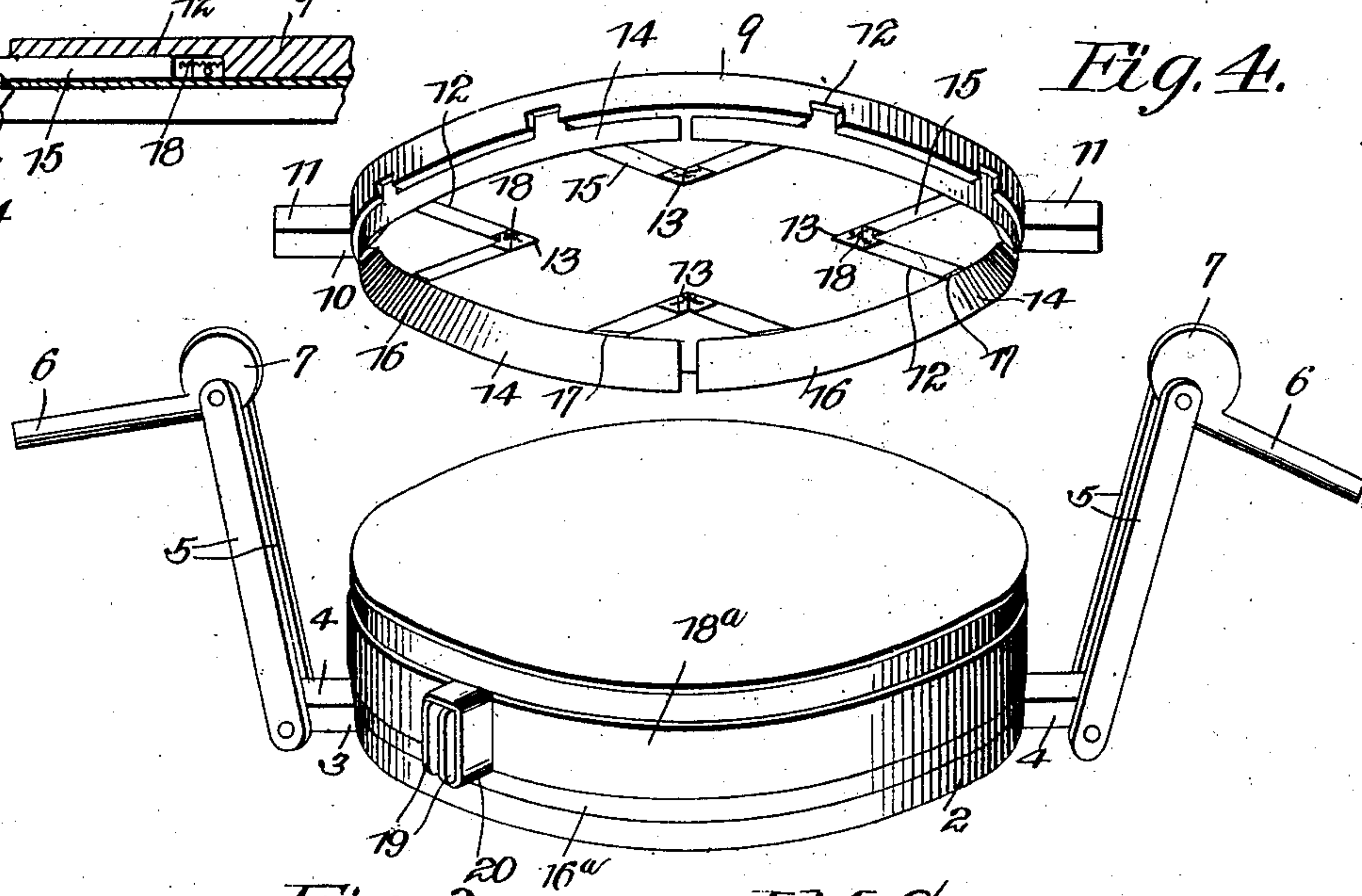
