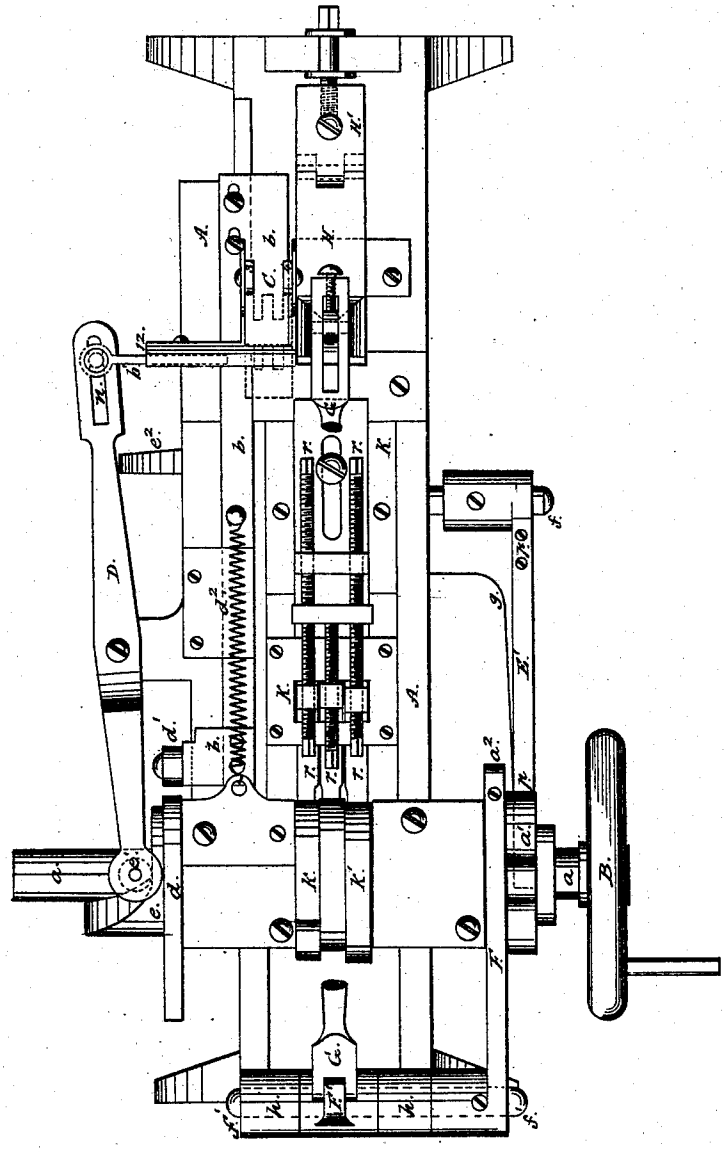
4 Sheets—Sheet 1.

A. RAIS.

MACHINE FOR MAKING BUTT HINGES.

No. 66,172. Patented June 25, 1867.

Fig. 1.



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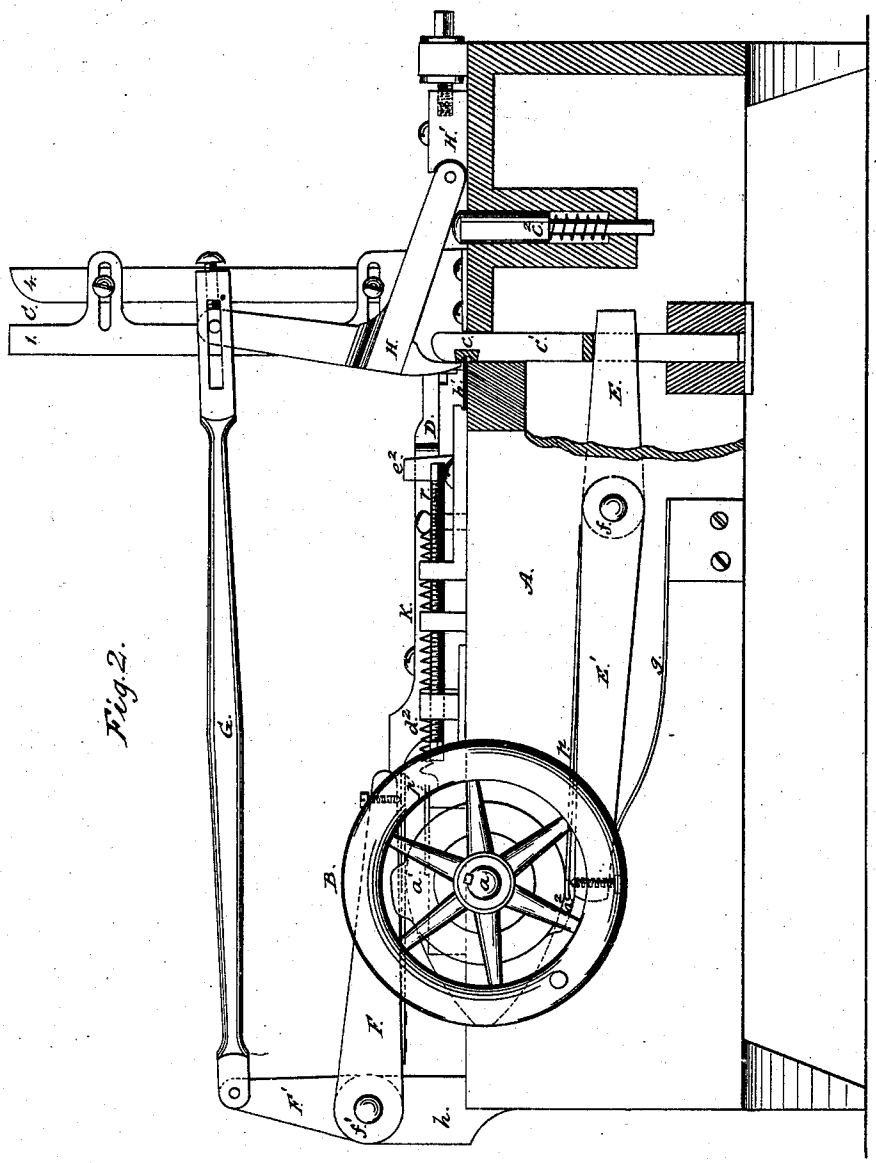


