

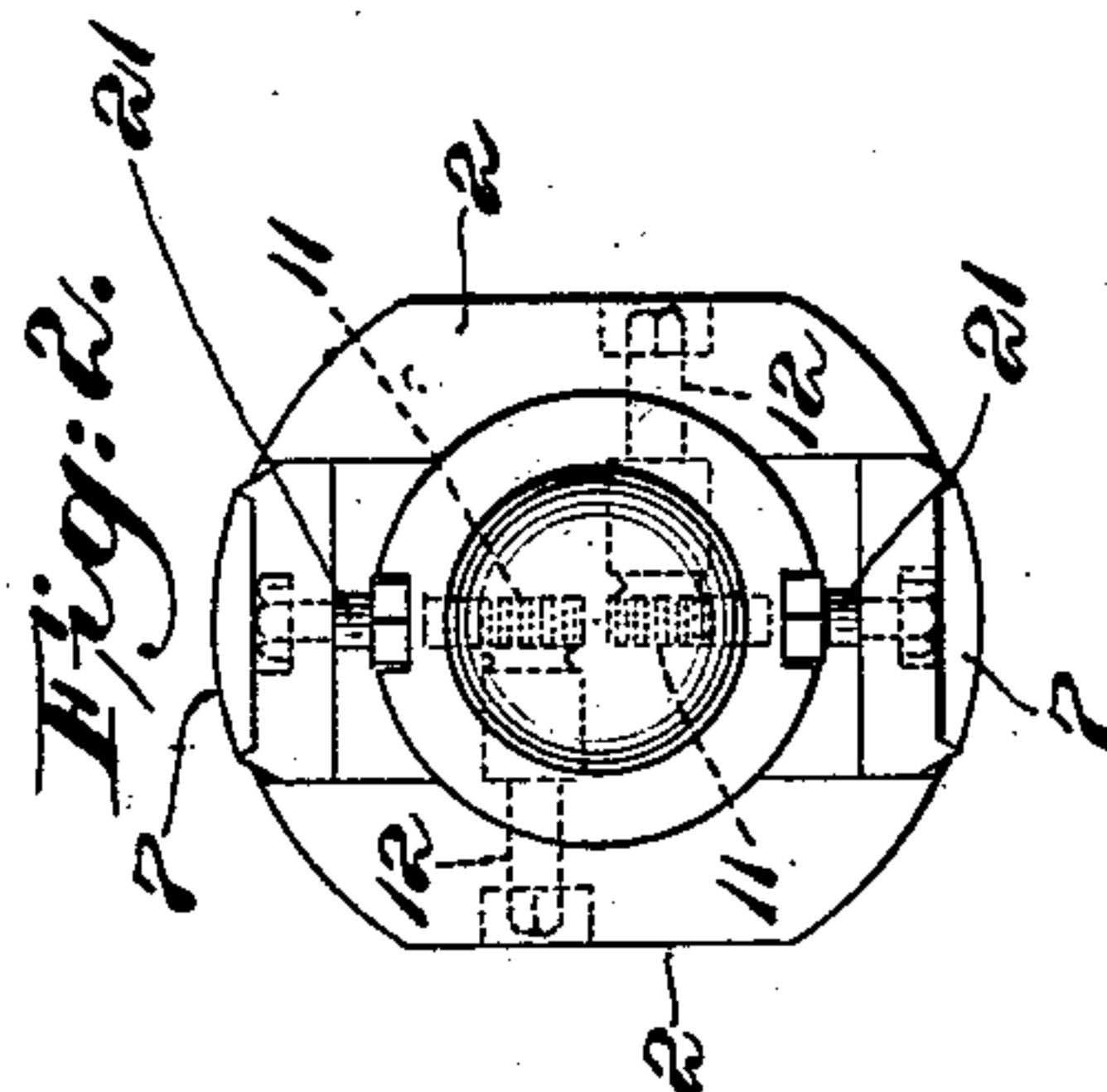
