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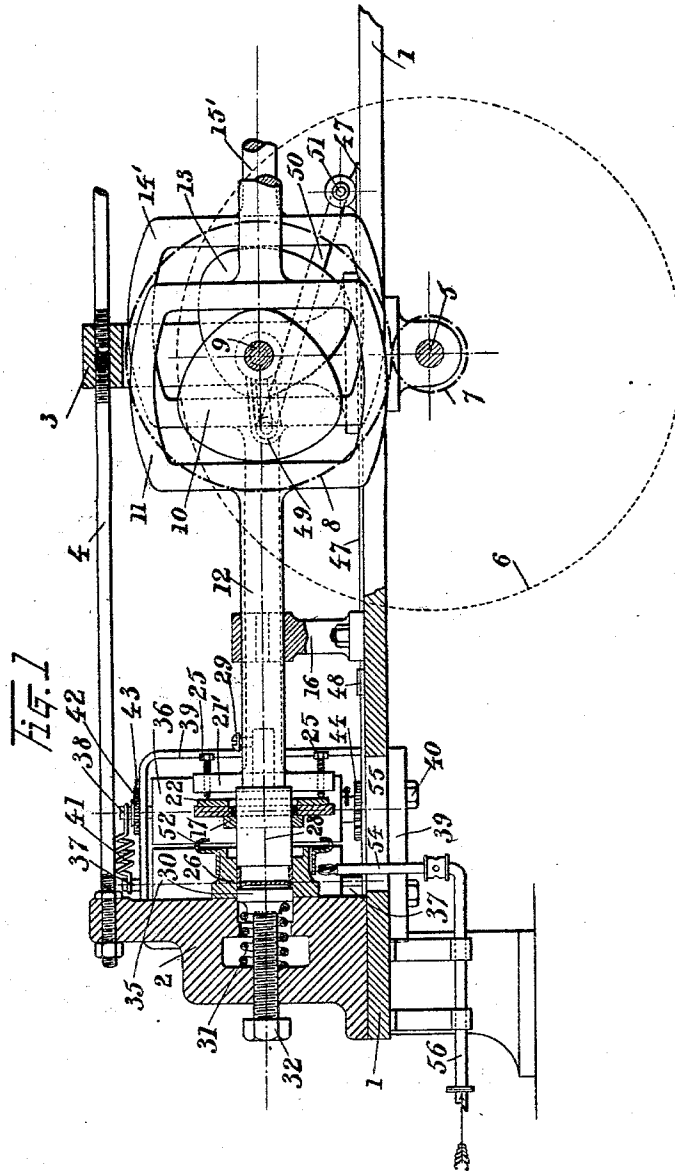
5 Sheets—Sheet 1.

A. BERAN.

MACHINE FOR MANUFACTURING BOXES FROM PAPER BOARD, &c.

No. 561,858.

Patented June 9, 1896.



Witnesses

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E. A. Clark

Inventor
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Attorneys

(No Model.)

