W. J. DREY.

MACHINE FOR FORMING SHOES.

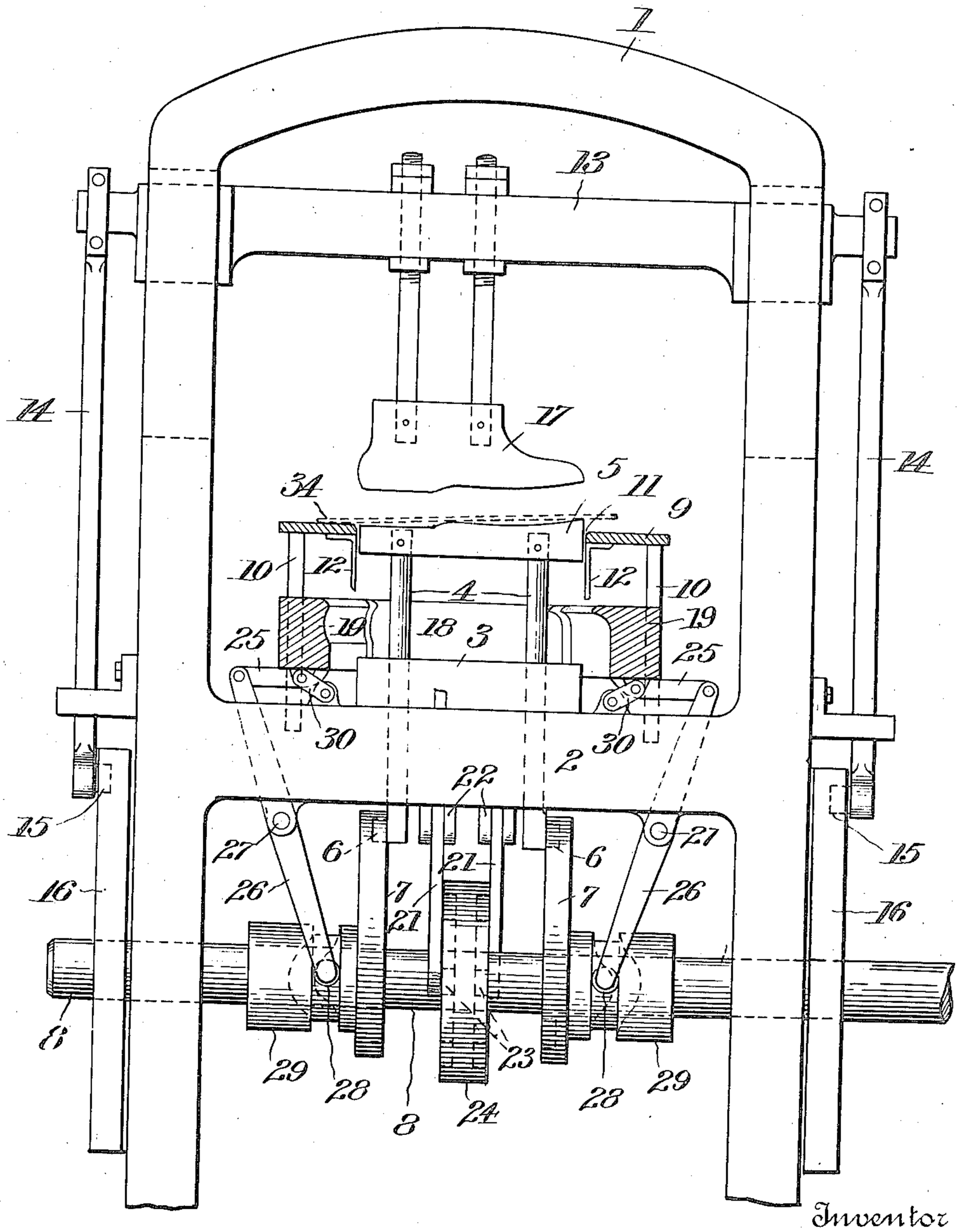
APPLICATION FILED MAR. 22, 1915.

1,167,277.

Patented Jan. 4, 1916.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2.

