Oct. 14, 1952 M. FANTELL 2,613,697

METHOD OF CURLING

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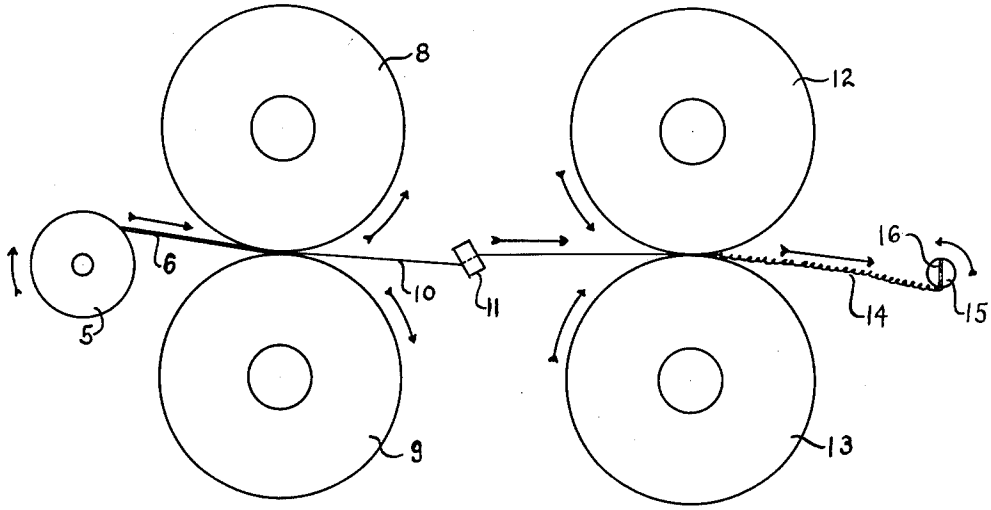


FIGURE 1

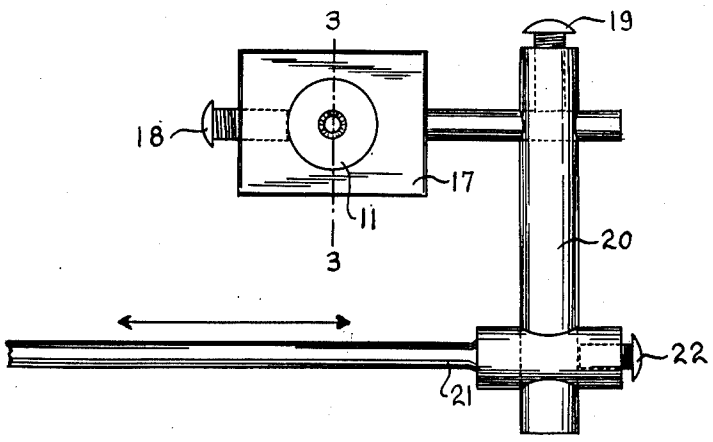


FIGURE 2

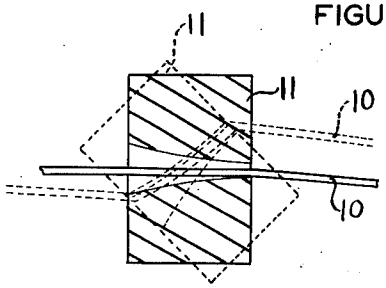


FIGURE 3

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METHOD OF CURLING

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2 Claims. (Cl. 140—71)

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My invention relates to a device for curling strips, ribbons or strands in order to form a sponge. More particularly my invention relates to the formation of metallic sponges.

It is an object of my invention to provide a device for curling metal ribbons and the like, that is adjustable to accommodate ribbons of varying degrees of hardness, that will effect varying degrees of curl, that is adaptable to provide varying degrees of curl in relation to the speed of the metal strips through the curling device, that is adjustable to provide varying degrees of curl with relation to the tension of the strip as it progresses through the apparatus. It is a further object of my invention to provide a curling device which is simple, easy to adjust, efficient in operation, uniform in the curl produced. It is a further object of my invention to provide a curling device that will accept metal strips of varying dimensions and differing cross section. My curling device will function with metallic wires that are circular in cross section. It will also accept metallic wires that vary from the circular in cross section. It will accept ribbon-like metallic strips. My curling device, being adjustable to varying degrees of hardness of the material to be curled, will also accept plastic strips as well as synthetic fibers and will impart a curl.