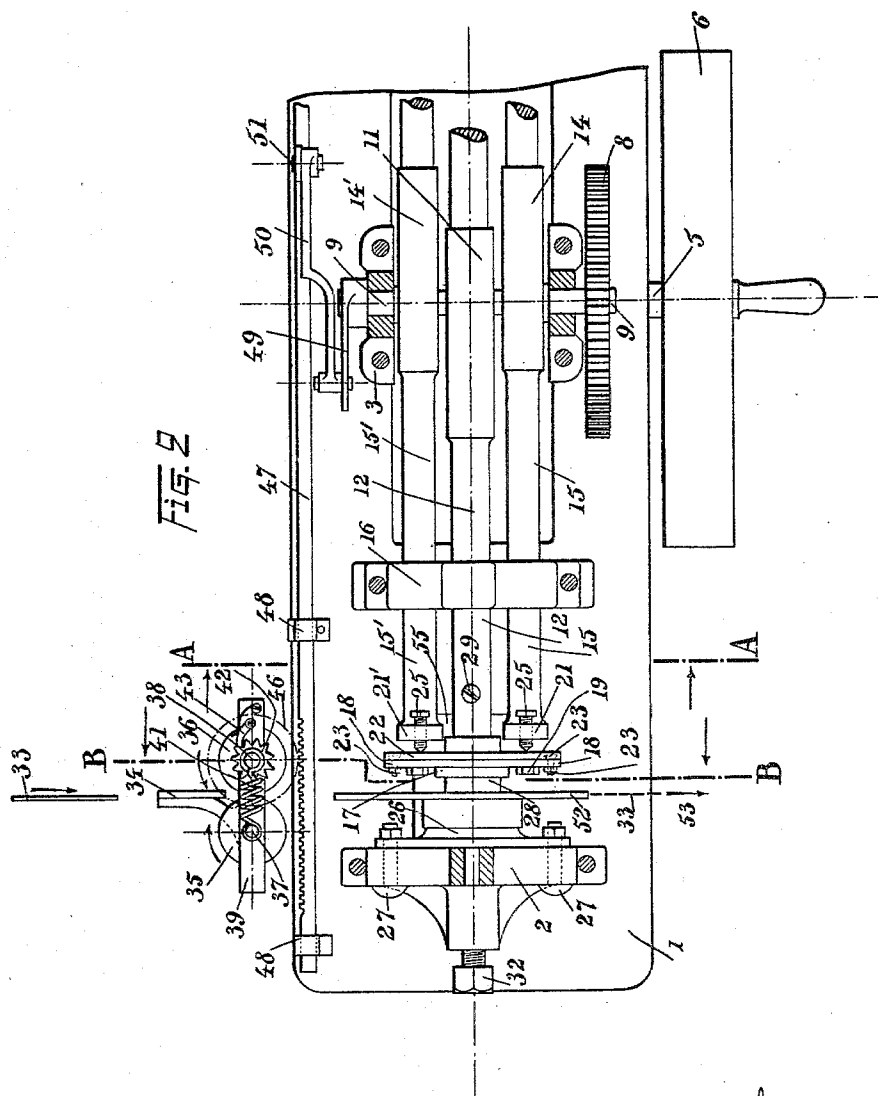
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Witnesses
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(No Model.)