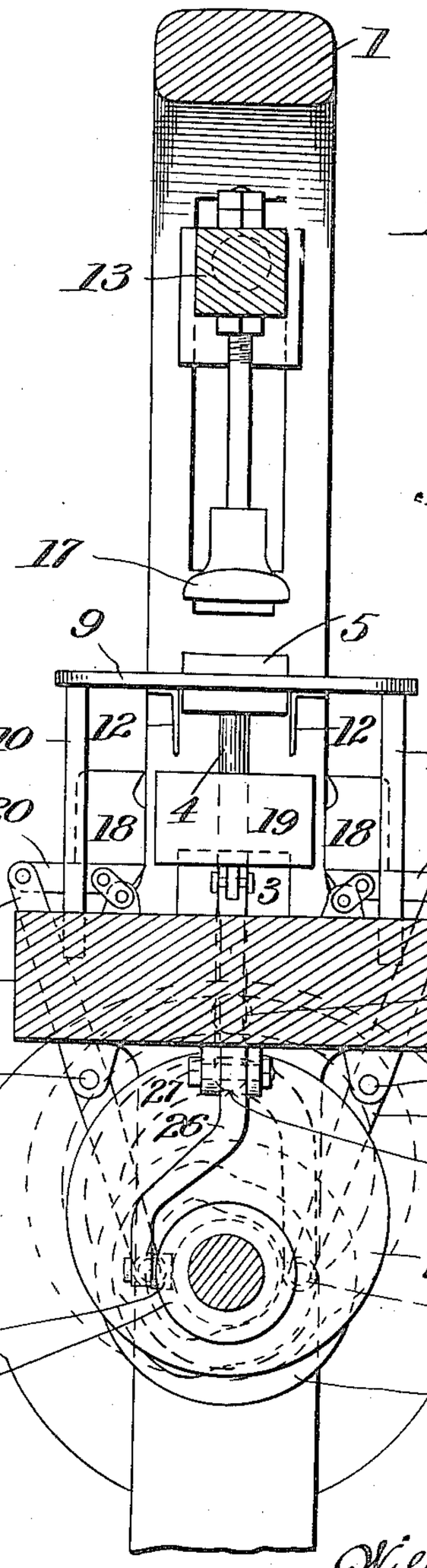
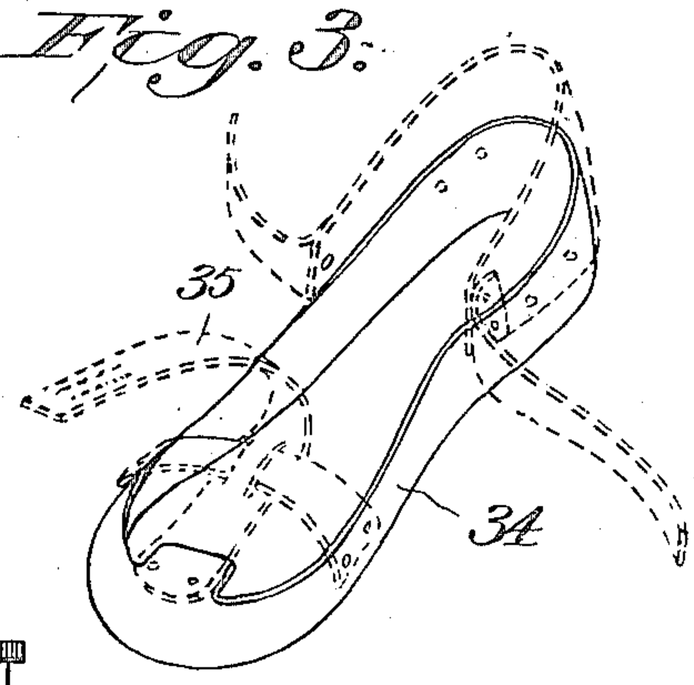


