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2,020,348

METHOD OF FASTENING CORE CAPS TO CORES

Filed July 14, 1931

2 Sheets-Sheet 1

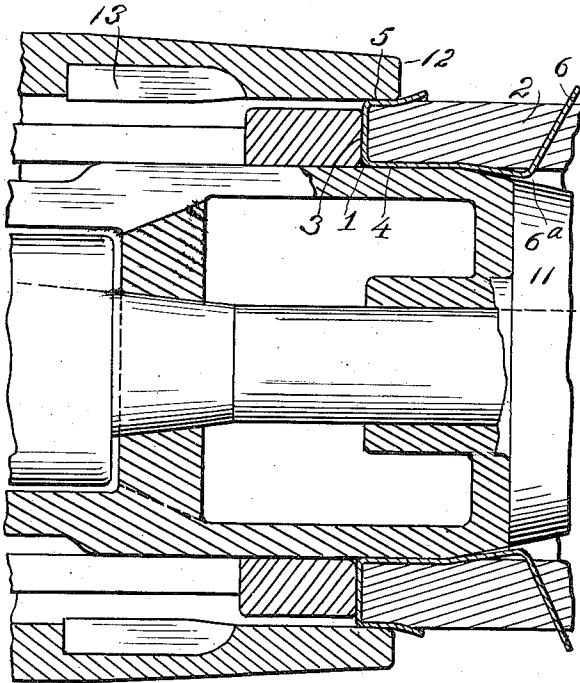
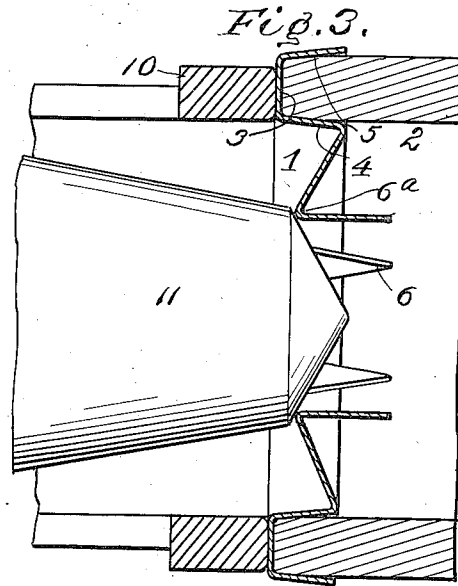
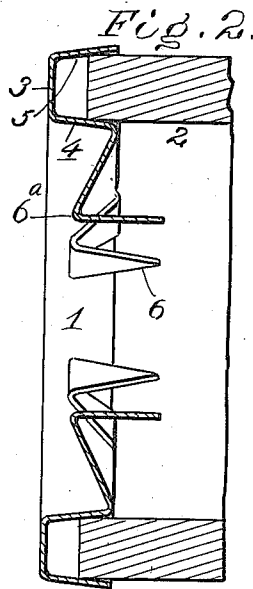
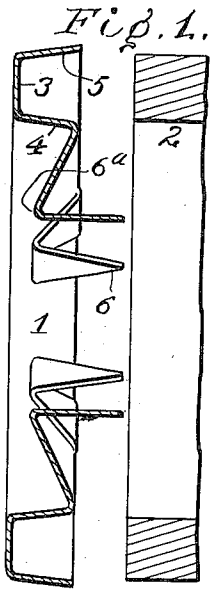


Fig. 4.

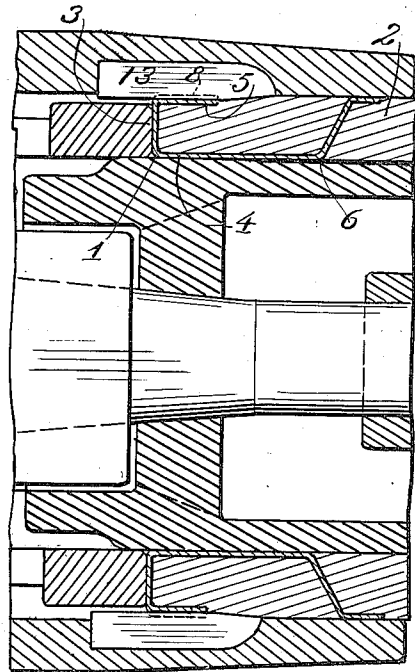


Fig. 5.

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Fig. 6.