Other objects and advantages will appear from a consideration of the hereinafter set forth description. The accompanying drawings and description are intended merely as illustrative of a preferred embodiment of my invention.

Figure 1 is a diagrammatic illustration of the apparatus and method of curling a metal strip.

Figure 2 is a front elevation of the curling device.

Figure 3 is a cross section taken on the line 3—3 in Figure 2, showing several positions of the curling device.

Referring now to the drawings in detail, my device has a spool or roll 5 of wire, strands of plastic or synthetic fibers 6. Nickel silver wire, brass wire, or stainless steel wire may be used. There are many other alloys and types of material which may also be used. This wire 6 may be approximately .005" in diameter. Of course other sizes may be used. The wire 6 is fed into a rolling mill between rolls 8, 9 of high carbon steel exerting a pressure of approximately 250–500 lbs. It may thereby be reduced to a ribbon approximately .0015" thick. If the material on the spool 5 is of proper dimension for curling, the flattening function of the rolls 8, 9 may be eliminated and they will merely be utilized for feeding the wire 6 (or other material) and maintaining tension during the curling process, much less pressure then being necessary. The ribbon 10 is then led through a diamond die 11. A carboloy die or other similar die may also be used. This die may have an orifice of approximately .025" diameter. The size of the orifice is not critical. After passing through the die 11, it is pulled through the opposed rollers 12, 13. The roller 12 is preferably of cast iron and the roller 13 of rubber. Up to this point, the strip 10 has been maintained under tension through the pull of the rollers 12, 13. Upon leaving the rollers 12, 13, the tension is relaxed and the wire is permitted to form curls 14 and is wound on the spindle 15. A slot 16 in the spindle serves to hold the end of the curled ribbon 14. The directions of revolution of the various rollers is indicated by the arrows. The speed of the spindle 15 should be approximately one-third the speed of the pulling rollers 12, 13 so that the wire 14 may curl.

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The die 11 is positioned in a holder 17 where it is held in place by a set screw 18. The holder 17 is angularly adjustable being held in any desired position by the set screw 19. The position of the holder and the die is positioned with respect to the path of the ribbon 10 by raising or lowering the upright 20 on the bar 21 and adjusting the angle of the holder 17. The upright 20 is fixed at any point by the set screw 22.

The bar 21 is constantly reciprocated so that the wire 10 is fed into the puller-rolls 12, 13 at varying points and is thereby not caused to wind on the spindle 15 all at one point. If, however, it is desired that the wire 10 be wound on the spindle 15 in a ball all at one point, the holder 21 may remain stationary.

Attention is directed to Figure 3 in which the adjustable feature of the die 11 is illustrated. The variable factors encountered in curling a metallic ribbon 10 or other material are:

(1) Speed of the wire;
(2) Size of the wire;
(3) Shape of the wire (round or ribbon);
(4) Hardness of the wire; and
(5) Tension of the wire.

By adjusting the angle of incidence of the wire to the curling edge of the die, the variable factors aforementioned may be compensated for and any desired degree of curl effected.

It is found that the less acute the angle that the wire leaves the die, the less sharp the resultant curl. Thus the position indicated by the solid figure in Figure 3 would produce a slight

curl, while the dotted figure in Figure 3 would produce a heavy curl.

It is therefore seen that I have provided a novel apparatus for imparting a curl to ribbon, wire, synthetic fibers, plastic material, etc. It is simple in construction, adjustable to the variable factors encountered in curling, easy to operate, fficient in operation, and adapted to work with many different types of material and sizes of material.

The foregoing described apparatus is intended merely as illustrative of a preferred embodiment of my invention, as many changes may be made in the arrangement and choice of parts within the scope of the appended claims without departing from the spirit of my invention.

I claim:

1. The method of curling a strand comprising passing a strand under tension through a hole through a die having sharply defined edges at both ends of the hole, positioning the hole in the die transversely to the path of the strand whereby the strand tightly and sharply bends at a material angle over each of the edges, and releasing the strand to curl.

2. The method of curling a strand comprising passing a strand under tension through a die-passage, said die-passage being a hole through a die having sharply defined edges at both ends of the die-passage, positioning the die-passage transversely to the path of the strand whereby the strand is frictionally engaged with the edges

of the die-passage and bent at a material angle over both edges, and releasing the strand to curl.

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