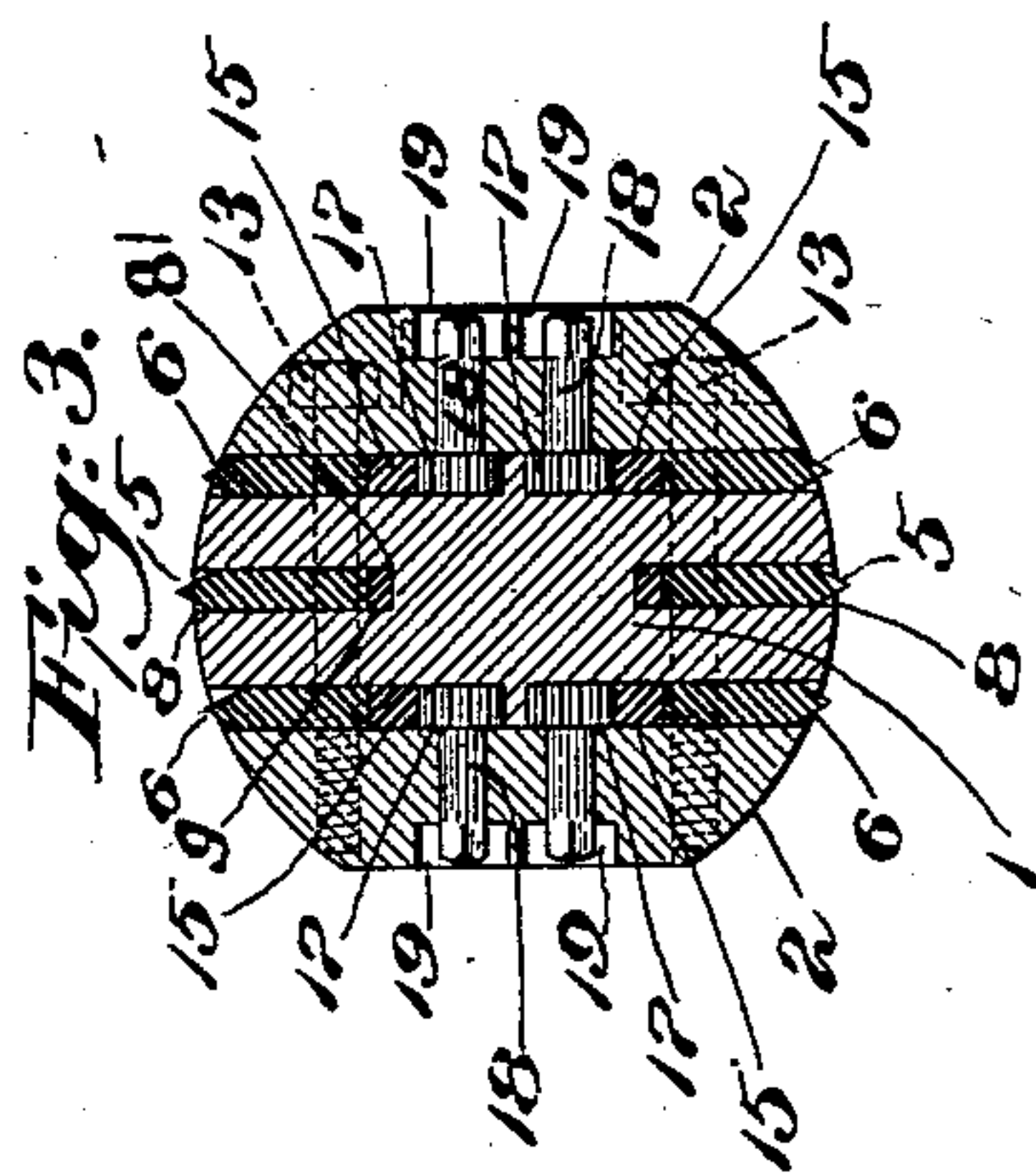
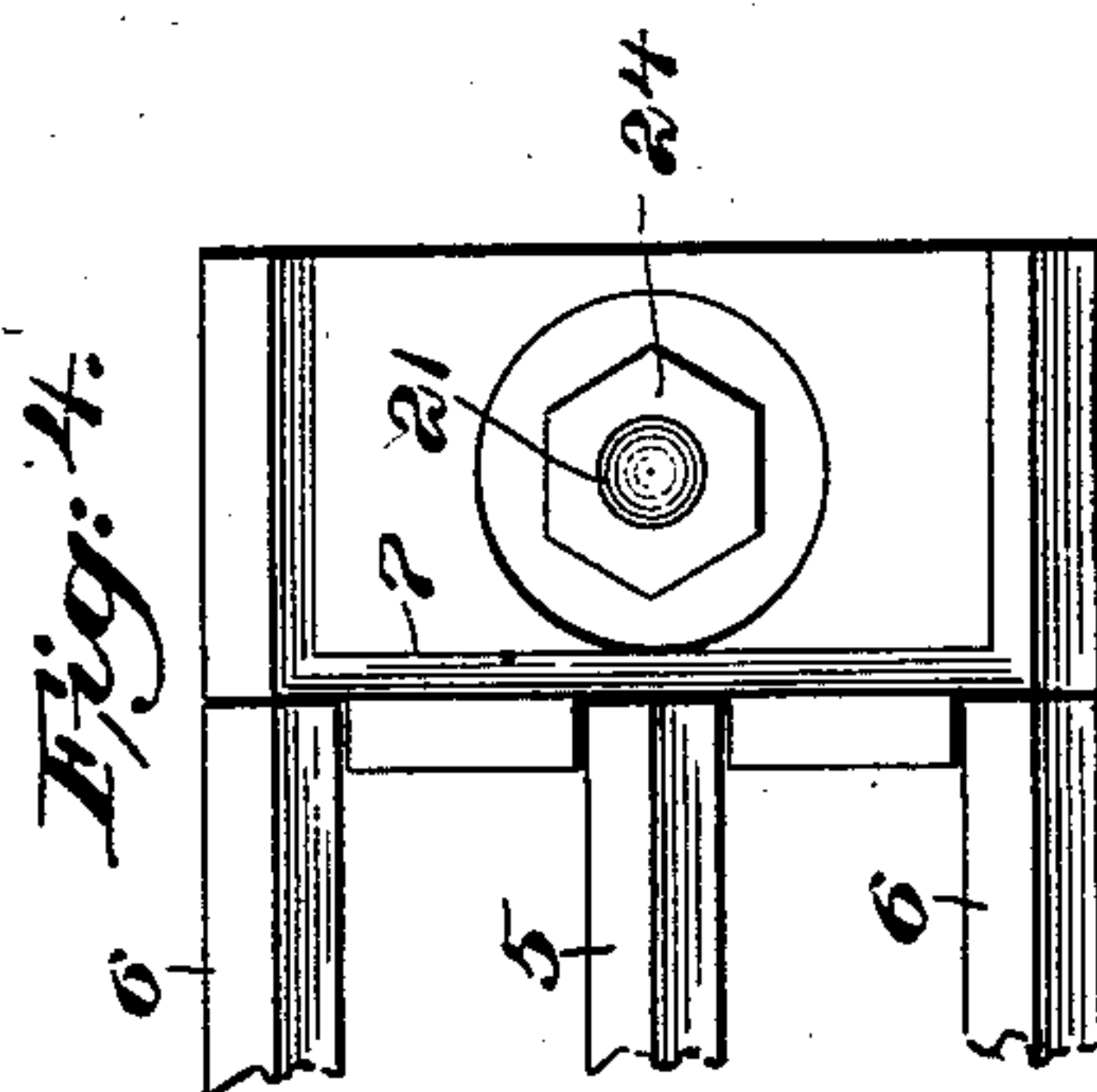
