



Sept. 21, 1943.

C. S. CRAFTS

2,329,830

ROTARY PRINTING PRESS

Filed Oct. 24, 1940

3 Sheets-Sheet 2

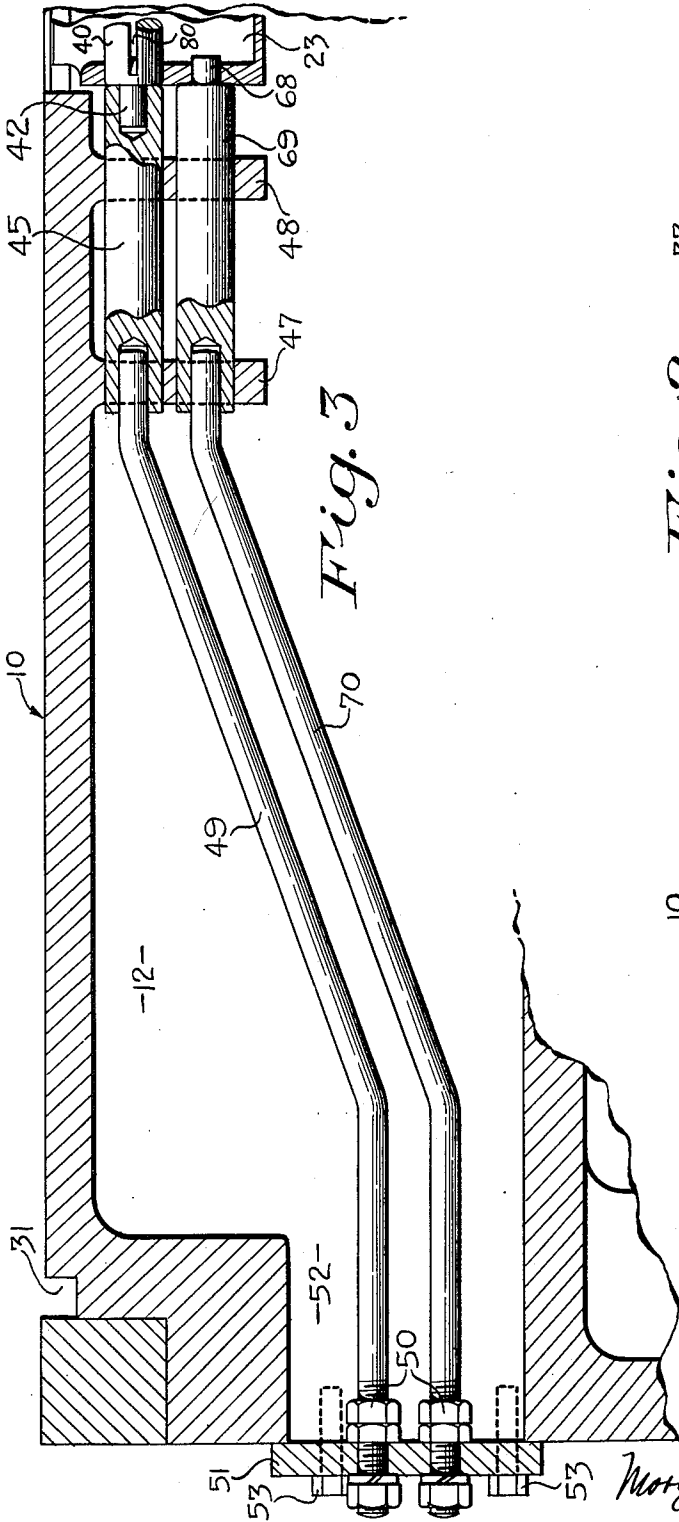


Fig. 3

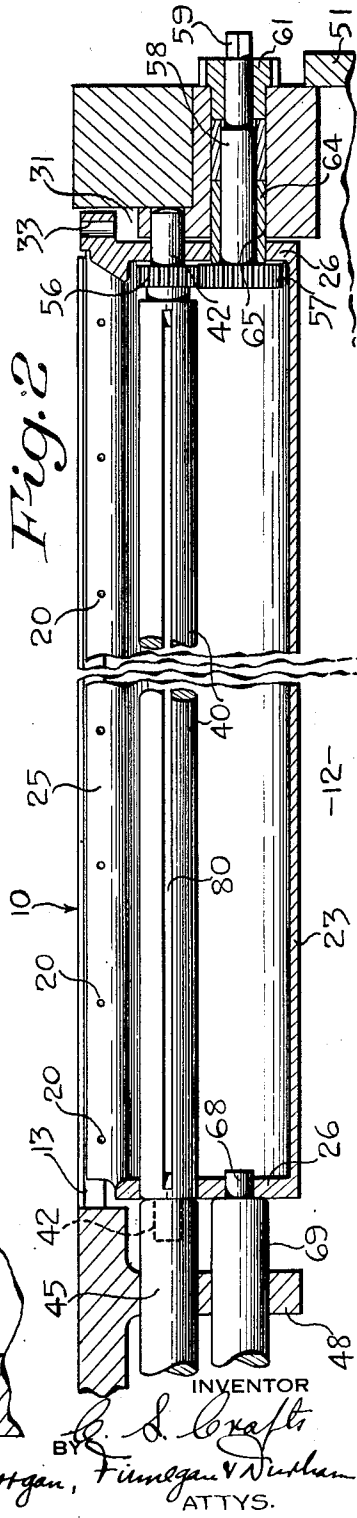


