May 15, 1923. 1,455,061

A. M. BARRETT

METHOD OF FORMING FOLDED STRIPS OF MATERIAL

Filed Oct. 6, 1919 2 Sheets-Sheet 1

Fig. 1.

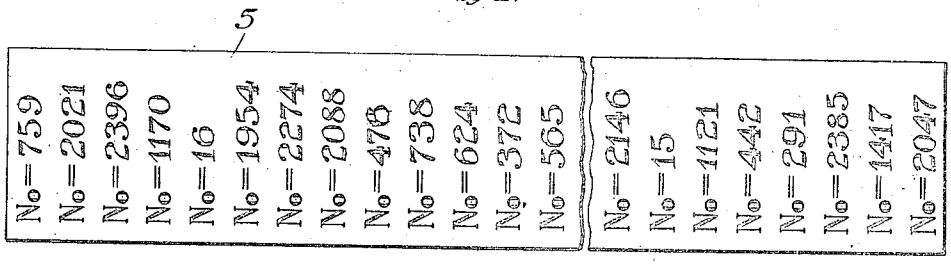


Fig. 2.

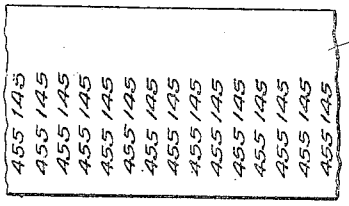


Fig. 3.

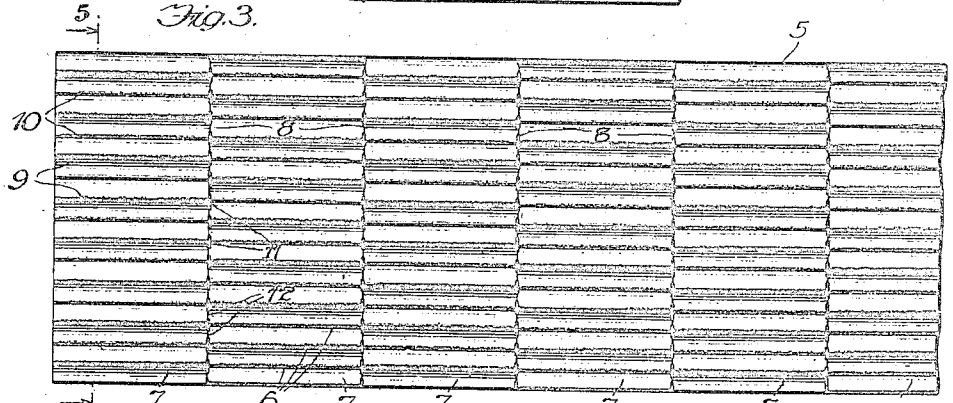


Fig. 4.

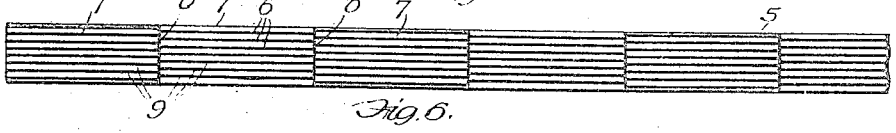


Fig. 5.

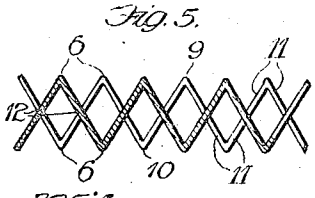


Fig. 6.

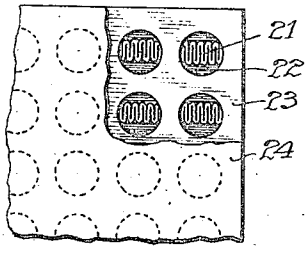
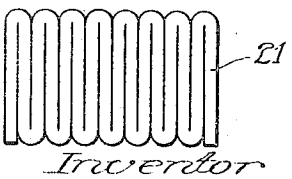


Fig. 7.