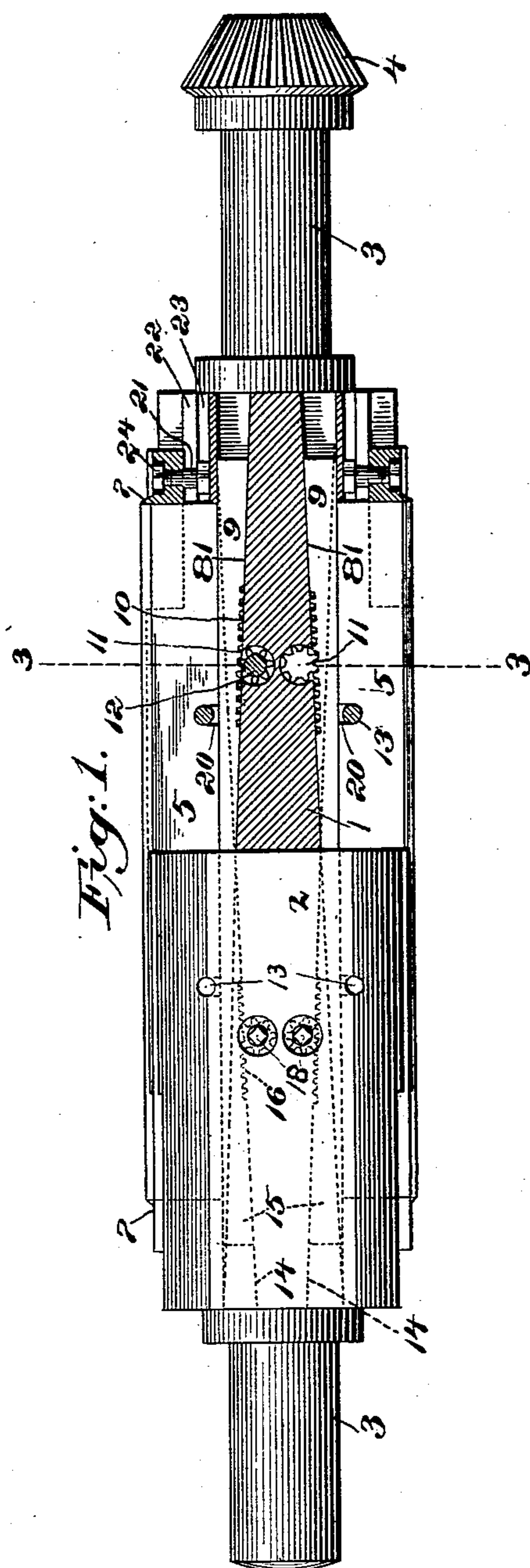
(No Model.)

