.
FREDERICK COATES.