Witnesses
Martin N. Olsen.
Fred M. Dorr.

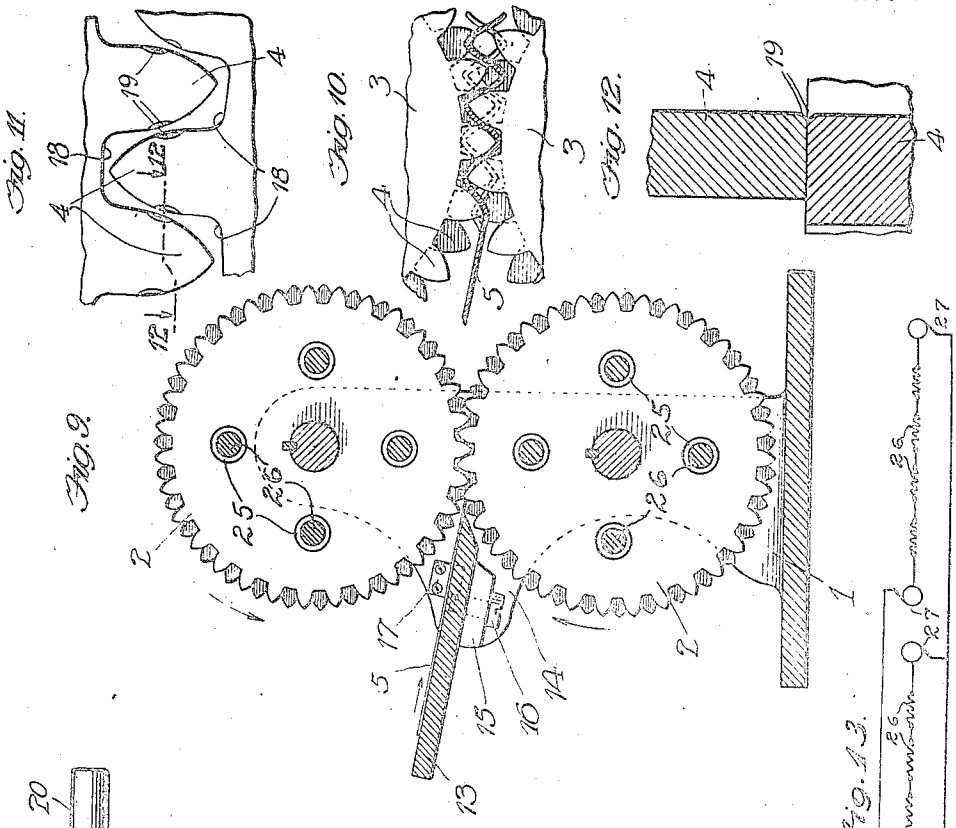
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Arthur M. Barrett.
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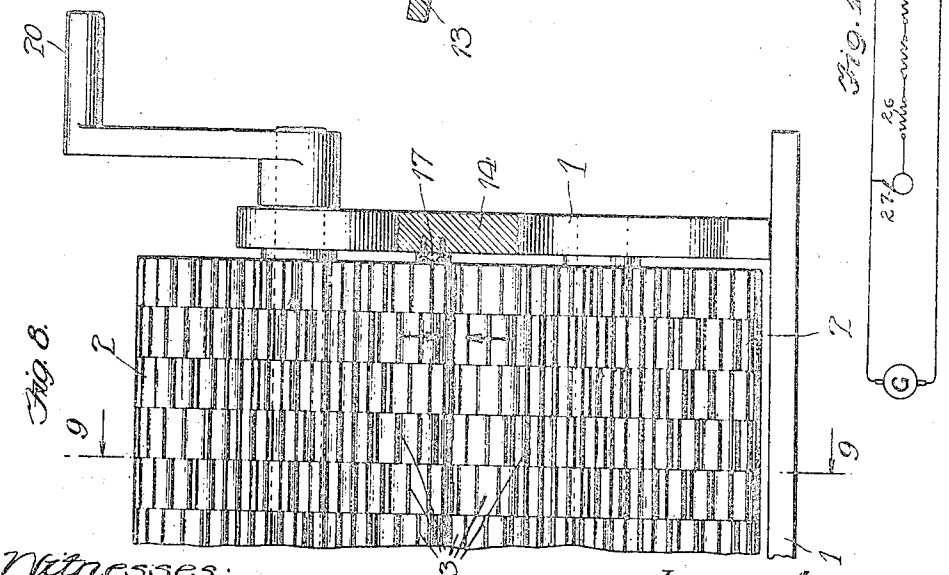
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A. M. BARRETT