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

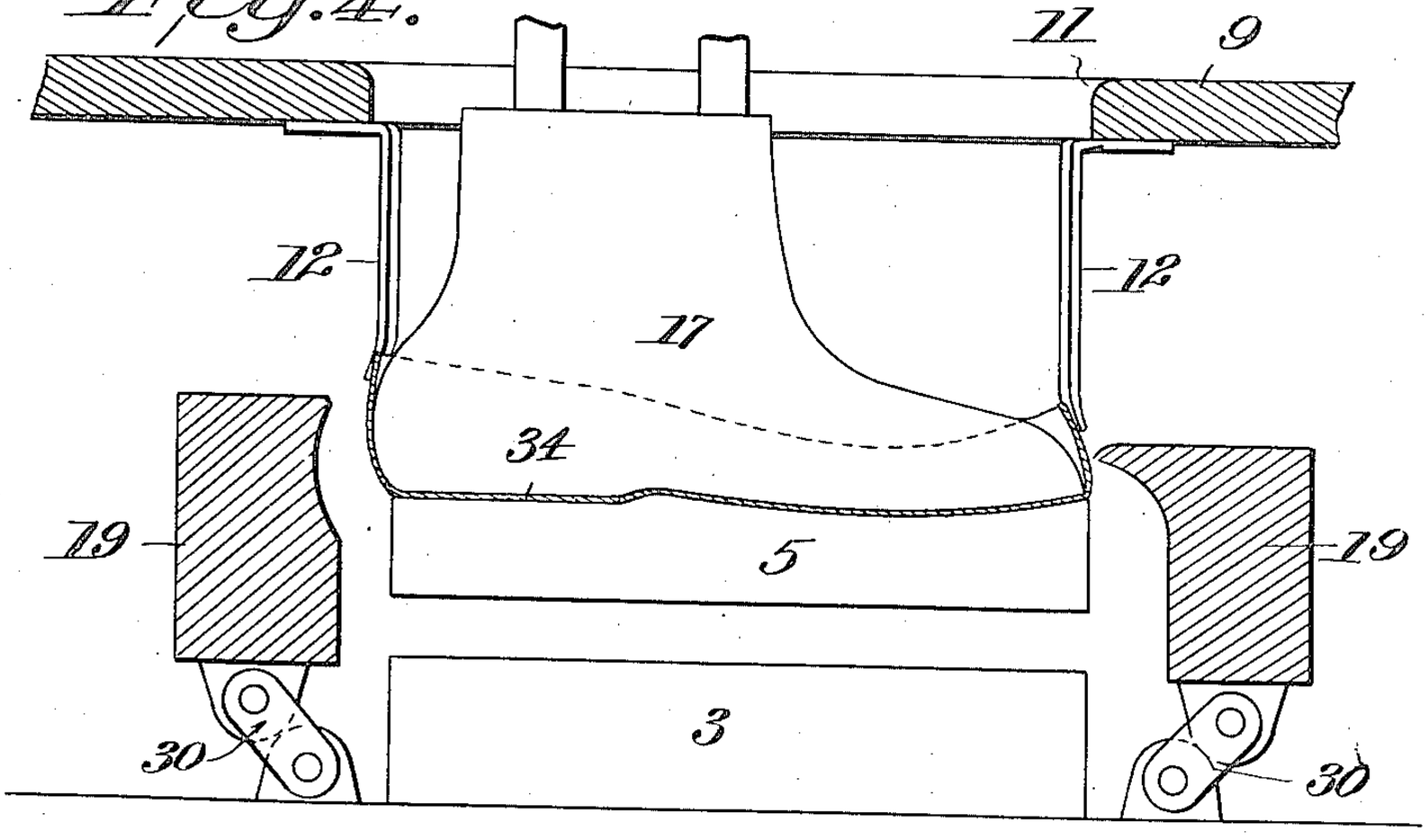
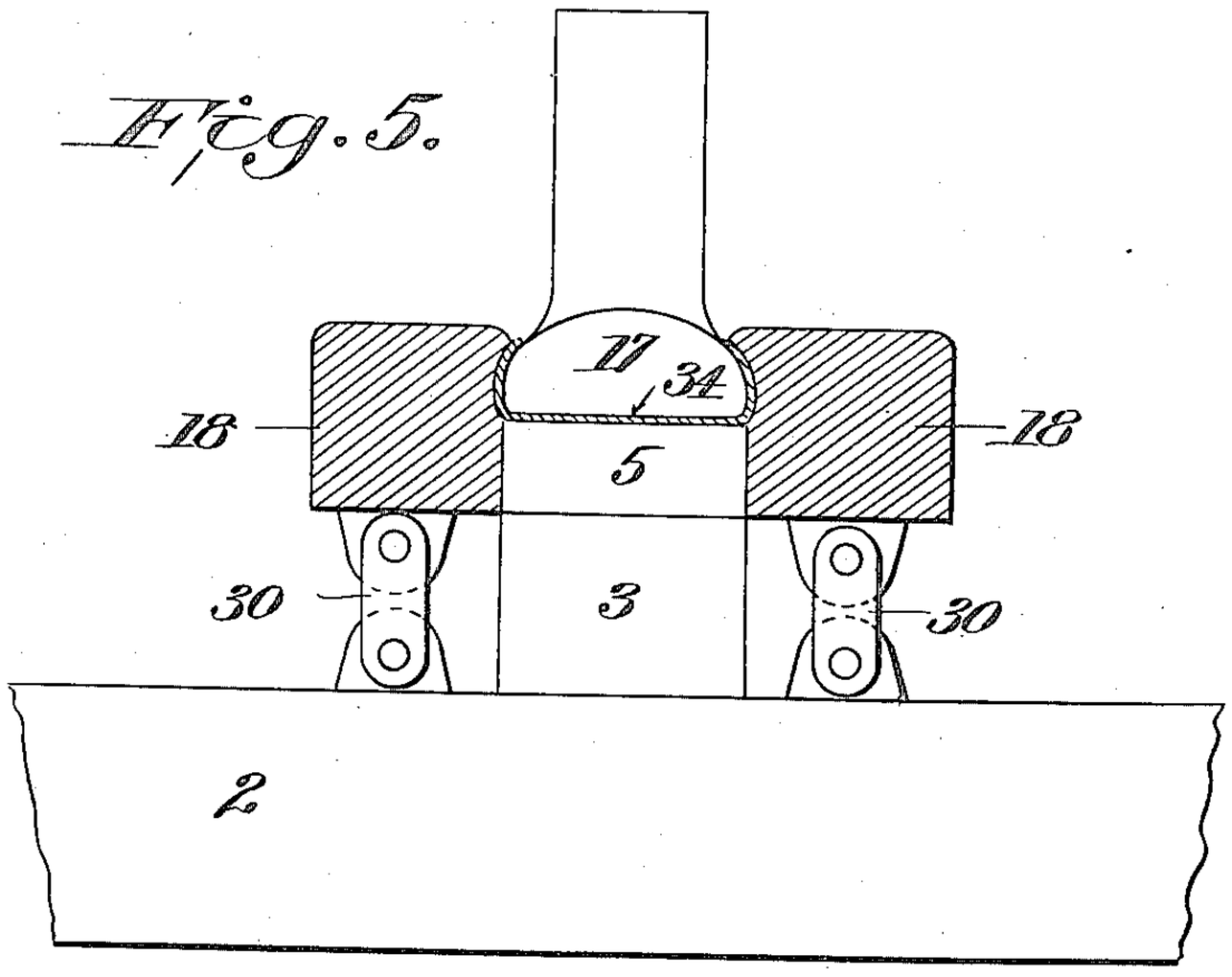