Fig. 2.

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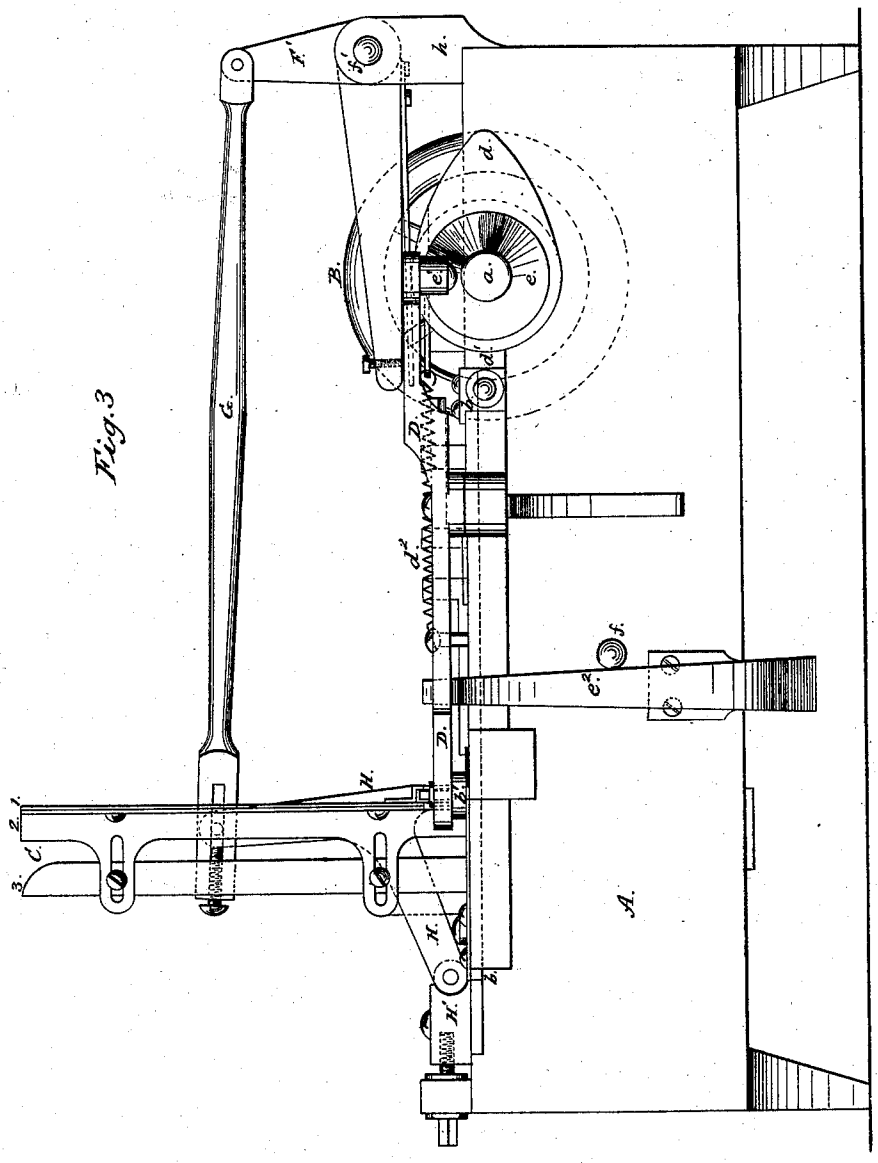
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Fig. 3