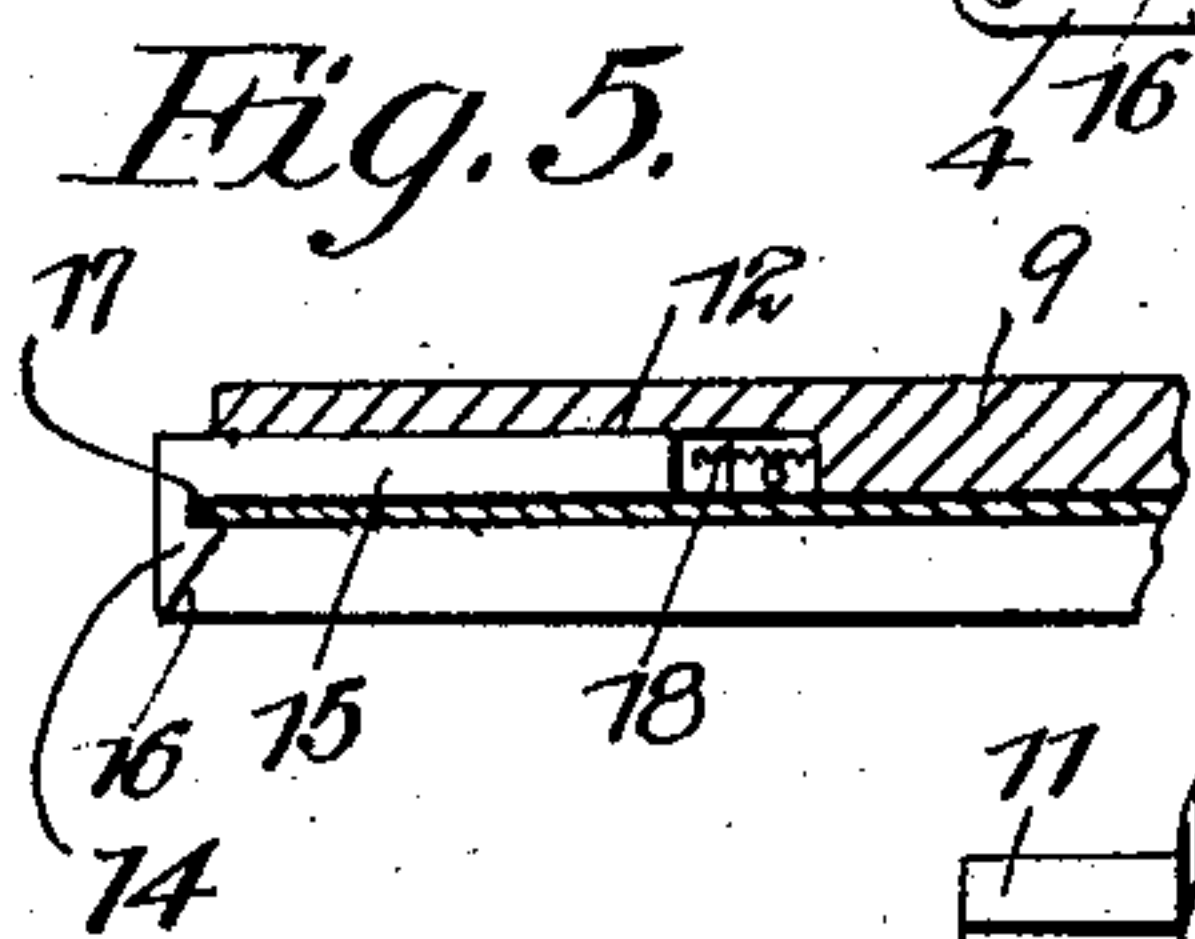
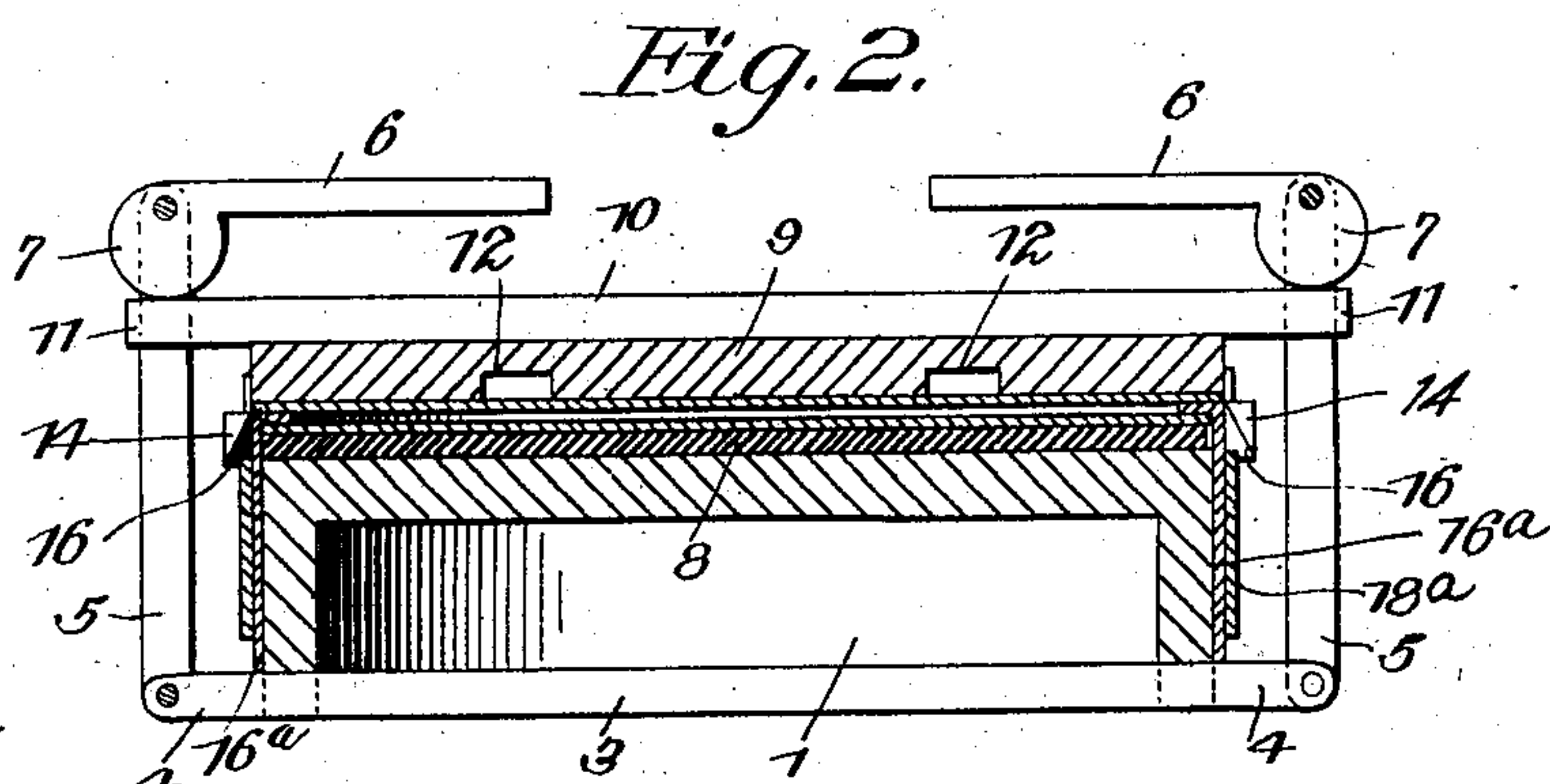