Fig. 5.



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4 SHEETS—SHEET 4.

Fig. 6.

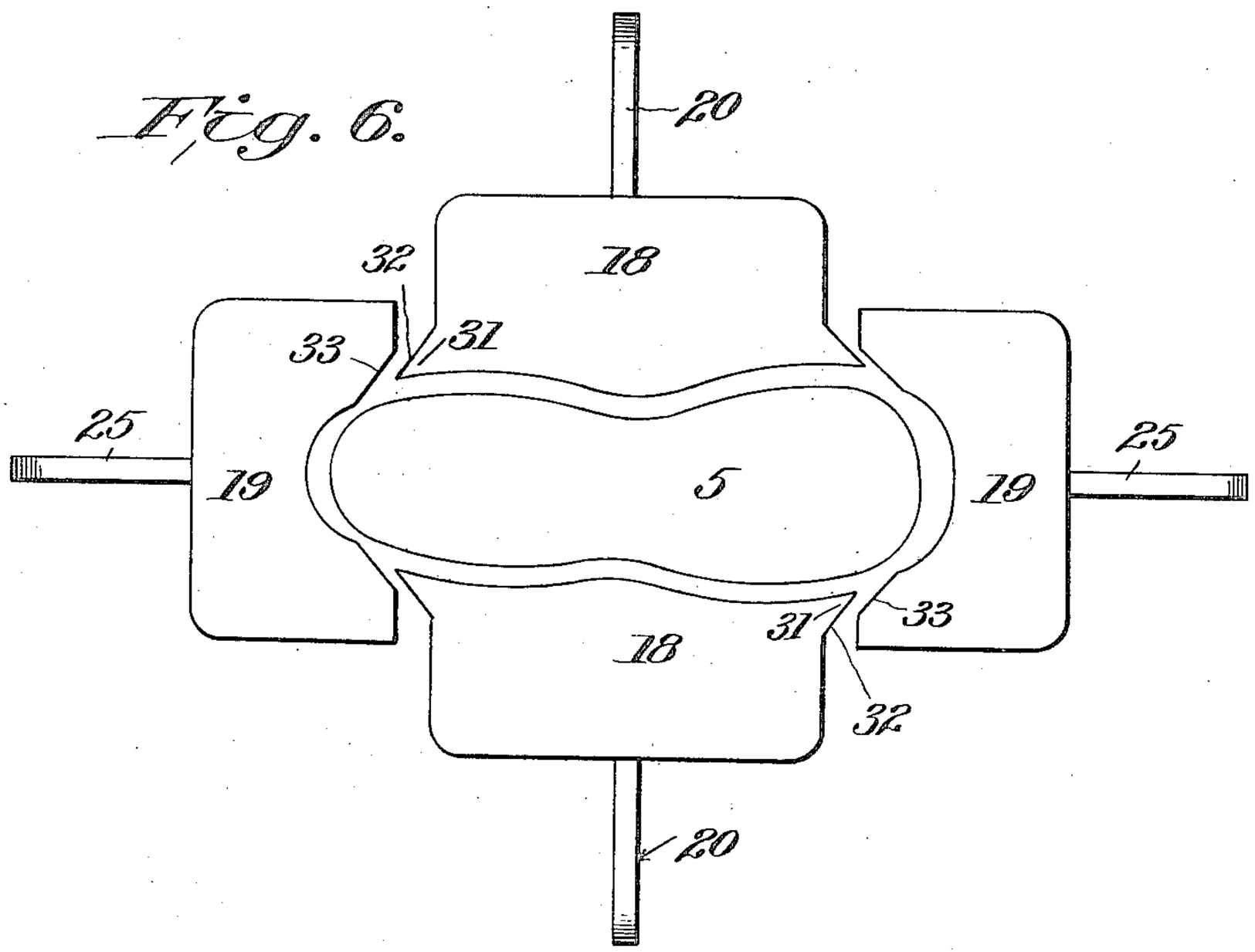
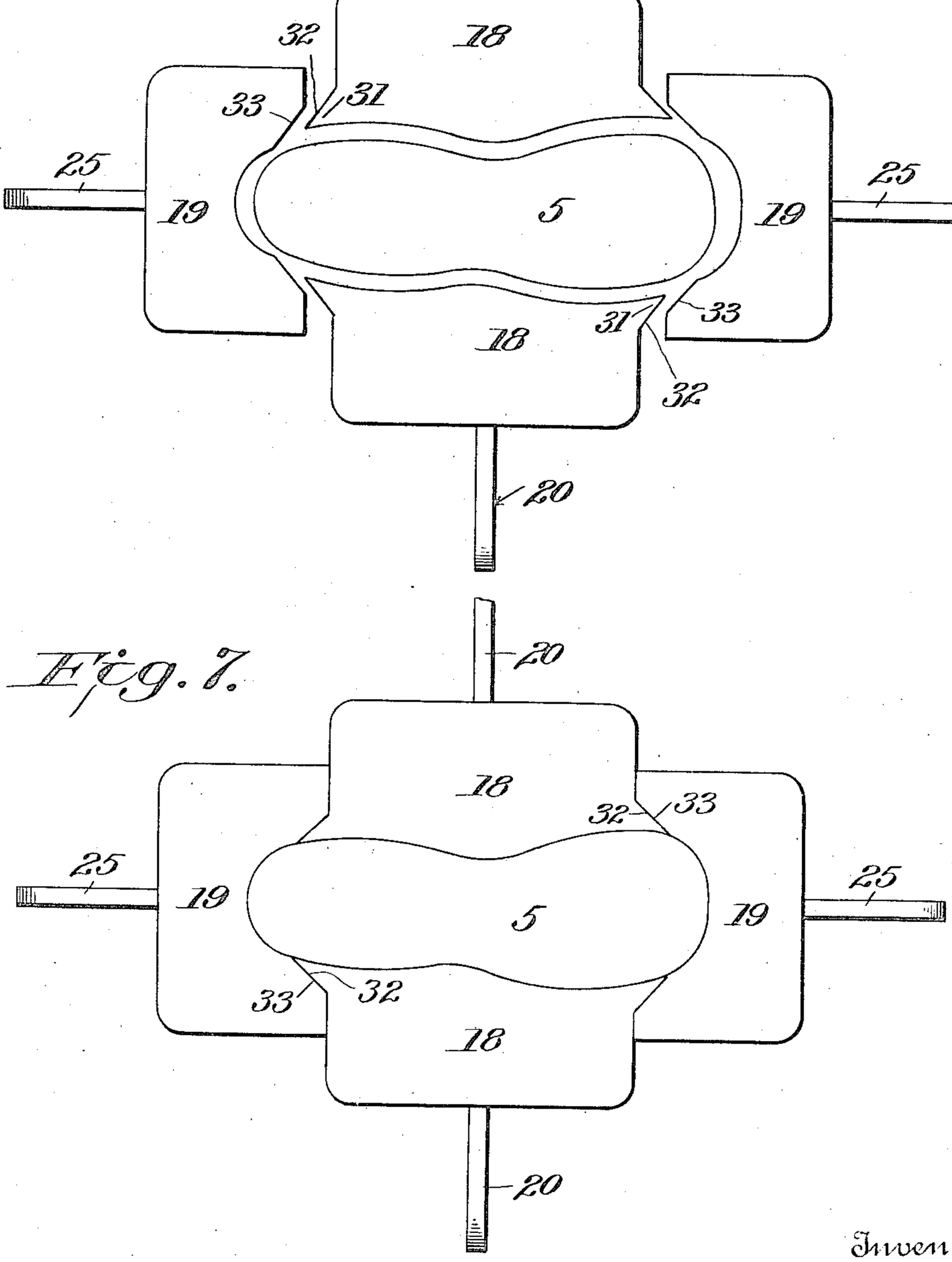