Fig. 2

INVENTOR  
*C. S. Crafts*  
BY *Morgan, Finnegan & Durban*  
ATTYS.

Sept. 21, 1943.

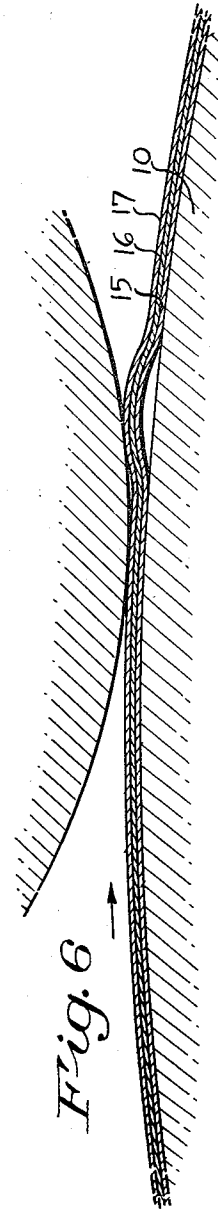
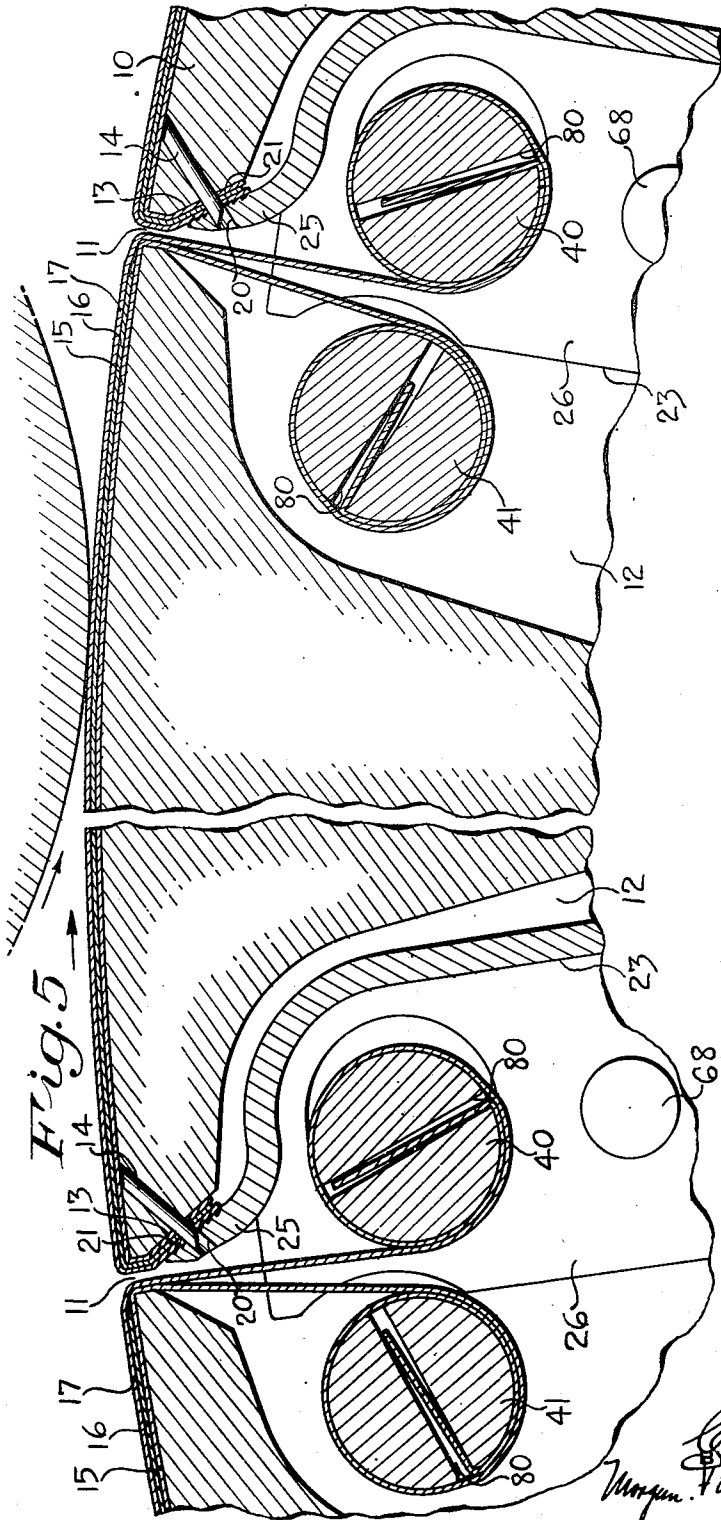
C. S. CRAFTS