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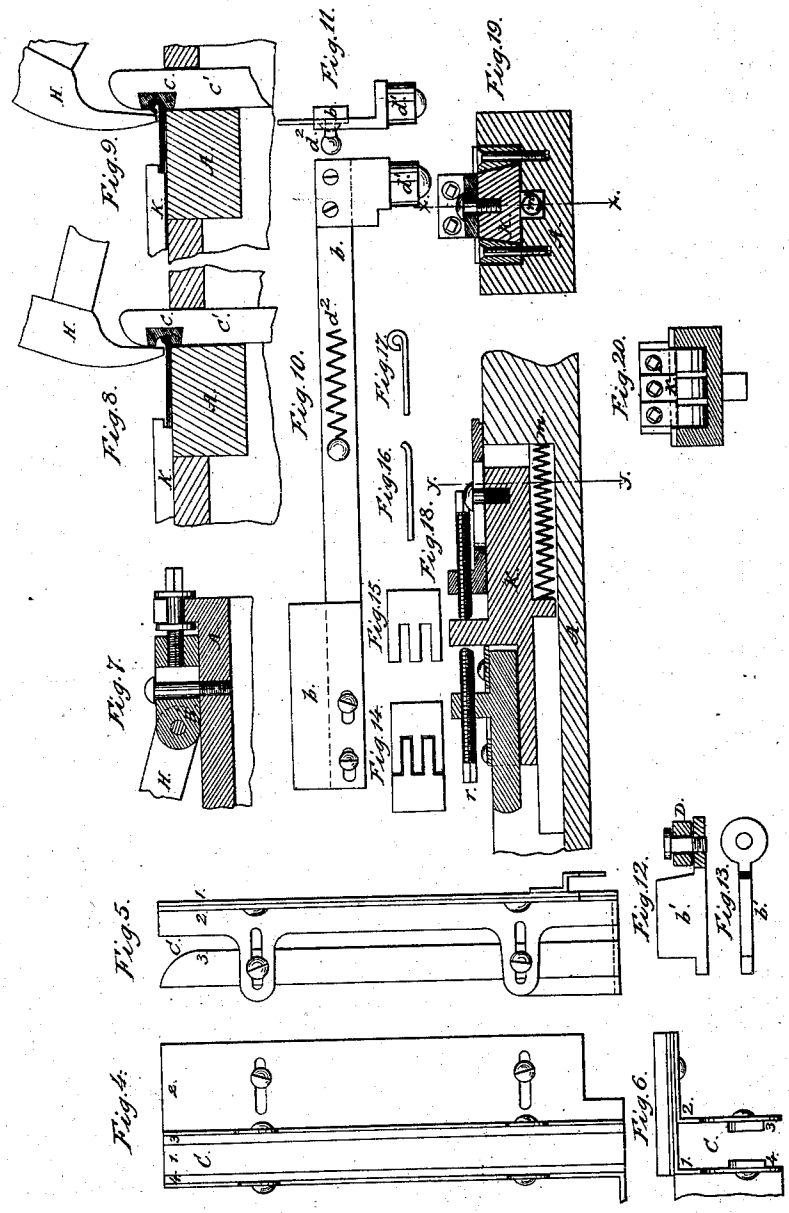
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United States Patent Office.

ADRIAN RAIS, OF WATERBURY, CONNECTICUT, ASSIGNOR TO SCOVILL MANUFACTURING COMPANY, OF SAME PLACE.

Letters Patent No. 66,172, *dated June* 25, 1867.

IMPROVED MACHINE FOR MAKING BUTT-HINGES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ADRIAN RAIS, of Waterbury, New Haven county, Connecticut, have invented a new and useful Improvement in Machinery for Making Butt-Hinges; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet 1, is a plan or top view of my improved machine for bending the knuckles of blanks for making butt-hinges.

Figure 2, Sheet 2, is a side elevation on the right hand, looking from the head or feeding end of the machine.

Figure 3 is an elevation of the opposite side.

Figures 4, 5, and 6, Sheet 4, are details of the feeding-box C.

Figure 7, Sheet 4, is a longitudinal vertical section of the block H′, showing its connection with the clamping-guide H.

Figures 8 and 9, Sheet 4, are sectional views of the bending-die *c*, in the sliding-bar c^1, and the parts connected, showing the operation of turning up the edge of a blank.

