June 1, 1926.

1,586,593

G. R. WYMAN

TUBE MAKING MACHINE

Filed June 4, 1924

3 Sheets-Sheet 1

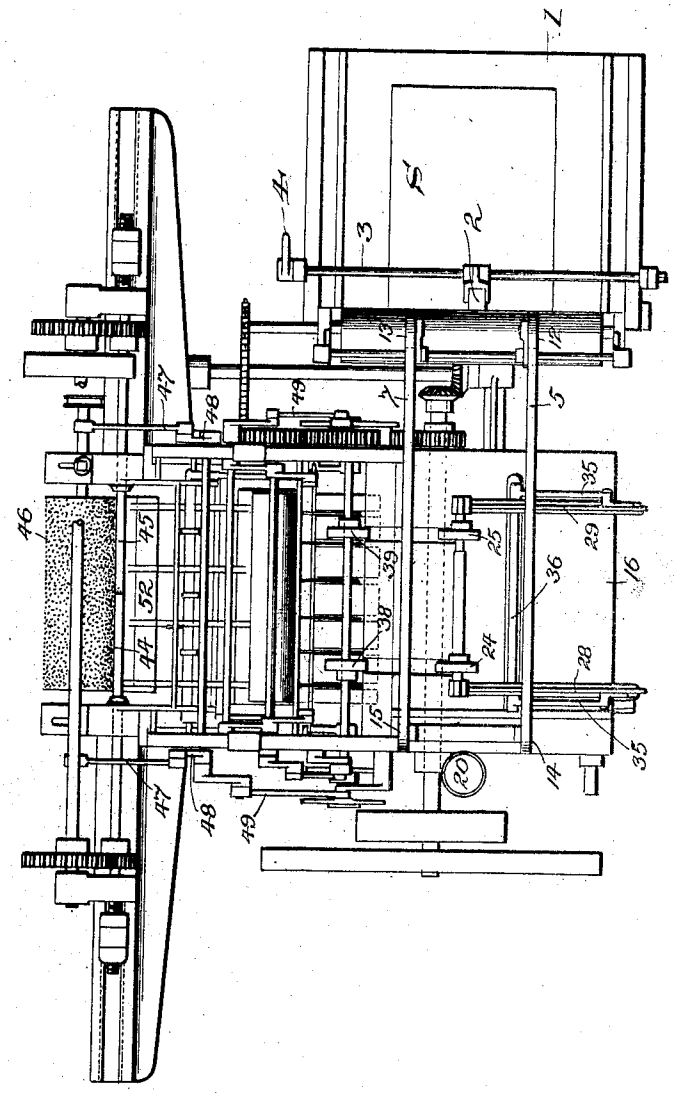


Fig. 1

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3 Sheets-Sheet 2

Fig. 2

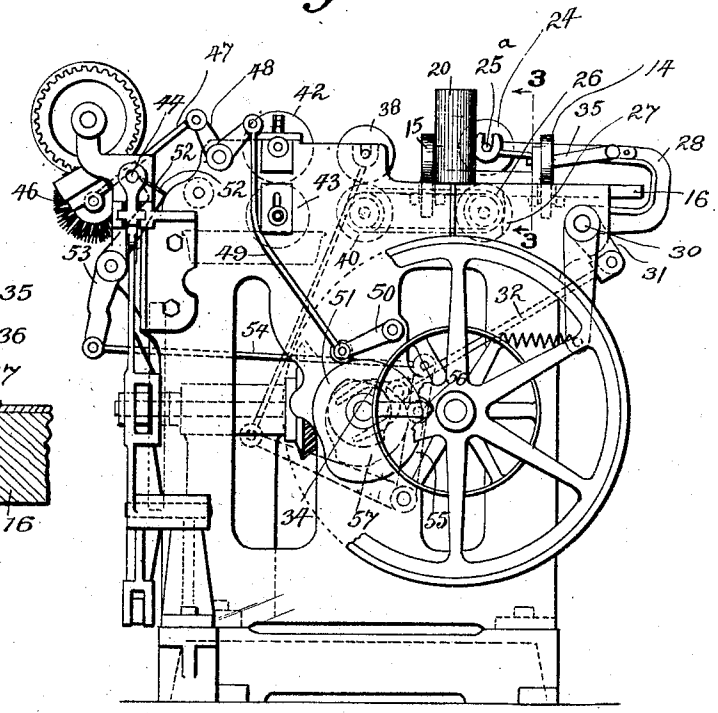