Fig. 7.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR FORMING SHOES.

1,167,277. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed March 22, 1915. Serial No. 16,173.

To all whom it may concern:

Be it known that I, WILFRED J. DREY, a citizen of the United States, residing at Carlisle, in the county of Cumberland and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Forming Shoes, of which the following is a full, clear, and exact specification.

This invention relates to shoe forming machinery, and has for its object to produce a machine for forming the soles and side portions of the type of shoe generally known as sandals of a single piece or sheet of material, whereby such shoes, which are generally used for children's wear, may be more quickly and economically manufactured.

Subsidiary objects will appear as the description proceeds.

The invention will be first hereinafter described in connection with the accompanying drawings which constitute a part of this specification, and then more specifically defined in the claims at the end of the description.

In the accompanying drawings, wherein similar reference characters are used to designate corresponding parts throughout the several views: Figure 1 is a front elevation of a machine constructed substantially in accordance with the present invention, the parts being shown in position for beginning the operation of forming a sandal from a sheet of material, the latter being indicated in dotted lines between the upper and lower dies. Fig. 2 is a side view of the machine, the frame being shown in section. Fig. 3 is a perspective view of the finished sandal, the fastening straps which may be riveted thereto, being shown in dotted lines. Fig. 4 is a detailed view showing the stage in the operation of the machine where the sheet of material has been clamped between the upper and lower dies and moved downward through the opening in the table, whereby the marginal portion of the sheet is turned up around the upper die which is in a form of a shoe last, the dies having nearly reached their lowest position within the side and end forming blocks. Fig. 5 is a detailed view showing the last stage in the formation of a sandal when the side and end forming blocks are moved inward to press the marginal portion of the blank over the edge of the upper die. Fig. 6 is a detailed plan view of the side and end forming blocks in their expanded position, and Fig. 7 is a similar view, showing said side and end forming blocks in a contracted position.