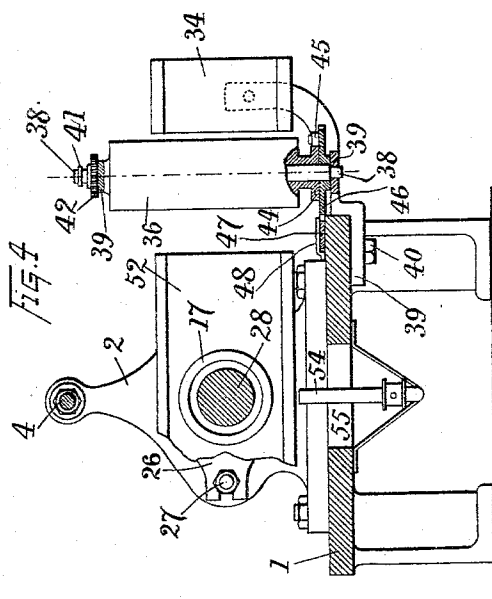
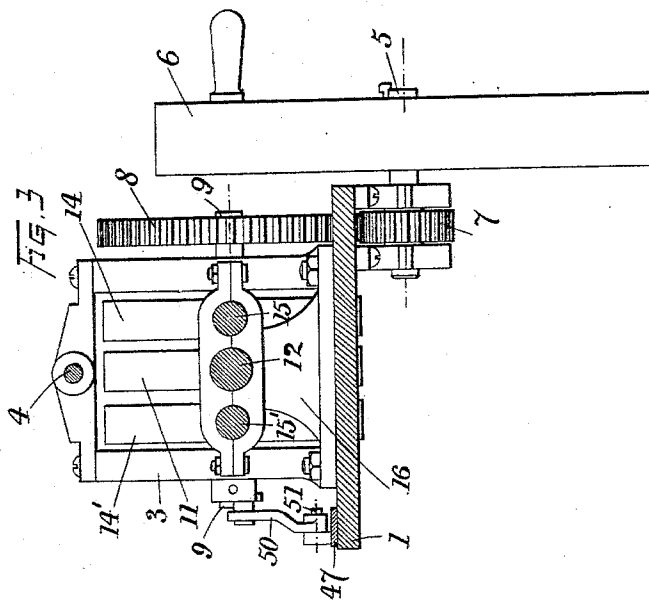
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Witnesses
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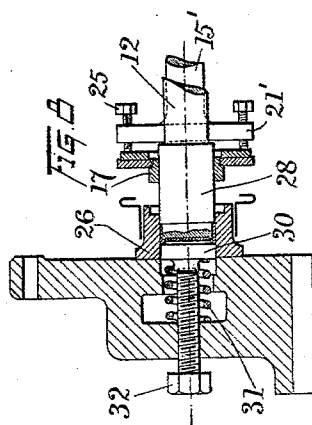
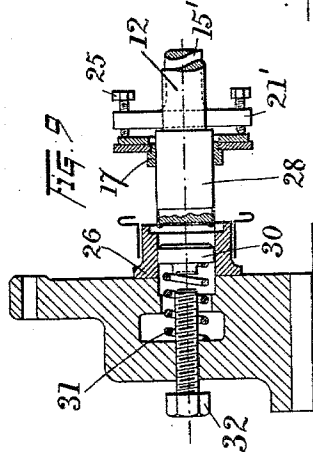
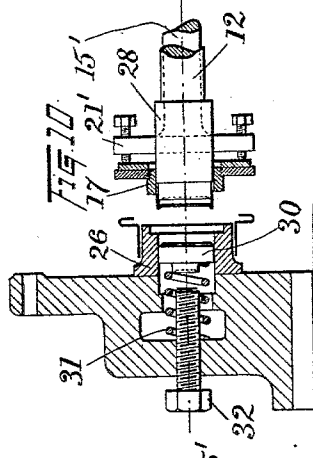
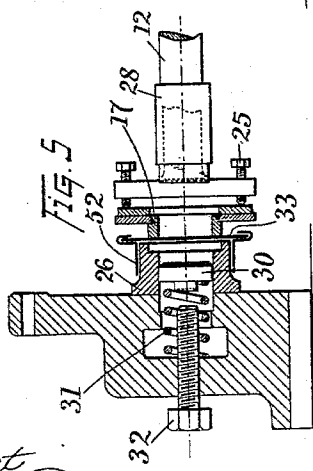
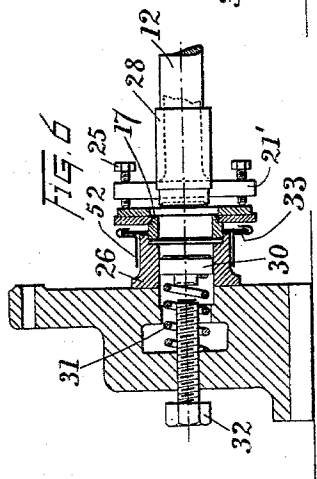
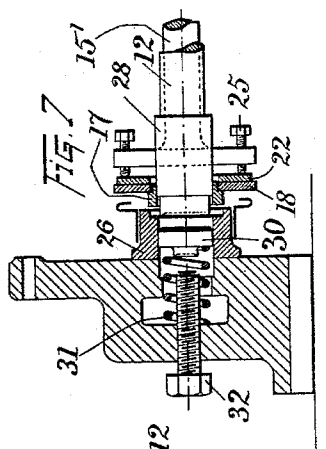
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(No Model.)