E. H. TAYLOR.

CUTTING AND SCORING ROLL FOR PAPER BOX MACHINES.

No. 562,985.

Patented June 30, 1896.



Witnesses:

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# UNITED STATES PATENT OFFICE.

EUGENE H. TAYLOR, OF LYNN, MASSACHUSETTS.

## CUTTING AND SCORING ROLL FOR PAPER-BOX MACHINES.

SPECIFICATION forming part of Letters Patent No. 562,985, dated June 30, 1896.

Application filed October 22, 1895. Serial No. 566,569. (No model.)

*To all whom it may concern:*

Be it known that I, EUGENE H. TAYLOR, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Cutting and Scoring Rolls for Paper-Box Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention consists in a roll of improved character and construction, provided with means for cutting a continuous strip of material into suitable lengths or blanks, scoring the said blanks at each side thereof adjacent to the cut edges to facilitate the operation of folding down the sides or flanges, and notching the said blanks at the corners thereof; and also provided with devices whereby to enable the cutters and scorers to be adjusted and the dimensions of the said blanks to be varied as required.

The invention first will be described fully with reference to the accompanying drawings, after which it will be more particularly pointed out and distinctly defined in the claims at the close of this specification.

Figure 1 of the drawings shows a roll embodying the preferred form of my invention, the said roll being in elevation for half its length and in central longitudinal section throughout the other half thereof, both journals of the roll and the beveled gear which is carried by one of the said journals being represented in elevation. Fig. 2 is a view showing the roll in end elevation, looking at it from the left-hand side in Fig. 1. Fig. 3 is a view showing the roll in transverse section on the vertical plane indicated by the dotted line 3 3 of Fig. 1. Fig. 4 is a view showing in plan certain features of the cutters and scorers, which I shall explain hereinafter.