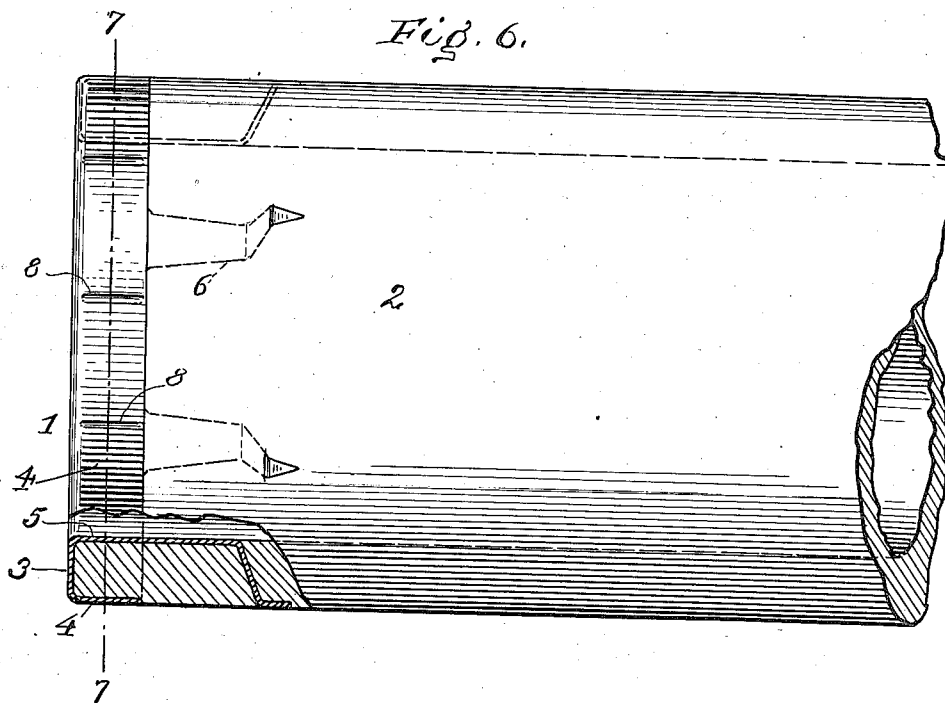


Fig. 7.

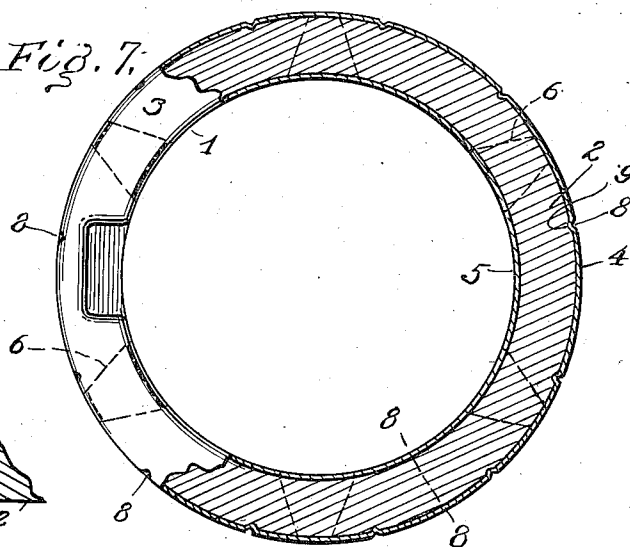
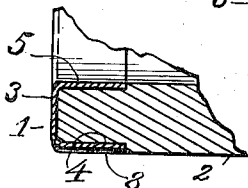


Fig. 8.



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METHOD OF FASTENING CORE CAPS
TO CORES

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Application July 14, 1931, Serial No. 550,678

6 Claims. (Cl. 153—1)

This invention relates to hollow cores, such as are used to have wound thereon into rolls, the paper webs or sheets produced on paper making machines. Such cores, usually made of straw-board, paperboard, pulp, paper pulp or similar material, are furnished on their ends with metallic core caps for the purpose of protecting the ends of the tubular core, and enabling it to withstand the severe strains to which it is subjected when, with the very heavy roll of paper supported thereby, it is mounted in a printing machine and rotated to unwind the paper.

The present invention is particularly concerned with the manner of attaching the core caps to the ends of the core, the object being to effect a firm connection of these parts free from any external projecting portions or obstructions liable to catch on, interfere with, or injure the paper sheet as it is wound on the core, and with this and other objects in view, the invention consists of the improved method of fastening the cap to the core, characterized by a deforming or distorting operation of the cap to cause it to become embedded in the material of the core.

In the specification to follow, the invention will be described in detail, and the novel features thereof will be pointed out in the appended claims.