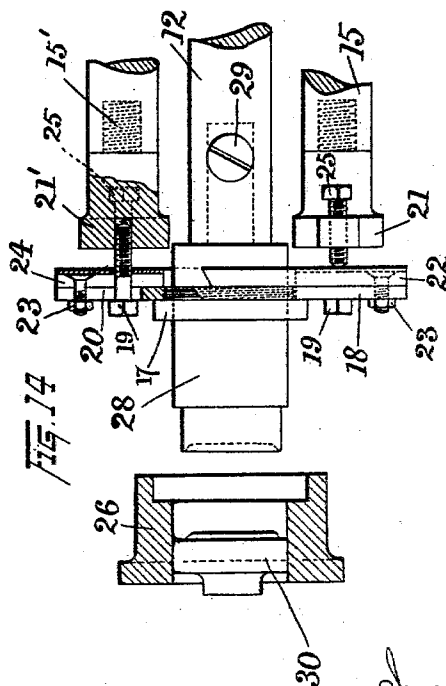
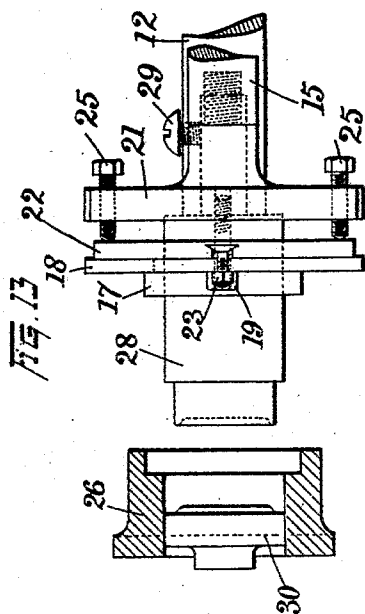
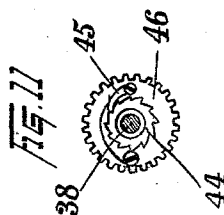
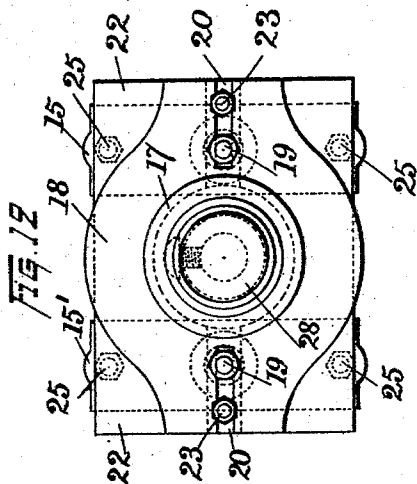
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UNITED STATES PATENT OFFICE.

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TO CHARLES WILLIAM FIRNIBER, OF PARIS, AND GUSTAVE DANTIER,
OF ARGENTEUIL, FRANCE.

MACHINE FOR MANUFACTURING BOXES FROM PAPER-BOARD, &c.

SPECIFICATION forming part of Letters Patent No. 561,858, dated June 9, 1896.

Application filed December 19, 1895. Serial No. 572,715. (No model.) Patented in France October 12, 1893, No. 233,359; in Germany February 10, 1894, No. 80,128, and in Austria-Hungary March 21, 1894, No. 47,287 and No. 97,595.

To all whom it may concern:

Be it known that I, ALBERT BERAN, manufacturer, a subject of His Majesty the Emperor of Austria and King of Hungary, residing at No. 9 Schwarzhorn-gasse, Vienna, Austria-Hungary, have invented certain new and useful Improvements in Machines for the Manufacture of Boxes from Paper-Board, Sheet Metal, and other Material, (for which Letters Patent have been issued to myself jointly with Franz Stastny in Austria-Hungary, No. 47,287 and No. 97,595, dated March 21, 1894, also in Germany, No. 80,128, dated February 10, 1894, and in my name alone in France, No. 233,359, dated October 12, 1893,) of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The machine which I have devised is intended for the manufacture of boxes from paper-board, sheet metal, or other suitable material, and comprises as its main active parts a punch by which a disk or blank is first cut out of a sheet of metal or other material and a pair of dies concentric to the punch, by which the said blank is stamped into shape, so as to produce either a body or a lid of a round or other shaped box at will. It is self-acting in operation, since the material from which the box bodies or lids are to be made is fed forward, cut out, stamped into shape, and the finished article discharged, all automatically, as will be described.

