Jan. 13, 1931. L. S. HOWE 1,789,273

PROCESS OF ORNAMENTING STRIP METAL

Filed Nov. 4, 1929

Fig. 1.

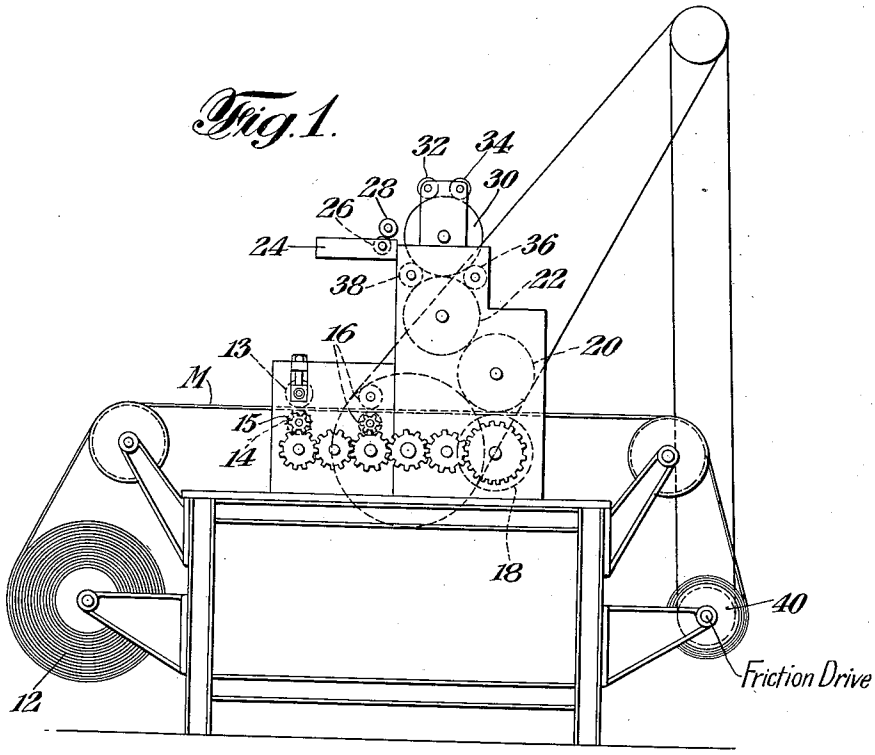



Fig. 2.

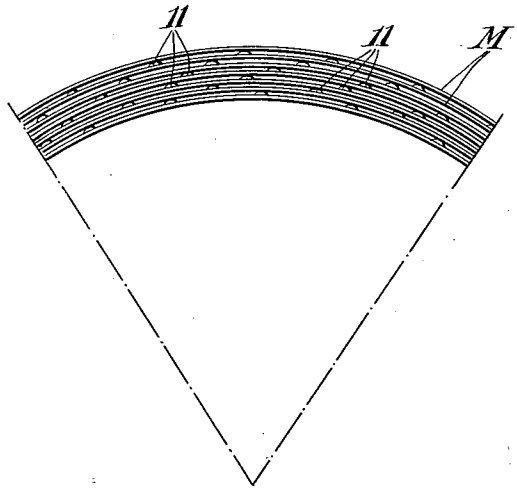
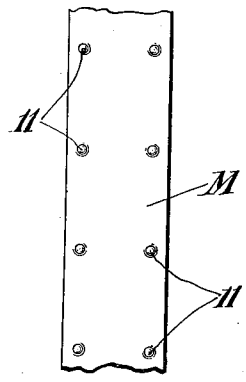



Fig. 3.




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# UNITED STATES PATENT OFFICE

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## PROCESS OF ORNAMENTING STRIP METAL

Application filed November 4, 1929. Serial No. 404,568.

It has heretofore been suggested that smooth strip metal can be ornamented by feeding the metal continuously past a printing roll of an offset printing station while the metal is held under yielding tension.

I have discovered that this process can be greatly simplified by forming a series of spaced projections on the strip of metal before it is passed through the printing station. These projections have the very important function of permitting the metal to be wound up immediately after it leaves the printing station without making any special provision for drying. This result is due to the fact that the projections serve as spacers so that when the newly printed metal is wound in a coil the inked surface is substantially unblurred and openings are left through the coil for the ready evaporation of volatile ingredients from the ink. The strip is preferably, though not necessarily, printed on the side toward which the projections extend, as in such case only the ink that is on the tips of the projections can be rubbed off, whereas if the other side were printed, then the projections might injure a much larger part of the surface when the metal is being assembled into a coil.