Fig. 4

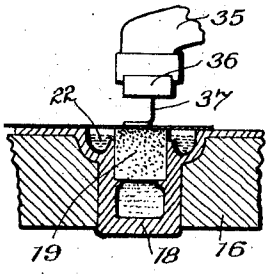
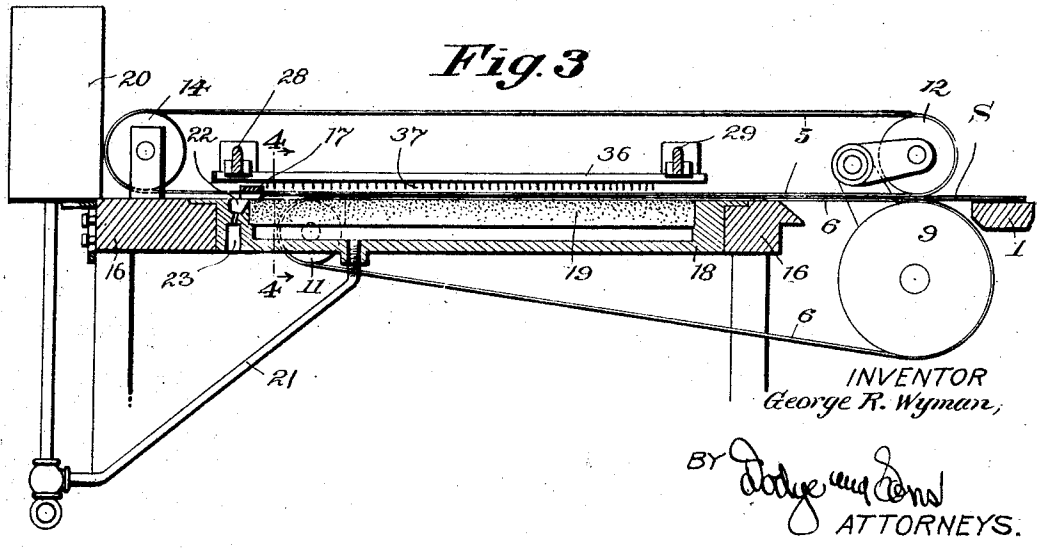


Fig. 3



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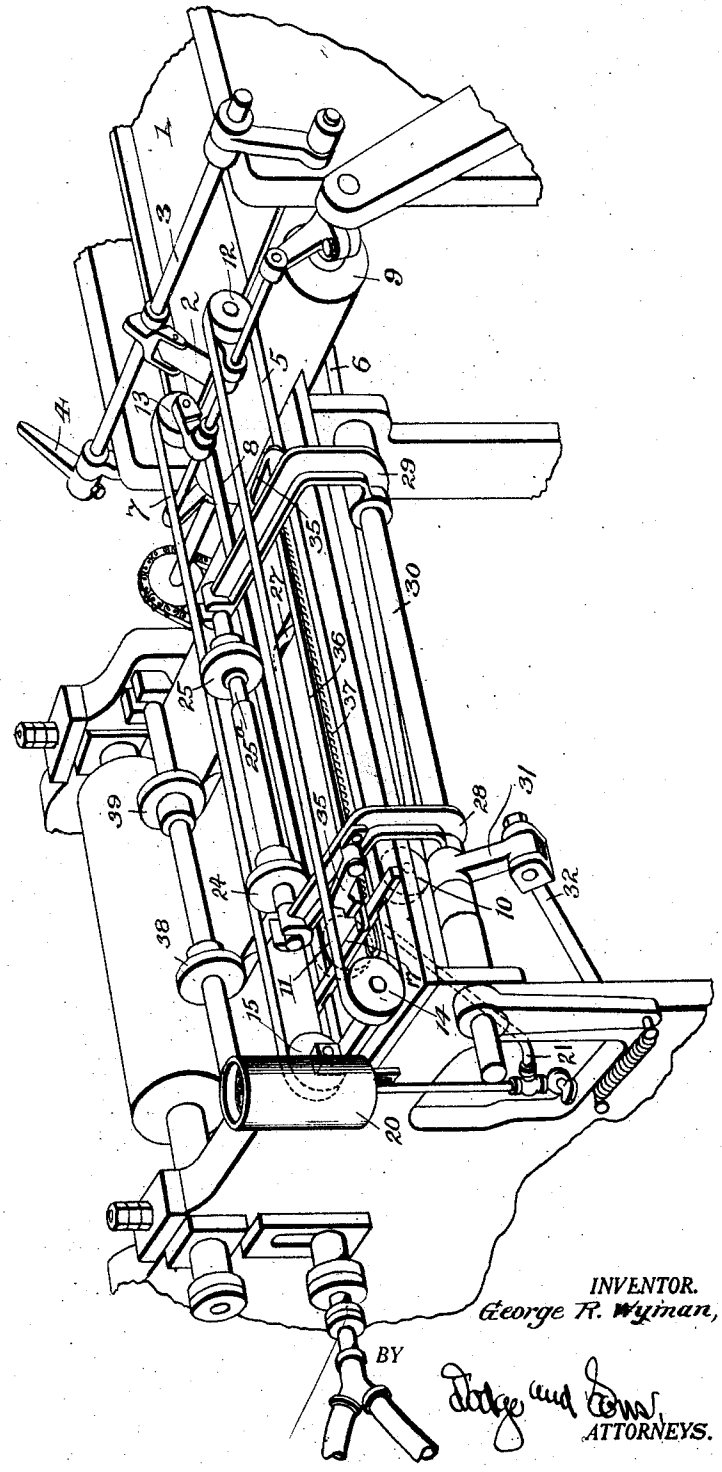
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Fig. 5