In the accompanying five sheets of drawings, Figure 1 is a longitudinal vertical section of my improved machine, shown broken away at the right. Fig. 2 is a plan of Fig. 1, partly in section. Fig. 3 is a vertical cross-section on the line A A of Fig. 2 looking in the direction of the arrows. Fig. 4 is a vertical cross-section on the line B B of Fig. 2 looking in the direction of the arrows. Figs. 5 to 10 show the punch and dies in various positions corresponding to the different stages of the manufacture. Fig. 11 is a detail of the ratchet and pawl by which intermittent rotary motion is imparted to the feed-rolls for the sheet metal. Fig. 12 is a face view, Fig. 13 a side view, and Fig. 14 a top view, partly

in section, showing on a larger scale the arrangement of the punch and the manner in which it is fitted and adjusted.

A machine as devised by me can be designed so as to be a double machine comprising two sets of working parts which are operated by the same driving means; but in order to simplify the drawings as well as the specification the machine is shown with but one set of working parts.

1 is the bed-plate, upon which are secured two frames 2 3, which are stayed at the top by a brace 4.

5 is the driving-shaft, carrying a fly-wheel 6 and a pinion 7, which meshes into a spur-wheel 8, fastened on a shaft 9, having its bearings in the frame 3. On the shaft 9 is secured a middle cam 10, Fig. 1, working in a strap 11, connected to a rod 12, which operates the male die, to be described. The said shaft also carries two outer cams, of which one, 13, only is shown in Fig. 1. Each cam 13 works in straps 14 14', connected to rods 15 15', which both operate the punch, to be described. The rods 12, 15, and 15' are guided in bearings formed in a standard 16, bolted to the bed-plate 1.

The punch 17 (see Figs. 12, 13, and 14) is screwed into the center of a plate 18, which by means of screws 19 19 (each engaging a slot 20 of the plate 18) is secured to a head 21 21', screwed into the end of the two rods 15 15'. The punch is thus rigidly connected to the said rods 15 15' and participates in the to-and-fro movements thereof. In order to provide for the adjustment of the punch 17, the plate 18 has secured to it a rectangular plate 22, the fastening being obtained by means of two bolts 23 23, the conical heads of which engage a dovetailed groove 24, Fig. 14, formed in the rectangular plate 22. Against the latter are made to bear four screws 25 25 25 25, of which two are arranged in a vertical plane in each head 21 21'. By adjusting the said four screws 25 on the one hand and the two screws 19 19 on the other the plates 18 and 22, together with the punch 17, carried thereby, can be adjusted. The punch 17 coöperates with a stationary female cutting-die 26,

which is rigidly secured to the frame 2 by bolts 27 27. (See Figs. 2 and 4.)

The dies by means of which a blank is pressed into shape are composed of a male stamping-die 28, fastened at the end of the rod 12 by a screw 29 and passing concentrically through the punch 17, and of a female stamping-die 30, capable of sliding within the female cutting-die 26 and placed under the action of a spring 31. The spring 31 is passed over a regulating-screw 32, against which the female stamping-die 30 bears when the male stamping-die 28 is forced up against the latter, as in the position shown in Figs. 1 and 8.

The sheet metal or other material from which the boxes are to be made is shown at 33, Fig. 2, just before it enters the machine. It passes first in a guide 34 and then between two feed-rolls 35 36, the shafts 37 38 of which are fitted in a frame 39, secured at 40 to the bed-plate 1, Fig. 4. Both rolls 35 36 are solicited toward each other by a spring 41, attached to the upper ends of the said shafts, the lower ends of the latter being also under spring-tension, if required. The upper end of the roll 36 carries a ratchet-wheel 42, into which engages a retaining spring-pawl 43, by means of which any retrograde rotation of the rolls contrary to the normal direction shown by the arrows in Fig. 2 is prevented. Fast on the lower end of the roll 36 is a ratchet-wheel 44, into which engages a spring-pawl 45, (see Figs. 1, 2, 4, and 11,) and on the lower end of the shaft 38 is fastened a spur-wheel 46, Figs. 2, 4, and 11, into which engages a rack 47, fitted in bearings 48 48 and capable of receiving to-and-fro motion from the shaft 9 through the instrumentality of a crank-arm 49, Figs. 1 and 2, and a connecting-link 50, jointed to the rack 47 at 51. After the material 33 has been advanced by the feed-rolls 35 36 it is conducted by a guide 52, Figs. 1, 2, and 4, which is fastened to the female cutting-die 26 and which presents the said material to the punch and stamping-dies.