METHOD OF FORMING FOLDED STRIPS OF MATERIAL

Filed Oct. 6, 1919 2 Sheets-Sheet 2





Witnesses:
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Patented May 15, 1923. 1,455,061

UNITED STATES PATENT OFFICE.

ARTHUR M. BARRETT, OF CHICAGO, ILLINOIS.

METHOD OF FORMING FOLDED STRIPS OF MATERIAL.

Application filed October 6, 1919. Serial No. 328,923.

To all whom it may concern:

Be it known that I, ARTHUR M. BARRETT, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Methods of Forming Folded Strips of Material, of which the following is a specification.

This invention relates to game-board plugs of the general character shown in United States Patents Nos. 780,086 and 1,260,767, and more particularly to a crimped or perforated intermediary product, usually made of paper, and to methods and means for producing same, ready for subsequent separation of the individual plugs. By means of printing on both sides of the material to be used, the plug elements or sections of the strip are collectively identified each by the same number on one side and are differentiated by respective serial numbers on the reverse side, so that when the resultant plugs are eventually unfolded incident to their use, they may each be identified both as to group and individual relations.

Heretofore it has been the practice to perforate the strips of paper before crimping or folding, but this has been the cause of considerable waste, for when the paper is perforated deeply enough to break off easily after folding, it is liable to fall apart during the handling incident to the folding process.

The main objects of the invention are to provide a method and means adapted to facilitate greater speed and accuracy in folding or crimping the paper and perforating same, ready for partition of the strip into sections or plugs such as required for punchboards; to enable the folding and perforation of the paper to be done simultaneously and by the same means; to provide an intermediary product of improved character in the form of a crimped and perforated strip in which the integral connections are relatively very small and the perforation slits are opened wide in folding the strip; to provide a perforated and folded strip of improved form having a uniform series of positive connections of minimum extent consistent with the strength required to prevent breaking up or disintegration of the strip by the usual handling preceding intentional partition into separate plugs; and to provide coacting mechanical means adapted to simultaneously perforate and fold the strips progressively as they are fed forward uniformly and continuously, and at the same time to apply heat thereto for setting the creases.

An illustrative embodiment of the invention is shown in the accompanying drawings, in which—

Fig. 1 is a plan of a printed strip ready for folding and perforating.

Fig. 2 is a view of the back side of a part thereof.

Fig. 3 is an enlarged view of the strip after passing through the machine.

Fig. 4 is a view of the strip tightly folded, ready for partition by tearing or breaking off the plugs.

Fig. 5 is a section on the line 5—5 of Fig. 4.

Fig. 6 is a plan of a corner of a game-board having perforations in which the plugs are inserted, a part of the face covering being torn away.

Fig. 7 is an enlarged end view of one of the plugs ready for use.

Fig. 8 is a side view of a folding and perforating machine.

Fig. 9 is a section on the line 9—9 of Fig. 8.

Fig. 10 is an enlarged fragmentary view of the folding gears.

Fig. 11 is an end view of a group of coacting gears showing both the shearing and non-shearing features of the tooth edges.

Fig. 12 is a section on the line 12—12 of Fig. 11.