The body of the roll comprises a middle or main portion 1 and the side pieces 2 2, which are secured to the said middle or main portion in the manner which is explained hereinafter. The main portion 1 is provided with journals 3 3, one of the latter carrying the bevel-gear 4 or other device through which the roll receives power from a suitable train of operating mechanism. 5 5 are cutting-blades extending lengthwise of the roll, and located diametrically opposite each other on the roll.

Adjacent to each of the cutters 5 is a pair of scoring-blades 6 6, one scoring-blade on each side of the cutter. The said blades 6 6 also extend lengthwise of the roll. As the latter rotates, each cutter severs from the continuous strip or web of material which is fed to the action of the roll a blank that is of a width corresponding with the distance between the edges of the two cutters 5 5 measured along the circle which is described by the said edges of the cutters 5 5 in the rotation of the roll. At the same time the edges of the scoring devices 6 6 score the successive blanks adjacent to each cut edge thereof, and parallel with the line of cut, so as to facilitate the operation of turning down the side portions of the blank. The two groups of cutting and scoring devices which are carried by the roll, each consisting of a cutter 5 and two scorers 6 6 adjacent to such cutter, are represented clearly in the sectional view which is given in Fig. 3. One of the said groups is shown partially in plan in Fig. 4. At the opposite ends of each group, comprising a cutter and two scorers, as just specified, are located the notching-cutters 7 7. One of these cutters is shown in plan in Fig. 4, as well as its relations to the ends of the parts 5 6 6 of one of the groups aforesaid. The object of the said notching-cutters is, as will be understood, to remove portions at the corners of each blank, and thus dispose of the excess of material at such points.

Each notching-cutter 7 comprises a cutting portion extending lengthwise of the roll in line with each scorer 6, and a connecting portion extending around the roll from the end of one scorer of a group, past the end of the adjacent cutter, to the end of the other scorer of the group. Each notching-cutter, therefore, removes a rectangular piece from the web of material at the corresponding end of the cut which is made in the said web by the adjacent cutter 5. A part of the said rectangular piece comes from one blank, and the other part comes from the next adjacent blank, as will be understood.

The notching-cutter 7 has the main portion thereof curved concentrically with the axis of the roll, as is shown most clearly in Fig. 2.

While I have shown two groups of devices applied to the roll, it is to be understood that one set alone may be employed, if desired, or



more than two in some embodiments of my invention.

The cutters 5 5 are located in grooves 8 8, extending lengthwise of the main portion 1 of the roll. The bottoms 81 81 of the said grooves are inclined from or near one end of the roll to or near the other end thereof. Thus one end of the bottom of each groove is farther from the axis of the roll than the other end thereof. Within each groove is placed a wedge 9, the outer face of which is parallel with the axis of the roll, while the inner face thereof is inclined correspondingly with the bottom of the groove, but in the opposite direction. The inclined inner face of the wedge is in contact with the reversely-inclined bottom of the groove, while the inner edge of the cutter-blade is in contact with the outer edge of the wedge. Adjustment of the wedge lengthwise of the roll will be accompanied by adjustment of the cutter-blade radially of the roll, and thereby may be secured the desired radial distance between the axis of the roll and the acting or outer edge of the cutter 5. Both of the cutters will be adjusted to bring their cutting edges to the same distance from the axis of the roll. The making of radial adjustment of the cutters is equivalent to varying the diameter of the roll, and the length of the circular path which is described by the edge of each cutter in the rotation of the roll will vary proportionately as the cutter is adjusted toward and from the axis of the roll, so that the distance between the cuts and the width of the blanks will be varied accordingly.

As a convenient means of effecting the longitudinal adjustment of the wedges which occasions the radial adjustment of the cutters, I form or provide the inclined inner edge of each wedge with a rack 10, and in engagement with each rack I employ a pinion 11 on a short shaft 12. The dotted lines in Fig. 2 show clearly the pinions 11 11 and the shafts 12 12 on which they are mounted. The said shafts extend in opposite directions transversely of the roll, and are fitted to holes made transversely in the main portion 1 and through the side pieces 2 2. Around the outer ends of the said shafts 12 12 the holes in the said side pieces 2 2 are enlarged or counterbored for the reception of the end of a socket-wrench, which may be applied to the squared extremities of the said shafts when required, for the purpose of rotating the latter, and the pinions thereon, and effecting longitudinal adjustment of the wedges 9 9, as called for in securing the desired radial adjustment of the cutters 5 5. The side pieces 2 2 are secured against the opposite sides of the main portion 1 of the roll by means of bolts 13 13, (shown clearly in dotted lines in Fig. 3,) the heads of the latter being received in depressions or recesses, as indicated in said figure.