2,329,830

ROTARY PRINTING PRESS

Filed Oct. 24, 1940

3 Sheets-Sheet 3



INVENTOR  
*C. S. Crafts*  
Morgan, Finnegan & Durham  
ATTYS.

# UNITED STATES PATENT OFFICE

2,329,830

## ROTARY PRINTING PRESS

Curtis S. Crafts, Oak Park, Ill., assignor to The  
Goss Printing Press Company, Chicago, Ill., a  
corporation of Illinois

Application October 24, 1940, Serial No. 362,518

10 Claims. (Cl. 101—415.1)

The present invention relates to new and useful improvements in the impression cylinders of rotary printing presses, and more particularly to the impression cylinders of relatively large multicolor magazine printing presses.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Figure 1 is a fragmentary end elevation, with certain parts broken away, of a typical and illustrative embodiment of the present invention;

Figure 2 is a fragmentary radial sectional view of the tympan holding and stretching means at one end of the cylinder shown in Fig. 1;

Figure 3 is a similar view of the other end of the cylinder and taken on the same radial section as Figure 2;

Figure 4 is a fragmentary end view with certain parts broken away, and showing the tympan sheet holding and stretching means of the illustrative impression cylinder;

Figure 5 is a fragmentary sectional view of an impression cylinder in accordance with the present invention showing the manner in which the tympan sheets are clamped and stretched, and their operation with a printing cylinder; and

Figure 6 is a fragmentary diagrammatic sectional view showing the manner in which a wrinkle forms in the tympan on the impression cylinder of a conventional printing press.

In multicolor rotary web printing presses such as are commonly used for the high speed printing of magazines, it is customary to have an impression cylinder which has a diameter considerably larger than the diameter of the several plate cylinders with which it cooperates. Such an impression cylinder is conventionally covered with a plurality of thicknesses of relatively hard but slightly resilient packing such as oiled manilla paper, and these sheets of packing are removably secured so as to cover the entire surface of the

impression cylinder, giving the impression cylinder the desired diameter and at the same time providing a slightly resilient support for pressing the web of paper to be printed against the inked plates carried by the several printing cylinders. Heretofore, it has been the universal practice to clamp or otherwise secure the leading edge of these sheets of packing and to leave the trailing end of one or more of the underlying sheets of packing unattached, means being provided for stretching the outermost, and generally the innermost, sheets of packing material. In this way, the intermediate sheet of packing, which is frequently a softer and more resilient grade of paper, is left relatively free at its trailing edge and is held in position by the binding action of the outermost sheet of packing and the friction of this intermediate sheet against the innermost sheet of packing.