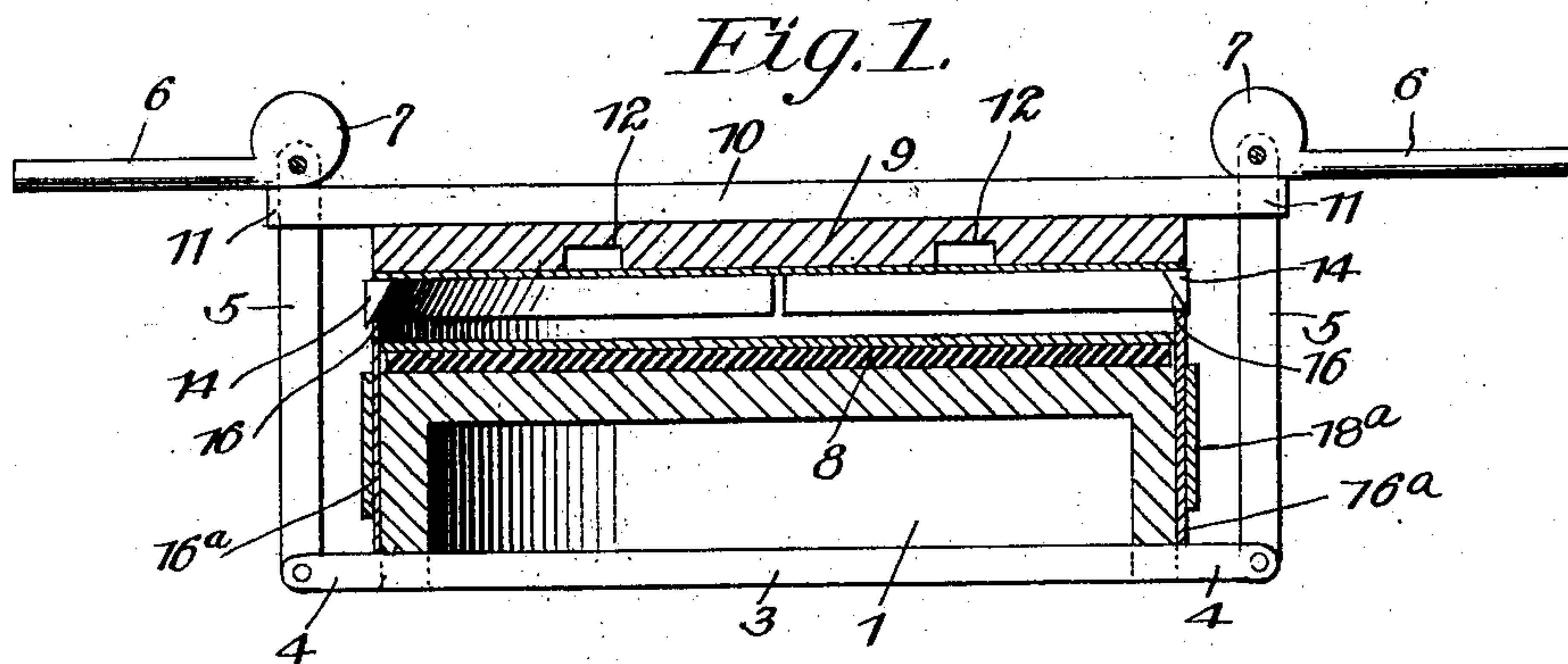