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UNITED STATES PATENT OFFICE.

GEORGE R. WYMAN, OF WALPOLE, MASSACHUSETTS.

TUBE-MAKING MACHINE.

Application filed June 4, 1924. Serial No. 717,866.

This invention relates to tube making machines, and more particularly to machines for producing tubes from which shot shells are made. High grade shot shells must be of uniform diameter and present a smooth exterior, free of all roughness due to the wrinkling of the paper from which they are formed. Moreover the convolutions which are pasted together must be tightly wound and the outer edge of the sheet closely laid down in adherent relation to the underlying body portion.

The present invention is in a sense an improvement of the machine set forth in U. S. Letters Patent No. 537,560 to C. S. Bird, dated April 16th, 1895, to which reference is hereby made.

The main object of the invention is to provide means to moisten that portion of the sheet which forms the outermost convolution (in whole or in part) prior to the application of the adhesive thereto, whereby such portion of the sheet upon being wound about the previous convolutions on the mandrel will lie flat and not curl up or blister. During the wetting or moistening operation, the sheet, or more particularly, the section which produces the final outer face of the tube may be colored by utilizing the water as a carrier for the paint or pigment.

A further object of the invention resides in the provision of means for effecting a withdrawal to a greater or less extent of the presser or smoothing bar or element during the winding of the outer end of the sheet to place, thus ensuring the retention of a sufficient amount of paste beneath such outer ends as will effect proper adhesion.

With these and other advantages in view as will hereinafter appear, reference will be had to the annexed drawings wherein:

Fig. 1 is a top plan view of the machine;

Fig. 2 an end elevation:

Fig. 3 a vertical section view on the line 3—3 of Fig. 2 showing the moistening pad and the overlying presser bar for forcing the sheet against the pad;

Fig. 4 is a detail sectional view on the line 4—4 of Fig. 3, and

Fig. 5 a perspective view of the machine with the rear portion broken away.

The sheet which is to be wrapped is denoted by S and such sheets are placed upon a table 1 and advanced against a stop 2 mounted on a shaft 3 adapted to be rocked by a hand lever 4. The sheet when the stop is raised is grasped between endless belts or tapes 5 and 6, and 7 and 8 arranged in pairs one above another, the lower belts passing about a driven roller 9 and idler rollers 10 and 11, while the upper ones are sustained by rollers 12 and 13 adjacent the table 1 and at the opposite end of the run by similar rolls 14 and 15. The sheet is advanced by the tapes or belts over a second table 16 until its advancing edge abuts a fixed stop 17 which arrests its further movement, the sheet being squared against the stop by the slight drag exerted by the belts.