The projections can readily be formed in the metal by the use of appropriate rolls and can be applied at any desired stage of operation prior to the actual printing. They should be near enough to the edges of the metal to provide a firm bearing spread and their height should be so proportioned to their longitudinal spacing that when the metal is coiled, there will be no intermediate contacts. It is advisable to have the projections spaced even distances apart so that as the metal is coiled the continuous change in circumference will eliminate the probability of superimposed projections coinciding. For drying, the coils can be stacked or arranged in any desired way that will permit air to circulate through and around them.

For the purposes of illustration, an embodiment of my process is described in connection with the apparatus shown in the accompanying drawings, in which Fig. 1 is a diagrammatic side view of the apparatus used; Fig. 2 is a side view of a portion of a coil of the ornamented metal; and Fig. 3 is a plan view of a portion of a strip of metal after the projections have been formed, but before it is ornamented.

In the drawings, the numeral 12 designates a reel on which the coils of the strip of metal are placed. This reel may be provided with any desired form of friction drag to prevent it from over-running. The metal strip M is here shown as passing from the reel 12 between the rolls 13 and 14. The under roll 14 has projections 15 which form dents in the metal and it is to be understood that the roll 13 has corresponding depressions so that projections will be formed on the upper side of the strip. As these projections are very small relative to the scale of this drawing, they are not indicated on the metal in Fig. 1, but are indicated at 11 in Figs. 2 and 3.

After passing from between the rolls 13 and 14 the metal passes between a pair of feed control rolls 16 which grip the strip firmly to prevent slipping. The feed rolls 16 are driven directly from the pair of rolls 18 and 20 in such a way that the metal will travel between these latter two rolls at exactly their peripheral speed. Of these two rolls, roll 18 is a backing roll and roll 20 the transfer or printing roll. Following the usual custom of offset printing, the transfer roll receives ink from the type roll 22. The ink is contained in a reservoir 24 in which rotates inking roll 26. Roll 28 intermittently touches roll 26 and then travels to roll 30 where it deposits a small amount of ink. This ink is spread out by oscillating motion of rolls 32 and 34 which operate in a manner well known in the art. The ink which has been spread out on roll 30 is transferred to the type roll 22 by the inking rolls 36 and 38. Inasmuch as the metal is to be printed continuously the transfer roll 20 is made with continuous surface.

As the metal comes out from between rolls 18 and 20 it passes directly to a winder 40. The winder 40 is driven by a friction drive which is so adjusted that a substantial tension is placed on the strip. After the reel is filled the metal is fastened in any desired

way and then removed as a coil from the reel and dried either in the open air or with heat. The spacing of the strips permits air to circulate through the coils so that the ink will readily dry out.

Solely by way of illustration, I may state that my process has been found to operate successfully where the small projections extend slightly less than a thirty-second of an inch above the surface of the metal, and are spaced about one-half an inch apart in parallel rows, but these proportions and dimensions may be modified as occasion demands, and many other arrangements of apparatus may be used.

I have termed the process of ornamenting as "printing" and the material applied as "ink" but these terms are used only for the purposes of illustration and not by way of limitation, as the application of various types of substance in many forms of coloration or ornamentation are intended to be covered.

What I claim is:

1. The process of continuously ornamenting strip metal, which comprises the steps of forming a series of projections along a strip of metal, continuously passing the strip of metal provided with such projections along in contact with a printing roll, whereby the surface of the metal is marked, and withdrawing the metal from the printing roll by coiling it with the projections on one layer contacting with the face of an adjoining layer, whereby the layers are held in spaced relation and the marked surface is kept substantially unblurred.

2. The process of ornamenting strip metal which comprises the steps of forming a series of small projections along a strip of metal, continuously passing the strip of metal provided with such projections along in contact with a printing roll and thereby applying a design to such metal, coiling the metal with the projections on one layer contacting with a face of an adjoining layer, whereby the layers are held in spaced relation whereby the material may readily dry.

3. A process as specified in claim 2 in which the design is applied to the surface above which the projections extend.

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