The operation is as follows: The material 33 introduced into the guide 34 is seized by the feed-rolls 35 36, to which intermittent rotary motion is imparted by the parts 49 50 51 47 46 45, and is conducted to the guide 52, the punch 17 and the stamping-dies 28 30 assuming the position shown in Fig. 5. In this position the punch 17 is close to the material 33 ready to cut out a blank therefrom and the male stamping-die 28 is away from its female die. The punch 17 then advances by the action of the parts 13 13, 14, 14', 15, 15', 21, 21', 25 25, 22, and 18, Figs. 1, 2, and 13, and cuts out a blank, the punch 17 and the stamping-dies 28 30 assuming the position shown in Fig. 6. In this position the punch 17 is engaged in its female die 26 and the male stamping-die 28 has advanced slightly toward the female stamping-die 30. The punch 17 then begins to recede, leaving the cut-out blank

adhering to the female die 26, and the male stamping-die 28, under the action of the parts 10 11 12, advances further until it assumes the position shown in Fig. 7, in which it is ready to drive the blank against the female die 30. As it advances the male stamping-die 28 drives the blank right up against the female die 30, at which moment the parts occupy the position shown in Fig. 8. In this position the female die has been pushed up against its seat on the screw 32 and stamped the blank into shape, the punch 17 having meanwhile continued to recede. The die 28 then itself begins to recede and to carry away with it the box-body or box-lid adhering thereto, as shown in Fig. 9, after which the punch 17 now begins to move forward until it meets the edge of the box-body, at which moment the parts occupy the position shown in Fig. 10. The box-body is then pushed off the end of the male stamping-die 28 by means of the punch 17 and falls through an opening 55 of the bed-plate 1 into any suitable receptacle, and the same operation is repeated, while the waste produced in the material 33 moves on in the direction of the arrow 53, Fig. 2, and can be disposed of in any desired manner.

In order to promote the shaping operation, heat may be applied to the shaping-dies 28 30. In Figs. 1 and 4 I have shown by way of example a burner 54, which may be fed with gas from a pipe 56, suitably supported in the machine. In the instance illustrated the burner is shown as applied under the female cutting-die 26.

The set of stamping-dies herein shown is suitable for the production of a box-body; but it is of course to be understood that it is also possible to strike up any other body, whether a lid for a box or any article which may be pressed into shape by means of dies. It is also obvious that other shapes than round ones can be made by correspondingly changing the dies and punch.

If it is desired to have a double machine, all the parts at the left of Figs. 1 and 2 can be duplicated, in which case but one single operating means, actuated by the shaft 9, will be sufficient.

I claim—

1. In a box-making machine, a male stamping-die 28, a female die 30, the spring for holding the same yielding and the adjustable stop or seat for the female die passing through the spring and in line with the female die, substantially as described.

2. In a machine for manufacturing boxes, a yielding female stamping-die 30, an adjustable stop therefor cooperating with a male stamping-die 28, in combination with means for operating the latter, substantially as set forth and shown.

3. In a machine for manufacturing boxes, a punch 17 adjustably secured to its actuating devices 15, 15' through the agency of a

plate 18, rectangular plate 22, heads 21, 21', bolts 23, 23, screws 19, 19 and screws 25, 25, 25, 25, substantially as set forth and shown.

4. In combination, the die 26, the punch 17, the bars 15, 15' with means for operating the same and the plate 22 connected adjustably to the ends of the bars 15, 15', the said punch being adjustable laterally on the plate, substantially as described.

5. In combination, the die 26, the punch 17, the male die 28, operating through the punch, the cam-shaft, the bars 15, 15' for operating

the punch and the central bar 12 for operating the male die, the feed-rolls, the reciprocating bar 47 for operating the same and the operating connection between the bar 47 and the cam-shaft, substantially as described.

In witness whereof I have hereunto set my hand, this 27th day of November, 1895, in presence of two subscribing witnesses.

ALBERT BERAN.

Witnesses:

DOUGLAS H. BRANDON,
EDWARD P. MACLEAN.