PATENTED JAN. 19, 1904.

APPLICATION FILED JUNE 22, 1903.

2 SHEETS—SHEET 1.



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No. 749,917.

PATENTED JAN. 19, 1904.

J. M. CARNCROSS.

MACHINE FOR MANUFACTURING PAPER BOXES.

APPLICATION FILED JUNE 22, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 6.

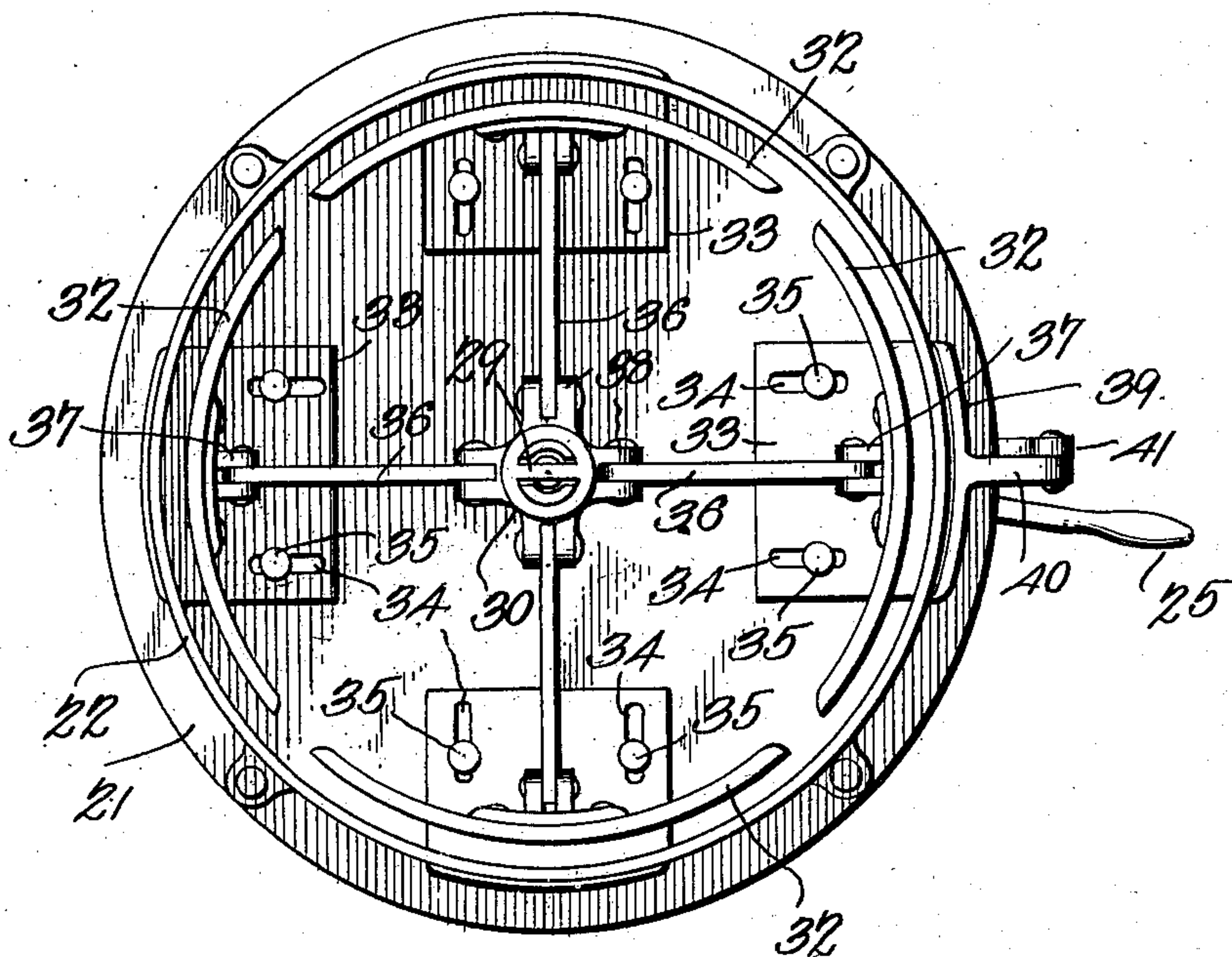
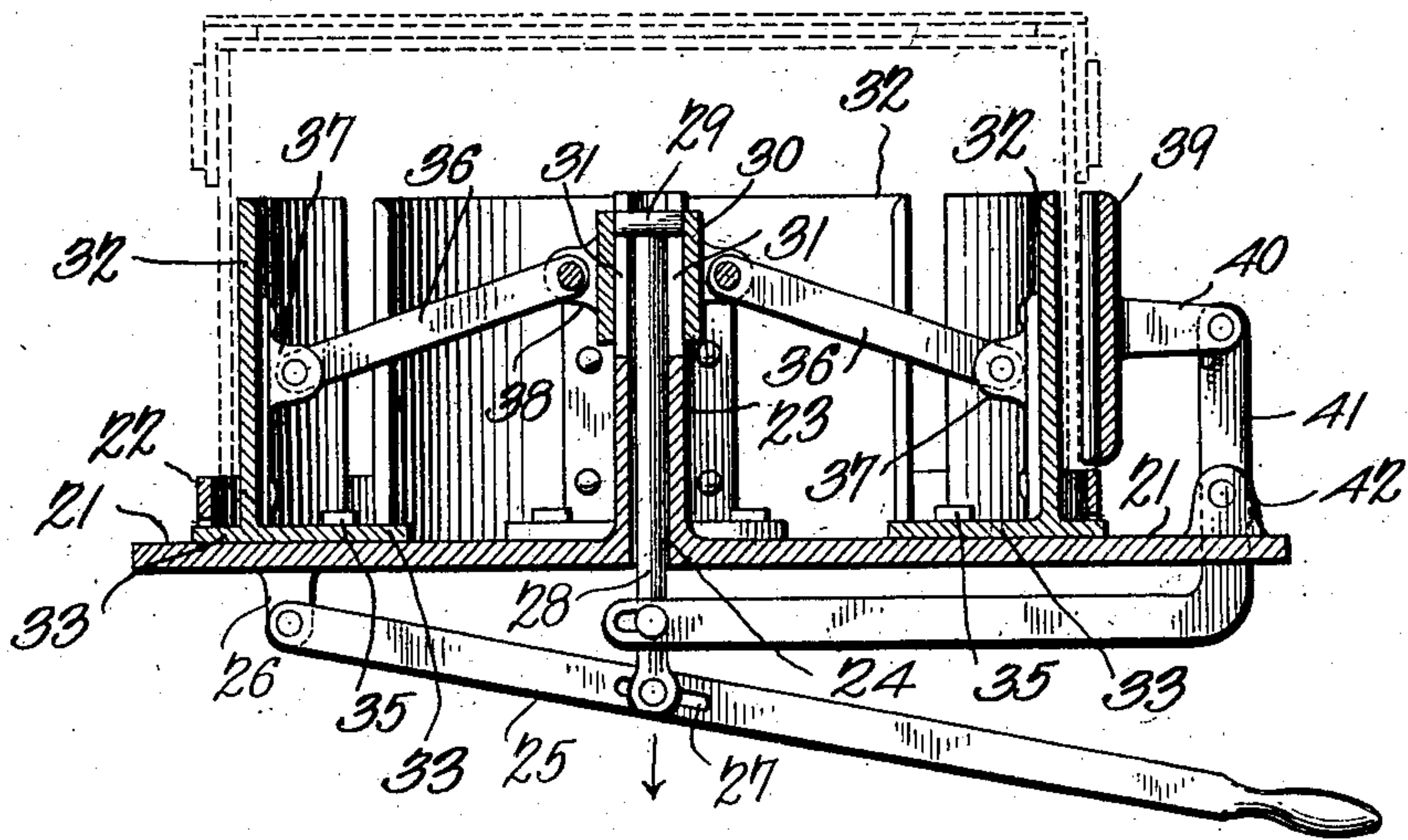