In the operation of a multicolor rotary web printing press utilizing such conventional form of impression cylinder, and particularly where the impression cylinder is three or four times the diameter of the printing cylinder, there is a decided tendency on the part of the underlying sheets to creep, and when this creeping has progressed sufficiently far, a wrinkle occurs in the packing of the impression cylinder which spoils the printed product, injures the plates on the printing cylinder, and if allowed to continue will break the printing plates and thereby result in damage to the press and possible injury to the pressman.

The present invention has for its object the provision of a novel and improved impression cylinder which avoids these defects of the prior art and can be safely operated for long periods of time without injury to the packing or the printing plates and produces a superior quality of printing. The invention also provides an improved tympan clamping and stretching means which will hold all of the sheets of packing on the impression cylinder without wrinkling.

In accordance with the present invention, the several sheets of packing or other material with which the impression cylinder is clothed are securely clamped to the impression cylinder along the trailing edge of these sheets, and at least the outer, and preferably the innermost, sheets of packing are secured at their leading edges by means which allow the outer and innermost sheets to be maintained taut, the intermediate sheets of packing being clamped to the cylinder only at their trailing edge and being free to move

at their leading edge except for the binding action of the outermost sheet and the friction between the intermediate sheet and the other packing sheets.

It will be understood that the foregoing general description and the following detailed description as well, are exemplary and explanatory of the invention but are not restrictive thereof.

Referring now in detail to Figures 1 to 5 of the drawings, there is shown a typical and illustrative embodiment of applicant's invention. The impression cylinder 10 comprises a relatively large cylindrical body of the desired diameter which is provided with one or more relatively narrow slots 11 extending longitudinally of the surface of the cylinder, and communicating with an axially extending cavity 12 formed in the body of the cylinder. Preferably, the slots 11 do not extend across the entire length of the cylinder 10, in the case of a relatively long cylinder, but are only a fraction of the length of the cylinder, other and staggered slots being provided for the other longitudinal portions of the cylinder.

The slots 11 are interiorly beveled and provide a face 13 in which are positioned a series of relatively closely spaced pins 14 which project from the beveled face and serve to impale the various thicknesses of sheet packing 15, 16 and 17, these pins being located on the leading edge of the slot 11 so as to secure the trailing edge of the sheets 15, 16 and 17. Thus, the structure shown in Figures 1, 4 and 5 is adapted to rotate in a clockwise direction. A jaw member extending throughout the length of each slot 11 is provided to clamp the trailing edges of the sheets against the face 13, and this jaw member is provided with apertures 20 to fit over the pins 14, and is also formed with a serrated face 21 to increase its grip on the sheets. This jaw conveniently comprises a trough-like member 23, the outer edge of which is reversely turned to provide the jaw portion 25, and this trough member 23 is provided with integral ends 26 by which it may be pivotally mounted for clamping and unclamping movement. One of the ends 26 is also formed with slight recesses 27 near its outer edge which is adapted to be engaged by the nose 28 of a relatively stiff parti-cylindrical leaf spring 29 secured to the body of the cylinder 10 by means of the screws 30 within an annular channel 31. This spring cooperates with the end 26 of the trough-like member so as to hold the jaw firmly in clamped or unclamped position. The ends 26 are also provided with sockets 33 into which a bar or other jaw operating member may be inserted for clamping or unclamping the jaw.

The means for clamping and stretching the leading edges of the tympan sheets comprise a pair of slotted reel rods extending the length of the slot 11 and positioned within the cavity 12, and these reel rods 40 and 41 are rotatably mounted by means of their journal ends 42 parallel to the axis of the cylinder 10. At one end of the cylinder the reel rod is mounted in a journal formed in the cylinder end casting while the other ends of the slotted rollers are mounted in a bore at the end of a small rod 45 slidably secured in aligned apertures in the inwardly projecting lugs 47, 48. Rods 45 are moved inwardly and outwardly into, and held in, roller journaling position by means of the bent rods 49 which are secured in place and adjusted by means of the nuts 50 which clamp the external end of rods 49 to the mounting plate 51 which is secured over an end hole 52 in the cylinder, plate 51 being

held to the cylinder by means of screws 53. End hole 52 also serves as a hand hole through which the reel rods may be inserted and removed from the cylinder.