Referring to the drawings:—

Fig. 1 is a view in sectional elevation of a core cap and of the end of a hollow core to which the cap is to be fastened, the said parts being separated from each other;

Fig. 2 is a similar view showing the cap seated on the end of the core preparatory to being acted on to embed it in the material of the core;

Fig. 3 is a view in sectional elevation showing the cap held in position on the end of the core by the mandrel member of the cap deforming and seating mechanism, preparatory to the operation of said mechanism to embed the cap in the core;

Fig. 4 is a sectional elevation, showing certain parts of the cap deforming mechanism advanced and subjecting the cap to the first stage of the operation of embedding it in the core;

Fig. 5 is a similar view, showing the parts of the mechanism fully advanced and completing the fastening of the cap to the core;

Fig. 6 is a side elevation on an enlarged scale of one end of a completed capped core, certain parts being broken away to better illustrate the construction;

Fig. 7 is a cross sectional view through the same on the line 7—7 of Fig. 6; and

Fig. 8 is a fragmentary sectional view on the line 8—8 of Fig. 7.

Referring to the drawings:

On reference particularly to Figs. 6, 7 and 8, which illustrate one end of the finished capped core, it will be seen that the cap 1 on the end of the core 2 comprises an end web 3 which is seated against the end of the core, an outer flange or wall 5 connected with the web and extending around the exterior of the core, and an inner flange 4 connected with the web and extending parallel with the flange 5 and around the interior of the core, the said inner flange being in the present instance provided at intervals with fastening prongs 6 which extend through the core material and have their ends clinched down as shown.

In accordance with the present invention, the outer flange 5 of the cap is embedded in the material of the core, so as to extend flush therewith and thereby leave the outer surface of the core, where it joins the flange, free from any projections or obstructions such as might interfere with or injure the paper wound thereon; and incidental to this embedding of the outer flange, but not so important, the inner flange 4 is likewise embedded in the material of the core and produces on the interior thereof a finished and smooth surface which facilitates the proper mounting and operation of the core in the printing machine.

The outer flange 5 on the cap is formed at intervals with inwardly extending indentations 8, producing on the interior of the flange inwardly extending ribs 9 which are likewise embedded in the core material and serve as an additional means for securing the firm and solid attachment of the cap to the core.

In the embedding of the cap in the core material as above explained, the outer flange of the cap, as well as the inner flange, is subjected to a deforming or distorting operation, the outer flange being reduced in diameter from its original size, as by the formation of the indentations 8, and the diameter of the inner flange being enlarged, as by stretching the same, these actions being performed by subjecting the outer flange to a compressive force acting inwardly, and subjecting the inner flange to an expansive force acting outwardly.

Any suitable means may be employed to subject the two flanges to these deforming operations in effecting the embedding of the same in the material of the core, and in the attachment of the cap to the core. One form of such mechanism is shown in the drawings in Figs. 3, 4 and 5, but in itself said mechanism forms no part of the present invention, which is confined to 55

the method of attachment of the cap to the core and the product resulting therefrom.

In the embedding of the cap in the core material in the attachment of the cap thereto, in accordance with the invention as above outlined, the procedure is as follows.

The cap with its two flanges slightly diverging as shown in Figs. 1 and 2, and with the prongs on the inner flange bent so as to present shoulders 6^a to facilitate their manipulation to pierce the core wall, is seated over the end of the core as shown in Fig. 2, and the mechanism partially shown in Figs. 3, 4 and 5 is positioned relative to the cap, to cause an annular member 10 of said mechanism to be engaged with the web portion of the cap, which member is pressed against the cap to seat said web portion firmly against the end of the core, as shown in Fig. 3, so as to hold the same during the subsequent operations on the cap.

An internal mandrel 11 and an external compressing sleeve 12 of said mechanism are now advanced within and around the seated cap, with the result that the shoulders 6^a of the fastening prongs will be first engaged by the mandrel and the prongs caused to pierce and extend through the wall of the core as shown in Fig. 4 with the inner portions of the prongs seated flatly against the core. At the same time the inner flange of the cap will be subjected by the mandrel to a powerful outwardly acting expansive force which will act to stretch the flange and embed it in the material of the core. Simultaneously with this action, the outer flange of the cap will be engaged by the compressing sleeve 12 and the flange will be subjected to a powerful pressure acting inwardly and operating to seat the flange flatly against the outer side of the core and partially embed the same therein, all as shown in Fig. 4. On the further advance of the said mechanism, there are brought into action against the outer flange, inwardly extending indenting members 13 on the compressing sleeve 12, which indenting members engaging the outer flange will form the inwardly extending indentations therein and produce on the inner side of the flange the corresponding ribs 9, before alluded to, which are by this action embedded in the core. By the formation of these inwardly extending indentations in the outer flange of the cap, the flange is deformed and the diameter of the same is reduced, and the flange thus permitted to be embedded in the core with its outer surface flush with the exterior surface of the core, as shown in Fig. 5, the projecting ends of the prongs 6 in this last stage of movement of the mechanism being clinched down on the outer side of the core as shown in Fig. 5.