A suitable frame 1 is provided with a cross bar or member 2 on which is mounted a bed plate 3 through which extend a pair of vertically disposed and longitudinally movable rods 4 supporting at their upper ends the lower die 5. The lower ends of the rods 4 are provided with roller bearings 6 fitting the slots of cams 7 mounted on a driving shaft 8.

About a level with the uppermost position of the lower die 5, which position is illustrated in Figs. 1 and 2, there is mounted a table 9 supported on legs 10 extending upward from the cross bar 2 of the frame. Said table 9 has an opening 11 therein, which opening conforms closely to the shape of the lower die 5 the contour of which corresponds to the outline of the sole of the sandal to be made. Brackets or pins 12 are secured to the under surface of the table 9 at intervals around the opening 11, the depending portions of said brackets or pins being flush with the edge of the opening. These brackets or pins extend downward near to the level of the tops of the side and end forming blocks which will be hereinafter described, the function of said brackets or pins being to hold the upturned marginal portion of the blank around the upper die until said blank passes between said side and end forming blocks.

A cross head or beam 13 is mounted to be reciprocated vertically on the upper portion of the frame 1 by means of pitmen or rods 14 having roller bearings 15 on their lower ends fitted in the grooves of cams 16 on the shaft 8. Said cross head 13 carries the upper die 17 which is made in the form of a shoe last and of a size corresponding to the lower die 5 and the opening 11 in the table 9. As illustrated in Figs. 1 and 2, the upper die 17 may be raised above or spaced from the lower die 5 when said lower die is substantially level with the table 9.

The side forming blocks 18 and end forming blocks 19 are mounted around the bed plate 3 and are capable of being moved simultaneously inward and outward for contracting them around the dies as shown in Fig. 5, and expanding them so that they will be spaced from the dies all around, as illus-

trated in Fig. 6. This contracting and expanding of the forming blocks is effected by means of levers connected to the blocks and controlled by cams on the driving shaft 8. The side blocks 18 are connected by links 20, to levers 21 intermediately pivoted at 22 below the cross bar 2 of the frame and carrying roller bearings 23 on their lower ends engaging grooves in the opposite faces of a cam 24 on the shaft 8, see Fig. 2. The end blocks are connected by links 25 to levers 26 intermediately pivoted at 27 below the cross bar 2 of the frame and carrying roller bearings 28 on their lower ends engaging the grooves in cams 29 on the driving shaft 8. The side and end forming blocks may be mounted on toggles 30 or mounted to be moved horizontally by any other suitable means. The inner faces of said blocks are shaped to conform to the outline of the dies, and the side blocks 18 are preferably provided at the ends of their inner faces with overlapping extensions 31 having beveled outer faces 32 adapted to interlock with correspondingly recessed portions 33 in the end portions of the end blocks 19, the object of this construction being to prevent parts of the upturned margin of the blank being caught and pinched between the blocks when they are contracted.

The initial position of the machine is illustrated in Figs. 1 and 2, the contractible forming blocks being expanded, the lower die being substantially level with the table 9, and the upper die 17 being spaced above the lower die. A sheet of material or blank 34, indicated in dotted lines in Fig. 1 and in solid lines in Figs. 4 and 5, is placed on the lower die as the first step in forming a sandal. It will be understood, of course, that the blank is of the proper shape to form the sole and sides of the sandal. The material used is preferably paper or compressed pulp commonly known as artificial leather, and the same should be moistened before it is placed in the machine in order to secure the best results.