For rotating the reel rods 40 and 41, each of them is provided with a gear 56 secured to the end of the rod nearest the cylinder end and meshing with a gear 57 carried by a rotatable stud 58 journaled in the cylinder end and provided with a squared outer end 59. Stud 58 is also provided with ratchets 61 fast thereto and cooperating with the double spring pawls 62 which prevent unwinding of the reel rods.

The trough-like jaw member 23 is pivotally mounted at one end by means of a sleeve 64 surrounding stud 58 and journaled within the bore 65 in the cylinder end wall, while at the other end, jaw member 23 is pivoted on the reduced cylindrical end 68 of rod 69 which is slidable in lugs 47 and 48 and is pushed into operative position by means of the bent push rod 70 in the same manner as with bar 45 and rod 49. The end walls 26 of the trough-like jaw member 23 are provided with elongated apertures which fit over the ends of the reel rod 40, the elongation of these apertures permitting the pivotal movement of the jaw member for the clamping and unclamping of the trailing edge of the tympan sheets.

As is usual, the slotted reel rods 40 and 41 are provided with longitudinally extending slots 80 into which the end of the tympan sheet may be inserted before the reel rods are rotated to tighten and stretch the tympan sheets, and preferably the tympan sheet is wrapped at least a full turn around these reel rods so that it may be securely held without slipping.

As shown in Figure 5, the direction of rotation of the impression cylinder 10 is indicated by the arrow, and the impression cylinder is customarily clothed with three sheets of packing, 15, 16 and 17. The trailing edge of these sheets is impaled on the pins 14 and thereafter the jaw 25 is sprung to closed position so as to tightly clamp these sheet ends between the teeth 21 and the beveled face 13. Thereafter, the underlying sheet of packing 15 is smoothed out on the cylinder surface, and the free end is inserted in the gap 11, and into the slot 80 and reel rod 41. Thereafter, reel rod 41 is rotated in a clockwise direction until the sheet 15 is tightly stretched and securely held. The intermediate sheet or sheets of packing 16 are then smoothed out and left with their leading edges free, after which the outermost sheet of packing 17 is smoothed and its free end is inserted into the gap 11 and then into the slot 80 and reel rod 40. Reel rod 40 is then rotated in a counter-clockwise direction to firmly secure and stretch the outer sheet of packing 17. The rods 40 and 41 are rotated until the packing sheets 15, 16 and 17 are sufficiently stretched, and from time to time these rods 40 and 41 must be tightened to compensate for the stretch of the packing sheets which takes place during continued printing.

I have found that with the conventional type of impression cylinder as illustratively shown in Fig. 6 (in which the several sheets of packing material 15, 16 and 17 are firmly clamped at their leading edge, while the trailing ends of the sheets 15 and 17 are connected to the reel rods, and the trailing end of the intermediate sheet or sheets 16 is unattached), that the sheet material creeps as it is subjected to the relatively heavy pressure between the printing and impression

cylinders, and this creep or elongation occurs in that portion of the packing material which has been subjected to the pressure of printing, thereby gradually pulling the intermediate sheet 16 ahead of the remaining sheets and tending to accumulate an excess of the sheet 16 near its leading edge and soon resulting in the formation of a wrinkle in this intermediate sheet 16.

By the present invention (as shown in Figure 5), any stretch which occurs in the intermediate sheet 16 is opposed by the firm clamp on the intermediate and other sheets at their trailing edges with the result that this usual tendency to wrinkle smooths out the intermediate sheet 16 and keeps the tympan in good printing condition.

Although all of the advantages of the present invention are achieved only by rotating the impression cylinder so that the packing sheets are securely clamped at their trailing edge, certain of the important advantages are achieved and the other improvements are useful in connection with impression cylinders having the leading edge of the packing sheet securely clamped.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:

1. In a tympan cylinder for rotary printing presses, the combination of a hollow cylinder body having a longitudinal slot therein to receive a tympan sheet end, a rotatable member within the cylinder body to stretch the sheet and means for journalling the rotary member including an axially movable bearing member, a rigid member extending therefrom, and means for securing the rigid member to the cylinder.