Fig. 13 is a circuit diagram of the roll heater.

According to the practice which has prevailed heretofore, it has been necessary to first perforate the strip and then subsequently to fold the same, thereby requiring two separate machines and two independent operations. By this invention, means are organized in one machine for simultaneously perforating and folding the strip, ready for subsequent partition whenever required.

In the construction of the machine shown in the drawings, the frame 1 is provided with a pair of intermeshing rolls 2, said rolls being made in sections 3 arranged to intermesh respectively with corresponding sections on the opposite roll. The teeth 4 on coaxially adjacent sections are staggered symmetrically with respect to each other, so that when a strip of paper 5 is run crosswise between the rolls, the fold lines 6 on successive sections 7 of the strip correspond-

ing with the several roller sections 3 are reversed with respect to each other, and the border lines 8 separating said sections of the paper are correspondingly sheared or perforated opposite the crests 9 and hollows 10 of the waves or folds as shown at 11 on Figs. 3 and 5, small integral connections 12 being left midway between said crests and hollows.

The rolls 2 of said machine are to advantage placed one over the other adjacent to a feed platform 13, so as readily to permit of feeding the plain printed strips nearly horizontally between said rolls as shown in Fig. 1. Said platform is supported on brackets 14 integral with said frame. Said brackets are provided with lugs 15 to which the platform is attached by means of screws 16. Gage means or guides 17 are provided to accurately center the strip in due alinement with the rolls, so as to assure end section 7 of normal width.

In order to insure uniform results and a series of definite and positive alternate cuts 11 and bonds 12 in the strips 7, the ends of the gear teeth 4 and the intervening hollows 18 are each formed with a square shearing edge, except that midway of the height of each tooth, as at 19, the edge is rounded for a short distance so as to leave short bonds 12 substantially unaffected by the rolls.

The method of making the plug strips herein shown and described and the application of same to punch boards are as follows:

Power is applied for operating the rolls, for instance by the handle 20, and as the machine operates, plain printed strips 5 are placed successively on the platform 13 and moved forward edgewise between the rolls, whereby said strips are simultaneously perforated and crimped, as shown in Figs. 9 and 10. The strip issues in substantially the form shown in Fig. 5, whereupon it is folded tightly by pressure, into the form shown in Fig. 4, in which condition it may be shipped or stored ready for use.

The lateral adjustment of the strip is taken care of automatically by the gage means 17, which are designed and arranged to accommodate and position a strip of exactly the right length to provide for a set of complete plugs.

Whenever it is desired to use the product for filling the holes in game boards, the strip 5 is partitioned by successively breaking off the individual plugs 21 and inserting them in the holes 22 of the punch board 23, where they are subsequently concealed by the outer covering 24, a corner of which is shown broken away in Fig. 6.

In order to assure a more positive setting of the creases and folds as the strip passes through the machine, heat may to advantage be applied coincidentally with the folding. For this purpose the rolls are preferably apertured as at 25, and the recesses equipped with electric heater elements 26, connected as shown in Fig. 13. Current is supplied from a source G through slip rings and brushes as shown at 27, one pair being provided for each roll, as will be understood.

The roll sections 3 may be so formed and arranged, or the teeth 4 may be so designed, as not to require any special shape at 19, though the form shown in Fig. 11 provides most positively for a definite connection between the shear cuts. The precise design will depend somewhat on the particular grade of material to be handled.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. The method of forming folded strips of material which consists in perforating in one direction a sheet of the material to be used, and simultaneously folding said sheet in a direction transverse to the perforation line, and subsequently tearing off folded strips on the perforation lines.

2. The method of forming folded strips of material which consists in perforating in one direction a sheet of the material to be used, and simultaneously heating and folding said sheet in a direction transverse to the perforation line, and subsequently tearing off folded strips on the perforation lines.

Signed at Chicago this 3rd day of Oct. 1919.

ARTHUR M. BARRETT.