Fig. 7.



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UNITED STATES PATENT OFFICE.

JACOB M. CARNCROSS, OF JACKSON, MICHIGAN.

MACHINE FOR MANUFACTURING PAPER BOXES.

SPECIFICATION forming part of Letters Patent No. 749,917, dated January 19, 1904.

Application filed June 22, 1903. Serial No. 162,674. (No model.)

To all whom it may concern:

Be it known that I, JACOB M. CARNCROSS, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented a new and useful Machine for Manufacturing Paper Boxes, of which the following is a specification.

My invention relates to machines for making paper boxes; and the object of the same is to produce a machine using a cushioned form around which the body of the top and bottom of a box is formed and a sliding and expansible ring or presser for turning in the edges of the box before fastening on the cap or top disk.

A further object is to construct a former which turns in the edges and holds the parts securely assembled until the adhesive material used becomes dry.

A further object is to produce an expansible mandrel or form for the body of the box to expand and hold the same in position until dry after the body has been inserted in the end of the box to form a complete box.

To these ends my invention consists in the novel construction and arrangement of the several parts, as hereinafter more fully described and claimed, and as illustrated in the accompanying drawings, in which similar numerals designate like parts throughout the several views.

Figure 1 is a vertical section of the lid or end-former with the parts assembled and in position to be compressed. Fig. 2 is a vertical section of the lid or end-former with the parts compressed and fastened together. Fig. 3 is a perspective view of the mandrel or former with a finished end or lid thereon. Fig. 4 is a bottom perspective of the compression disk or plate. Fig. 5 is a detail sectional view of one portion thereof. Fig. 6 is a top plan view of the mechanism for forming the box-body. Fig. 7 is a vertical sectional view of the same.

Referring more particularly to the drawings, the numeral 1 designates a mandrel or former of any desired size and height, which is used to form the top or end of a box. Said mandrel or form may be either solid or hollow; but I have preferably illustrated the

same as being hollow, which makes it lighter, and said form is provided around its outer and lower edge with a peripheral flange or ring 2. Secured across the lower edges is a bar or rod 3, which extends for a short distance on either side thereof, as at 4, beyond the periphery, and pivoted to each free end of the bar 4 are a pair of links 5 of any desired length proportionate to the height of the mandrel or former 1, and 6 6 are cam-levers having their cam ends 7 pivoted between each pair of links 5 at their free ends. The top face of the mandrel or form 1 is provided with a cushion 8, of rubber or any other desired material, for a purpose to be hereinafter more fully set forth.

The numeral 9 designates a disk or plate, and 10 is a rod or bar secured to and extending across the upper face of the same, with its ends 11 projecting a short distance beyond the periphery thereof and on diametric opposite sides. The lower side of face of the disk or plate is provided with a plurality of grooves or ways 12, arranged in pairs, extending from the periphery thereof and terminating short of the center, as at 13. An expansible ring composed of a plurality of sections 14 is arranged to move against the lower face of the disk or plate 9, and each section is provided with a pair of arms 15, adapted to fit and move freely within the grooves or guideways 12. The inner faces of each section 14 are beveled or inclined, as at 16, and 17 designates a notch or groove arranged at the junction of the arms 15 with the said sections 14. Located at the inner end of each groove 12 are springs 18, and said springs serve as a means to normally hold the sections 14 of the expansible ring in their retracted or unexpanded position.