The opposite sides of the main portion 1 of the roll are rabbeted, as shown clearly in Fig. 3, to provide longitudinal recesses or spaces

between the main portion 1 and the side portions 2 2 for the reception of the scorers 6 6. The bottom of each space is inclined, as indicated by dotted lines at 14 14, at the left of Fig. 1, and against these inclined bottoms 14 14 bear the reversely-inclined inner edges of wedges 15 15, which are shown by dotted lines at the left in Fig. 1. These wedges 15 15 have outer edges, which are parallel with the axis of the roll, and the inner edges of the scorer-blades 6 6 are in contact with the said outer edges of the wedges.

The arrangement in connection with each scorer is essentially the same as that which has just been described as existing in connection with each cutter. The object is the same, namely, to effect an adjustment of the scorer, so that its edge shall stand at a greater or less distance from the axis of the roll. Adjustment of the scorers follows that of the cutter, and will be made in order to maintain the scorers in proper working position relatively to the cutters and the material which is operated upon.

In connection with the wedge 15 for each scorer I employ devices for adjusting the said wedge longitudinally, and I have shown such adjusting devices as comprising a rack 16 on the inner edge of each wedge, a pinion 17 in engagement with the said rack, and a short shaft 18 on which the said pinion is mounted. Each of the said shafts 18 is mounted to turn in a hole through one of the side pieces 2, and the said hole has an enlargement, as at 19, around the squared outer end of the said shaft for the reception of a socket-wrench, which latter may be fitted upon the said squared end, and by means of which the shaft may be turned. The bolts 13 13 pass through holes in one side piece 2, through holes in the middle or main portion 1, and through notches or slots 20 20 in the inner edges of the cutters and scorers, as indicated in the case of the cutters in Fig. 1, and the threaded ends thereof fit threaded holes in the other side. By tightening up said bolts 13 13 the parts are drawn together so as to clamp the scorers 6 6 between the side portions 2 2 and the main portion 1, and also spring the sides of the grooves 8 8 against the sides of the cutters. By means of the said bolts not only are the side portions 2 2 secured to the main portion 1, but the cutters and scorers are all clamped in place securely in the desired position of adjustment. It will be observed that the cutters 5 5 are located in one plane extending diametrically through the roll, and are adjustable in the said plane toward and from the axis of the roll. The scorers 6 6 are adjustable in planes parallel to the said diametrical plane of the cutters.

The object of the radial adjustment of the cutters which has been described is to vary the distances between successive cuts, and thereby produce blanks of different widths. The adjustment of the scorers accompanies that of the cutters, and is necessary in order



to compensate for the adjustment of the latter, and to cause the edges of the scorers to enter the material to the proper depth. As will be understood, also, the adjustment of the scorers varies the distance between the two scorers which act on the same blank, measured along the circular path which the edges describe, and correspondingly varies the distance apart of the scorers which are made alongside the cut edges of each blank. Thereby the width of the blank after its sides have been turned down along the scores is varied as required. The adjustment of the scorers being to the same extent as the adjustment of the cutter and in planes parallel therewith the distance between the cut and the score at each side thereof does not vary.

The cutters and scorers are readily removable, so that others of different length may be readily substituted, the notching-cutters being provided with adjusting devices by means of which their position on the roll may be varied to suit the length of the cutters and scorers. Each notching-cutter is held in place by a bolt 21, the stem of which enters a slot 22, extending lengthwise of the main portion 1 of the roll, the inner portion of the said slot being enlarged, as at 23, to receive the enlarged head of the bolt 21. 24 is a nut which is applied to the threaded end of the bolt 21, it being accessible from the exterior of the roll, as indicated in the drawings, to enable it to be manipulated at will, as may be required in order to loosen and tighten the notching-cutter in making adjustment thereof.