Table 16, see more particularly Figs. 3 and 4, is slotted or recessed to receive an elongated trough shaped receptacle 18, the upper face whereof is flush with the bed. Said trough extends transversely of table 16 and in line with the sheet as it feeds from table 1 so that the rear portion or edge of the sheet is passed over or lies directly above the trough.

A suitable absorbent pad 19 is mounted in the upper portion of the trough, the upper face whereof is flush, or substantially so, with the surface of the table 16. The lower portion of the trough is in communication with a reservoir 20 through a pipe 21 so that the trough is constantly filled with liquid and the pan likewise maintained in a saturated condition. The head of the liquid may be regulated by raising or lowering the reservoir and by filling it to a greater or less extent.

A gutter 22 having a drain opening 23 extends about the felt, said gutter serving to draw off any excess liquid and preventing it from passing outwardly onto the table.

The sheet as it is passed over the pad and against the fixed stop passes below a pair of feed rollers 24 and 25 and above a similar pair of rolls 26 and 27, which latter are constantly driven. Rolls 24 and 25 are secured to a shaft 25^a, the ends whereof rest in suitable bearings formed adjacent the inner ends of a pair of substantially L-shaped arms 28 and 29. The free ends of said arms extend inwardly above and in spaced relation to the table 16 and the sheet thereon, while the outer lower ends are secured to a rock shaft 30. Oscillating movement is imparted to the shaft through the medium of a crank arm 31 and rod 32, the lower end whereof is forked and co-operates with a cam 34.

Pivotally secured to each of the arms is a lever 35 and a bar 36 is attached thereto,

said bar, as will be seen upon reference to Fig. 3 being slightly longer than the length of pad 19.

To the under face of said bar is secured a series of flexible fingers 37 formed from rubber, spring metal, or any suitable material, the lower ends of which when the bar is lowered flatten out against the underlying sheet and cause the same to bear closely against the pad and to hold it against the same as the sheet is fed forwardly over the table toward the winding mandrel.

The parts are so proportioned that as the levers or arms 28 and 29 are lowered, the fingers 37 contact the sheet or that portion thereof which is over the pad after which the sheet is caught between the feed rolls 24 and 25 and the co-operating driven rolls 26 and 27, and by them advanced to and caght by a second series of rolls 38 and 39, and 40 and 41. As the sheet is fed forwardly, the rear portion thereof is drawn beneath the fingers which act to hold it against the moistened pad, and thus such rear portion is wetted upon its under surface and such surface colored at the same time if so desired.

From the last mentioned set of rolls, the sheet passes through suitable paste applying means as set forth in the patent above mentioned and indicated herein in Figs. 1 and 2 by 42 and 43 to the two part winding mandrel 44 and 45. Said mandrel is rotated by means which admit of an endwise movement of its two elements to cause a stripping of the completed tube therefrom.

The leading end of the sheet as it reaches the winding mandrel or arbors is brought into direct contact therewith by a rotary brush 46 which is moved upwardly against the sheet through the action of links 47, interconnected bell-cranks 48, link 49, lever 50 and cam 51 co-acting with the latter.

Acting upon the sheet at the same time the brush is working is a presser blade preferably flexible, designated by 52, said blade being moved up against the sheet when the leading edge thereof gets about half way around the mandrel or arbor and is held thereagainst until just before the last portion of the sheet is wound, at which time it drops back so as to relieve the pressure sufficiently as to leave enough paste upon such end portion as to ensure full adhesion thereof.

Blade 52 is carried by levers 53, one of which, Fig. 2, is connected by a link 54 to a second lever 55, which latter carries a roll 56 co-operating with a cam 57. Said cam is so shaped that the action above specified takes place and the action of the presser bar is different in that respect from the bar 100 in the patent above specified, which it has been found has a tendency to remove too much of the paste with the consequence that the outer layer of the sheet has a tendency to blister, particularly so adjacent the end.

It has been found that by dampening the sheet as above set forth, there is less tendency for the sheet to curl or blister when the paste is applied thereto,—consequently, the sheet or the outer end or layer thereof may be laid down upon the body evenly in proper adherent relation and without any tendency to blister or curl.

In the claims, it is to be understood that the use of the term moistening means, or means to apply moisture to the sheet, is to be interpreted as covering not only the actual application of moisture but also the appilcation of a liquid coloring matter which moistens the sheet as well as colors it.