This completes the operation of embedding the cap in the core and in effecting the fastening of the same thereto, and results in the production of the finished capped core shown in Fig. 6, where it will be seen that both the inner and outer flanges of the cap are embedded in the material of the core so as to lie flush therewith, and where it will be seen that the outer flange has been reduced in diameter by the formation of the inwardly extending indentations 8 therein, producing the internal ribs 9 also embedded in the core material.

It will be obvious that due to the method of fastening the cap to the core by embedding the flanges therein and by the embedding of the ribs on the outer flange, a very compact and solid construction of cap is produced containing a minimum amount of material, and fastened in such

manner as to maintain firm engagement with the core with practically no liability of looseness or displacement, and presenting a continuous smooth surface on the exterior of the core free from any projecting parts at the edge of the external flange, and also presenting on the interior of the core a similar smooth surface, all contributing to a very efficient arrangement and construction of the parts, and attendant with the minimum of expense in the production of the caps and in the fastening of the same to the cores.

While in the foregoing description and accompanying drawings the invention has been set forth in the particular detailed form and method of procedure which has been found in practice to answer to a satisfactory degree the ends to be attained, it is to be understood that these details may be variously changed and modified by the skilled mechanic without departing from the limits of the invention; and further, it will be understood that the invention is not limited to any particular form or construction of the parts, except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim is:—

1. In the method of fastening metallic core caps having an external annular wall and an internal annular wall to fibrous tubular cores, seating the cap on the end of the core, with said external wall surrounding said end of the core and said internal wall within said end of the core, subjecting said external wall simultaneously throughout its circumferential extent to a deforming operation acting to reduce the diameter of said annular wall and embed the same wholly throughout its extent in the material of the core flush with its outer surface, and subjecting said internal wall simultaneously throughout its circumferential extent to a deforming operation acting to increase the diameter of said internal wall whereby said end of the core is firmly gripped between said external and internal walls.

2. The method of fastening core caps having inner and outer annular flanges, to hollow cores, which consists in seating the cap on the end of the core, with the flanges extending respectively around the inner and outer sides of the end of the core, and subjecting said flanges simultaneously throughout their circumferential extent to a deforming operation acting to reduce the diameter of the outer flange and increase the diameter of the inner flange, and thereby ended the same wholly throughout their extent in the material of the core.

3. The method of fastening core caps having inner and outer annular flanges, to hollow cores, which consists in seating the cap on the end of the core, with said flanges extending respectively around the inner and outer sides of the core at its end, and subjecting said flanges to deforming operations simultaneously throughout their circumferential extent and acting to stretch the inner flange and increase its diameter, and to form inwardly extending ribs on the outer flange, while embedding said inner flange in the interior of the core, and said outer flange and ribs in the exterior of the core, with said latter flange flush with the external surface of the core.

4. The method of fastening core caps having inner and outer annular flanges connected by an annular web, to hollow cores, which consists in seating the cap over the end of the core with the web bearing against the end of the core and with said flanges extending respectively around the

inner and outer sides of the core, subjecting the web of the core cap to pressure to hold it against the end of the core, and subjecting the flanges of the cap to pressure to reduce the diameter of the 5 outer flange and stretch the inner flange, whereby to embed said flanges in the material of the core flush with the surface thereof.

5. In the method of fastening metallic core caps having an outer annular flange and an inner 10 annular flange to fibrous tubular cores, seating the cap on the end of the core with the outer flange surrounding the core and the inner flange within the core, subjecting the exterior of the outer flange to inwardly acting pressure exerted 15 simultaneously throughout its circumference to partially embed the flange in the material of the core, subjecting the outer flange to further inwardly acting pressure, while forming therein external indentations and corresponding inwardly 20 extending ribs, thereby reducing the diameter of

the flange and completing the embedding of the same in the material of the core, and subjecting the inner flange of the cap to expansive pressure exerted simultaneously throughout its circumference to stretch the flange and thereby to cause 5 said end of the core to be firmly gripped between said inner and outer flanges.

6. The method of fastening core caps having inner and outer annular flanges, to hollow cores, which consists in seating the cap on the end of 10 the core, with the flanges extending respectively around the inner and outer sides of the end of the core, and subjecting said flanges simultaneously throughout their circumferential extent to a deforming operation acting to compress the 15 outer flange to reduce its diameter, and to stretch the inner flange to increase its diameter, and thereby embed both flanges throughout their extent in the material of the core.

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