The roll constructed as shown in the accompanying drawing is intended chiefly for use in the production of blanks for the covers of boxes. Such covers, in addition to varying in their lengths, vary chiefly in the distances or widths between the side flanges thereof, while the depth of the flanges themselves is not required to vary.

In the construction shown, the notching-cutters are not adjustable radially. Provision for effecting such adjustment as well as longitudinal adjustment thereof might readily be made, but I find it convenient to provide a number of notching-cutters, of sizes corresponding with the variations which it is desired to produce in the effective diameter of the roll. In fitting the roll for the purpose of producing blanks of any desired size, I apply thereto notching-cutters appropriate for that size, and then adjust the scoring and cutting knives so as to bring them into proper position.

I claim as my invention—

1. A roll for producing blanks for use in the manufacture of paper boxes, provided with a cutter, scorers adjacent to said cutter and on opposite sides thereof, and means to adjust the cutter radially and to adjust the scoring devices in planes parallel with the said cutter, substantially as described.

2. The roll consisting of the main portion 1 and side portions 2, 2, the said main portion

being grooved longitudinally and also having spaces or recesses at the opposite sides thereof, cutter and scorer blades applied as described, means to adjust the said blades transversely of the length of the roll, and means to clamp the blades in position in their grooves or recesses, substantially as described.

3. The roll consisting of the main portion 1 and side portions 2, 2, the said main portion being grooved longitudinally and also having spaces or recesses at the opposite sides thereof, cutter and scorer blades applied thereto as described, wedges located in the grooves or recesses beneath the cutter and scorer blades, devices to adjust the said wedges longitudinally, and means to hold the parts of the roll together and clamp the blades in position in their grooves or recesses, substantially as described.

4. A roll comprising a main portion 1 and the side portions 2, 2, located at its opposite sides, the said main portion being grooved longitudinally and having spaces or recesses at the opposite sides thereof, cutter and scorer blades located in the grooves or recesses, wedges in the said grooves or recesses beneath the said blades and provided with racks, pinions to engage with the said racks, means to turn the said pinions, and the bolts 13 to clamp the parts 1, 2, 2, together and clamp the blades in their respective grooves or recesses, substantially as described.

5. A roll for producing blanks for use in the manufacture of paper boxes, provided with a cutter, scorers adjacent to the said cutter and on opposite sides thereof, means to adjust the cutter radially and to adjust the scoring devices in planes parallel with the said cutter, a notching-cutter at the end of the group comprising the cutter and scorers, and means to adjust the said notching-cutter, along the roll to suit the length of the cutter and scorers, substantially as described.

6. The roll consisting of the main portion 1 and side portions 2, 2, the said main portion being grooved longitudinally for the reception of a cutter, having spaces or recesses at the opposite sides thereof for the reception of scorer-blades, and having an undercut slot at the end thereof, cutter and scorer blades applied as described, means to adjust the said blades transversely of the roll, means to clamp the blades in position in their grooves or recesses, a notching-cutter, and a securing-bolt therefor fitted to the said undercut slot, substantially as described.

7. The roll consisting of the main portion 1 and side portions 2, 2, the said main portion being grooved longitudinally for the reception of a cutter, having spaces or recesses at the opposite sides thereof for the reception of scorer-blades, and having an undercut slot at the end thereof, cutter and scorer blades applied as described, wedges applied in the grooves or recesses beneath the cutter and scorer blades, devices to adjust the said wedges longitudinally, means to hold the parts



of the roll together and clamp the blades in position in their grooves or recesses, a notching-cutter, and a securing-bolt therefor fitted to the said undercut slot, substantially as described.

5 8. A roll having removable cutter and scorer blades, and also having at the end of the group of said blades a notching-cutter provided with means for securing it to the roll

and adjusting it lengthwise of the latter, substantially as described. 10

In testimony whereof I affix my signature in presence of two witnesses.

EUGENE H. TAYLOR.

Witnesses:

CHAS. F. RANDALL,  
ALICE H. MORRISON.