The cover or end of a box is formed by this device in the following manner: A strip of cardboard or any other suitable material 16^a, which is of a width slightly greater than the height of the mandrel or form 1, is placed around the periphery thereof, so that its lower edge rests upon the flange 2. An encircling band 18^a, provided with the ears 19, is next placed around the material, and the whole is held in position by means of a loop or ring

20, which passes over the ears 19 of said ring. A disk of cardboard of the usual shape and of a diameter equal to the top of the form 1 and also that of the body portion formed by the strip 16^a is then laid upon the cushion 8 on top of the form 1. A second disk of cardboard or any material of which the box is to be constructed is placed into position against the lower face of the plate or disk 9, so that the edges thereof enter the grooves or notches 17, formed at the juncture of the arms 15 with the sections 14 of the expansible ring. This second disk is of a diameter slightly greater than the diameter of the form or mandrel 1 and of a size just equal to the exterior of the body portion formed by the strip 16 and is held in position by means of the springs 18, which exert a tension thereon. It is to be understood that the proper adhesive material may be applied at the proper points. The disk or plate 9 is then placed in a position so that the beveled face 16 of the sections 14 rest upon the upper edge of the strip 16^a and the bar 10 is parallel with the bar 3. The links 5 are then turned up to a vertical position and the cam-levers 6 thrown back. The links 5 are then pushed forward, so that they stand astride of the ends 11 of the bar 10, and the free ends of the levers 6 are raised and brought over toward each other, causing the cams 7 to act upon the ends 11 of the bar 10, thereby pressing the plate 9 down against the form or mandrel 1. During this operation the inclined faces 16 of the sections 14 cause the upper edge of the strip 16^a to be pressed inward below the second disk of cardboard, which is carried by the disk or plate 9, and a farther pressure on said plate by means of the cams causes the sections to expand still farther, thereby releasing the hold upon the cardboard carried thereby, thus depositing the same upon the intumed end of the strip 16^a, where it is securely held in position until the adhesive material has become thoroughly dry. The rubber disk or cushion 8 serves as a means to equalize and divide the pressure throughout, thus causing the several members of the box-section to be held properly in position. After the parts have become thoroughly dry the portion thus formed is removed from the mandrel; but the band or ring 18^a is allowed to remain in position upon the box-cover.

In my improved box-body-forming mechanism illustrated in Figs. 6 and 7 21 indicates a base-plate having a vertical inwardly-extending annular flange 22, attached in any suitable manner to the base-plate adjacent to its periphery. This flange is provided with a plurality of horizontal slots arranged at diametrically opposite points and flush with the upper surface of the base-plate. There also extends vertically upward from the base-plate a tubular hub 23, the central opening 24 of which continues through the base-plate. 25 is an operating-lever pivoted at one end to an ear

26, depending vertically from the base-plate, said lever being provided at its free end with a suitable handpiece and adjacent to its longitudinal center with a slot 27, which receives the pivoting-bolt of a shaft or link 28, disposed for vertical reciprocation within the opening 24 of hub 23 and operable by the lever, as will be readily understood. The shaft 28 is engaged at its upper end with a transverse web 29, formed upon the interior of a vertically-slidable collar 30, mounted upon the hub 23, the web 29 being adapted to work in oppositely-disposed slots 31, formed through the walls of hub 23 and longitudinally thereof. 32 indicates a series of expanders, preferably four in number, which extend vertically upward from the base-plate 21 and are movably associated therewith, each by means of a base-plate 33, which engages one of the slots in the flange 22 and is provided with slots 34, receiving bolts 35, whereby the expanders or members are susceptible of movement in a horizontal plane toward and from the central hub 23 and are guided in such movement through the slot-and-bolt connection and also by their bases 33 engaging the slots in the flange 22, as above described. The expanders 32 and their base-plates are preferably formed integral by casting, and the expanders each present in plan the form of a quarter-circle of somewhat less diameter than the diameter of flange 32. These parts may, however, be constructed in any other suitable manner, provided the transverse curvature of the outer faces of the expanders is retained. Each expander is connected to the sliding collar 30 by means of a link 36, pivoted at its opposite ends between ears 37 and 38, formed, respectively, upon the expander and collar, the length of the links being such that the expanders will be moved into contact with the flange 22 upon the collar 30 reaching the extremity of its downward movement. 39 is a presser plate or member having its inner face transversely concaved. This member, which is vertically disposed, has an integral normally horizontal arm 40, which is pivoted to the upper end of a link 41, which is in turn pivoted to an ear 42, carried by the base-plate 21. The link 41 has a normally vertical portion, to which the presser-plate is pivoted, and a right-angularly-disposed horizontal portion, which lies beneath the base-plate and has its end in slot-and-bolt connection, as at 43, with the shaft 28 immediately above the pivotal point of the latter with the lever 25. By this arrangement when the lever 25 is drawn downward for spreading the expanders 32 the presser-plate 39 will be simultaneously moved toward the expanders, as will be readily understood. In practice a blank of paper or the like suitable for forming the body of the box is seated over the expanders 32 and has its overlapping edges disposed centrally of the presser-plate, said edges having had applied to them a coating of some