What I claim is:

1. In a paper tube machine, the combination of sheet moistenting means; means to draw the sheet over and in contact with said moistening means; with a portion of the sheet in advance thereof; pasting means; and a winding mandrel adapted to receive the moistened and pasted sheet.

2. In a paper tube machine, the combination of a bed; an absorbent pad mounted therein; means located above the pad adapted to press the sheet to be wound against the pad; a winding mandrel; and sheet feeding means adapted to draw the sheet over the pad and beneath said pressing means and to advance it to the mandrel.

3. In a paper tube machine, the combination of sheet moistening means; means for feeding a sheet thereto with a portion of the sheet in advance of the moistening means; a winding mandrel; and means for drawing that portion of the sheet which is over and to the rear of said moistening means across the same and advancing it toward the mandrel.

4. In a paper tube machine, the combination of sheet moistening means; means for feeding a sheet thereto with a portion of the sheet in advance of the moistening means; a winding mandrel; means for drawing that portion of the sheet which is over and to the rear of said moistening means across the same and advancing it toward the mandrel; and means for holding the sheet against said moistening means as it is drawn forwardly.

5. In a paper tube machine, the combination of sheet moistening means; means for feeding a sheet thereto with a portion of the sheet in advance of the moistening means; a winding mandrel; means for drawing that portion of the sheet which is over and to the rear of said moistening means across the same and advancing it toward the mandrel; and means for yielding and pressing the sheet against said moistening means as it is drawn forwardly.

6. In a paper tube machine, the combina-

tion of an absorbent pad; a plurality of flexible members arranged above and lengthwise thereof; sheet advancing means; means for lowering said members against the sheet to press the latter into contact with the pad as the sheet advancing means comes into action; and a winding mandrel to which the sheet is fed.

7. In a paper tube machine, the combination of an absorbent pad; a bar extending lengthwise thereof and in spaced relation thereto; a series of fingers extending downwardly therefrom; sheet advancing means; and means for lowering the bar and causing the fingers to press the sheet against the pad.

8. In a paper tube machine, the combination of means to moisten the rear portion of a sheet to be wound; a winding mandrel; and sheet advancing means, said means acting to draw the sheet from said moistening means and advance the same to the mandrel.

9. In a paper tube machine, the combination of a bed; a trough mounted therein; an absorbent pad mounted in the trough; sheet advancing means; and means serving to press the sheet against the pad as the sheet is advanced.

10. In a paper tube machine, the combination of a bed; a trough mounted therein, said trough having a gutter formed about its upper edge; an absorbent pad mounted in said trough; sheet advancing means; and means located above the pad acting to hold a sheet against the pad as the same is drawn thereover by the sheet advancing means.

11. In a paper tube machine, the combination of a pad; means for moistening the same; a pair of levers extending over the pad; means for raising and lowering said arms; and means carried by said arms serving when the arms are lowered to press a sheet against the pad.

12. In a paper tube machine, the combination of a pad; means for moistening the same; a pair of arms extending over the pad; means for raising and lowering the arms; means carried by the arms serving when the arms are lowered to press a sheet against the pad; a pair of rollers carried by the arms; and driven rollers positioned beneath the rollers carried by the arms and serving when said last named rollers are lowered to grasp and draw the sheet forwardly from the pad.

13. In a paper tube machine; the combination of a winding mandrel; sheet advancing means; means for applying paste to the sheet; a presser bar; and means holding said bar against the sheet as it is being wound and retracting the same during the final stage of the winding action.

14. In a paper tube machine, the combination of a winding mandrel; sheet advancing means; means for applying paste to the sheet to be wound; a presser bar; cam actuated means serving to press the bar against the sheet after the advancing edge of the sheet is partially about the mandrel and retracting the same to relieve the pressure exerted by the bar as the winding nears its completion.

15. In a paper tube machine, the combination of a winding mandrel; sheet advancing means; means for moistening the rear section of the sheet to be wound; means for applying paste to the sheet; a rotating brush acting to brush the sheet against the mandrel; a presser bar; and means acting to hold the bar against the sheet during the major portion of the winding action and to gradually relieve such pressure during the final stage of the winding operation.

In testimony whereof I have signed my name to this specification.

GEORGE R. WYMAN.