2. In a tympan cylinder for rotary printing presses, the combination of a hollow cylinder body having a longitudinal slot therein to receive a tympan sheet end, a rotatable member within the cylinder body to stretch the sheet and means for journalling the rotary member including an axially movable bearing member having an extension thereon, and means for securing the extension to one of the cylinder ends.

3. In a tympan cylinder for rotary printing presses, the combination of a hollow cylinder body having a longitudinal slot therein to receive a tympan sheet end, a rotatable member within the cylinder body to stretch the sheet and means for journalling the rotary member including a bearing member held against all but axial movement, a rod attached thereto and means for securing the rod to the cylinder end to hold the bearing against axial movement, said cylinder end being apertured to permit removal of the bearing, rod and rotatable member.

4. In a tympan cylinder for rotary printing presses, the combination of a cylinder body having a narrow slot therein opening into a larger, axially extending cavity in the cylinder body, a sheet clamping jaw cooperating with one edge of the slot to secure the tympan, a rotatable sheet stretching means adjacent said slot, and a trough-like jaw body on which the jaw is mounted and within which the sheet stretching means is positioned, said jaw body being pivoted below the sheet stretching means and being provided at its ends with elongated apertures

through which the sheet stretching means are journaled.

5. In a tympan cylinder for rotary printing presses, the combination of a cylinder body having a narrow slot therein opening into a larger, axially extending cavity in the cylinder body, a sheet clamping jaw cooperating with one edge of the slot to secure the tympan, a rotatable sheet stretching means adjacent said slot, and a trough-like jaw body on which the jaw is mounted and within which the sheet stretching means is positioned, said jaw body being pivoted below the sheet stretching means and being provided at its ends with elongated apertures through which the sheet stretching means are journaled, and means for journalling said sheet stretching means and jaw body each including an axially movable bearing member having an extension thereon and means for securing the extension to one of the cylinder ends.

6. In a tympan cylinder for rotary printing presses, the combination of a cylinder body having a narrow slot therein opening into a larger, axially extending cavity in the cylinder body, a sheet clamping jaw cooperating with one edge of the slot to secure the tympan, a rotatable sheet stretching means adjacent said slot, and a trough-like jaw body on which the jaw is mounted and within which the sheet stretching means is positioned, said jaw body being pivoted below the sheet stretching means and being provided at its ends with elongated apertures through which the sheet stretching means are journaled, and means for journalling said sheet stretching means and jaw body each including a bearing member held against all but axial movement, a rod attached thereto and means for securing the rod to the cylinder and to hold the bearing against axial movement, said cylinder end being apertured to permit removal of the bearing, rod and rotatable member.

7. A printing press including a printing cylinder and a tympan cylinder rotating therewith, said tympan cylinder having a slotted cylinder body, a jaw at the leading edge of a slot in the tympan cylinder body to securely hold a plurality of sheets of packing by the trailing edges, a plurality of sheet tightening and gripping members in a slot to engage and tighten the leading edges of a plurality of sheets of packing and a sheet of packing beneath the outermost sheet unattached at its leading edge.

8. A printing press including a printing cylinder and a tympan cylinder rotating therewith, said tympan cylinder having a slotted cylinder body, a jaw at the leading edge of a slot in the tympan cylinder body to securely hold an under sheet of packing by the trailing end, a sheet tightening and gripping member in a slot to engage and tighten the leading end of an outer sheet of packing, said under sheet of packing, beneath the outermost sheet, having its leading end unattached.

9. A printing press including a printing cylinder and a tympan cylinder rotating therewith, said tympan cylinder having a plurality of sheets of packing clothing the tympan cylinder and secured at their trailing edges to the tympan cylinder, one of said sheets beneath the outermost sheet being free of the tympan cylinder at its leading edge, and means at the leading edge for tightening and securely holding the outermost sheet.

10. A printing press including a printing cyl-

inder and a tympan cylinder rotating therewith, said tympan cylinder having a plurality of sheets of packing clothing the tympan cylinder and secured at their trailing edges to the tympan cylinder, means at the leading edge for tightening and securely holding one of the sheets beneath the outermost sheet, at least one of the

remaining sheets beneath the outermost sheet being free of the tympan cylinder at their leading edges, and means at the leading edge for tightening and securely holding the outermost sheet.

CURTIS S. CRAFTS.