suitable cement. The previously-formed end member of the box, with the band or ring 18^a in position thereon, is then seated over the upper end of the body-blank, as illustrated by dotted lines in Fig. 7. The parts being in this position, lever 25 is manipulated for moving the expanders 32 outward in the manner above explained, whereby pressure is applied to the interior of the box-body for shaping the same, while at the same time the presser-plate 39 moves inward and bears upon the outer wall of the box-body directly over its seam, thus securely holding the latter and preventing spreading thereof. The parts remain in this position until the cement has dried, when the lever 25 is shoved upward, thus contracting the members 32 and permitting removal of the box-body.

From the foregoing it will be seen that I produce a device of comparatively simple construction which will be efficient in operation and one which is admirably adapted for the attainment of the ends in view.

It is to be understood that I do not limit myself to the precise details herein set forth, inasmuch as minor changes in the form, proportion, and manner of assemblage of the parts may be made without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new is—

1. In a paper-box machine, the combination with a mandrel, and means for holding the material in position thereon, of a disk, an expansible ring, and means for forcing said disk against the mandrel, for causing the ring to turn the edge of one section of the box and deposit another section thereon.

2. In a paper-box machine the combination with a mandrel, a ring surrounding the same, and a clip for holding said ring in position, of a disk, a plurality of movable sections carried thereby and means for forcing said sections against the mandrels for turning the edge of one section of a box and depositing another section thereon.

3. In a paper-box machine, the combination with a mandrel, a cushion carried thereby, and means for holding the material in position, of a disk, a plurality of movable sections therein and means for forcing said disk against the cushion, for turning the edges of one section of a box, and expanding said movable sections.

4. In a box-making machine, the combination with a mandrel, of a disk, a sectional ring carried thereby, and means for holding said sections together, the inner faces of said sections being inclined, and means for connecting said disk and mandrel to expand said sections.

5. In a box-making machine the combination with a mandrel, of a disk, provided with a plurality of grooves in its face, arms moving in said grooves, sections carried by said arms, said sections being provided with a notch, springs for holding said sections in position, and means for forcing said disk against the mandrel to expand said sections.

6. In a box-making machine the combination with a mandrel, pivoted links carried thereby and cams pivoted to said links, of a disk, an expansible ring carried thereby, and projections extending beyond the periphery of said disk, for engaging the cams to force said disk against the mandrel, and expand said ring.

7. In a paper-box machine the combination with a hollow mandrel, a bar secured to the base thereof and extending beyond its sides, links pivoted to the free ends of the bars, and a cam-lever pivoted to the free ends of the links, of a disk, an expansible ring carried thereby and a bar secured across the top of said disk, the ends thereof projecting beyond the periphery of the disk for engagement with the cam-levers to expand the ring.

8. A box-former, comprising a mandrel carrying the body of a box, and the bottom-filler, a disk provided with an expansible ring carrying the bottom and means for forcing said disk against the mandrel, whereby the ends of the body are turned in against the filler, and the ring expanded for depositing the bottom upon the inturned ends.

9. In a box-making machine, the combination with a base-plate provided with a vertical flange having horizontal slots, of a plurality of radially-movable expanders attached to the base-plate and having base-plates engaging said slots, a centrally-disposed reciprocatory shaft, means for operating the same, and links connecting the expanders with the shaft.

10. In a box-making machine, the combination with a base-plate, of a plurality of radially-movable expanders associated therewith, a centrally-disposed reciprocatory shaft, operative connections between the shaft and expanders, a link pivoted to the base-plate and connected with and operable by the shaft, and a presser-plate carried by the link and movable thereby.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JACOB M. CARNCROSS.

Witnesses:

GEO. B. KELLOGG,
L. D. LEWIS.