When the driving shaft 8 starts to rotate, the cams 16 operate first to lower the upper die 17 onto the lower die 5, thus clamping the blank firmly between said dies and forming the sole of the sandal in conformity with the facing surfaces of said dies. As soon as this is accomplished, the lower die 5 begins to move downward with the upper die, by reason of the cams 7. As the dies move downward through the opening 11 in the table 9, the marginal portion of the blank will be turned up around the edge of the upper die by the edge of said opening 11. As the blank is carried still farther down by the dies, the brackets or fingers 12 retain the upturned marginal portion of the blank in position until said dies reach their lowest position, with the lower die resting upon the base plate 3, as shown in Fig. 5, and the upturned marginal portion of the blank arranged between the forming blocks 18 and 19. The arrangement of the grooves in the cams 7 and 16 is such that the dies will remain stationary in their lowest position while the cams 24 and 29 come into play for contracting the side and end forming blocks around the dies and withdrawing or expanding said blocks. The cams 7 and 16 then operate again to raise the dies together until the lower die reaches its uppermost position illustrated in Figs. 1 and 2, after which the cams 16 continue to raise the upper die until it is spaced above the lower die as at the start. The formed sandal may then be removed from the upper die and another sheet or blank placed between the dies for a repetition of the operations just described. To complete the sandal thus formed it is only necessary to attach the fastening straps 35 indicated in dotted lines in Fig. 3, which may be done very quickly by the use of rivets.

When the blank is first clamped between the dies the portion of the blank forming the sole of the sandal is by the apparatus thus described subjected to an extremely high pressure while the dies are temporarily held stationary in the process of forming the sole portion of the sandal thus compressing the material forming the sole part, after which the dies with the material therebetween start on their downward movement, as above described.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine of the character described, the combination with a pair of dies for clamping a blank between them to form the sole of a sandal, of a table having an opening through which the dies are movable for turning up the marginal portion of the blank to form the sides of the sandal.

2. In a machine of the character described, the combination with a pair of dies for clamping a blank between them to form the sole of a sandal, of a table having an opening through which the dies are movable for turning up the marginal portion of the blank to form the sides of the sandal, and means for compressing said upturned marginal portion of the blank around one of the dies for shaping the sides of the sandal.

3. In a machine of the character described, the combination with a pair of dies for clamping a blank between them to form the sole of a sandal, of means for turning up the marginal portion of the blank to form the sides of the sandal, means to which said blank is moved spaced below said upturning means for pressing said upturned marginal portion of the blank around one of the dies to shape the sides of the sandal, and means

for holding the upturned marginal portion of the blank in position as it is moved from the upturning means to the pressing means.

4. In a machine of the character described, the combination with a pair of dies for clamping a blank between them to form the sole of a sandal, of means for turning up the marginal portion of the blank to form the sides of the sandal, means to which said blank is moved spaced below said upturning means for pressing said upturned marginal portion of the blank around one of the dies to shape the sides of the sandal, and a series of brackets or pins extending below the upturning means adapted to hold the upturned marginal portion of the blank in position as it is moved from the upturning means to the pressing means.

5. In a machine of the character described, the combination, with a pair of dies for clamping a blank between them to form the sole of a sandal, of a table having an opening through which the dies are movable for turning up the marginal portion of the blank to form the sides of the sandal, means spaced below the table for pressing said upturned marginal portion of the blank around one of the dies to shape the sides of the sandal, and depending brackets attached to the table and arranged flush with the opening therein for holding the upturned marginal portion of the blank in position as it passes from the table to the pressing means.

6. In a machine of the character described, the combination, with a movable upper die shaped like a shoe last, of a movable lower die having its upper surface shaped to conform to the bottom of the upper die and conforming in outline to the upper die, a table having an opening therein through which the dies are movable for turning up the marginal portion of a blank clamped between them for forming the sides of a sandal, and means for moving the upper die independently of the lower die for spacing them apart to permit the introduction of a blank between them, and means for moving said dies together through the opening of the table.

7. In a machine of the character described, the combination, with a vertically movable upper die shaped like a shoe last, of a vertically movable lower die having its upper surface shaped to conform to the bottom of the upper die and having its outline conforming to that of the upper die, a table having an opening therein through which the dies are movable for turning up the marginal portion of a blank clamped between them for forming the sides of a sandal, means for moving the upper die independently of the lower die for spacing them apart to permit the introduction of a blank between them, and means to move the dies together through the opening in the table, and horizontally movable blocks mounted below the table and adapted to be simultaneously contracted around the dies to press the upturned marginal portion of the blank against one of the dies for shaping the sides of the sandals.

In testimony whereof I have signed my name to this specification in the presence of two attesting witnesses.

WILFRED J. DREY.

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