Figures 10 and 11, Sheet 4, are top and end views respectively of the feeding-slide *b*.

Figures 12 and 13, Sheet 4, are side and end views respectively of the feeding-slide b^1.

Figure 14, Sheet 4, is a view of a butt-hinge plate cut into match-blanks or skeletons.

Figure 15, Sheet 4, is a view of one side of the match-blanks.

Figure 16, Sheet 4, is an edge view of a blank turned up at the edge by the first operation of the die *c*, preliminary to the bending of the knuckle.

Figure 17, Sheet 4, is an edge view of the same, after the knuckle is bent.

Figure 18, Sheet 4, is a central vertical longitudinal section of the compound slide K, showing the retractor-spring *m* in the interior.

Figure 19 is a cross-section of the same, taken in the line *y y*, fig. 18.

Figure 20 is a rear end view of the same.

Similar letters of reference indicate corresponding parts.

This invention relates to an improvement in machinery for bending the knuckles of butt-hinges by means of a single die, at one operation, instead of two distinct operations with separate dies, thereby simplifying the mechanism and manufacturing hinges more rapidly and economically.

My improvement consists in connecting a single bending-die with co-operative machinery in such a manner that the blanks or skeletons of butt-hinges shall be regularly and successively delivered by feeding apparatus from a hopper or feed-box to the front of the die, where, by one movement, the blank shall first receive the pressure on its edge, to turn it up by the die, and then, by another movement, the blank shall receive pressure against the die, which will continue the bending thus first started on the edge, until the knuckle is entirely formed, ready to make the hinge-joint, at one single operation.

A is the frame or bench; B, the driving-pulley or gear, hung on the horizontal shaft *a*, that extends across the rear or tail end of the machine. At the head of the machine is placed a vertical hopper or feed-box, C, formed of four plates, 1, 2, 3, and 4, fastened together with screw-bolts, in such a manner that the area of the feed-box may be diminished or enlarged for receiving hinge-blanks of different sizes, as shown in place, figs. 1, 2, and 3, and in detail, figs. 4, 5, and 6. Under the feed-box C is a horizontal side-plate, *b*, the extreme end of which lies close to the bottom of the box, and supports the blanks piled flat within the feed-box, until the side-plate is moved forward far enough to receive one blank in an offset equal to the thickness of the blank, which is then drawn from under the feed-box by the backward movement of the slide-plate *b* into position opposite another slide, b^1, that works at right angles to the slide *b*, and pushes the blank across the bed of the machine to position opposite the bending-die *c*, as shown in place, figs. 1 and 2, and in detail, enlarged, figs. 8 and 9, and hereinafter described. The two feeding-slides *b* *b′* are operated by two cams, *d* *e*, placed on the outer end of the driving-shaft *a*. The cam *d* is heart-shaped, and works against the friction-roller d^1, to move the feeding slide-plate *b* forward under the feed-box C, to receive a blank—the backward movement of the slide-plate *b*,

for drawing the blank from under the feed-box, to place it into position opposite the slide b^1, being effected by a spiral spring, d^2, that retracts with the slide as fast as the return movement of the cam d will allow, as shown in place, figs. 1 and 3, and in detail, figs. 10 and 11, sheet 4. The other cam, e, is a side cam, which works against a friction-roller, e^1, placed on one end of a side lever, D, to push it outward, in order to push the feeding-slide b^1 forward, with a blank, into position opposite the die c; the backward movement of the slide b^1 being effected by a flat bent spring, e^2, which pushes back the outer end of the lever D, with the slide, as fast as the return movement of the side cam e will permit, as shown also in figs. 1 and 3. The steel bending die c is fitted in the upper end of a vertical sliding-bar, c^1, passing down through the bed of the machine to the under side, where it connects with the end of a horizontal arm, E, on a rock-shaft, f, on which also, in the same line, is another arm, E′, constituting, in fact, one straight lever, having the rock-shaft for its fulcrum. The arm E′ is moved by a round cam, a^1, having one segment projection, which depresses the arm slightly at every revolution of the driving-shaft a, on which the cam is placed for the purpose of raising the sliding-bar c^1 with the arm E, and thus pushing up the die c above the bed of the machine, to turn up the edge of the blanks and perform the first part of the operation of bending the knuckle, and holding the die stationary till the knuckle is bent, as hereinafter more particularly described, and as shown in place in fig. 2, and in detail, enlarged, in figs. 8 and 9. And under the arm E′ is a flat spring, g, fastened to the side of the frame A, which bears the arm close against the cam a^1, for the purpose of raising the arm E′ and drawing down the slide-bar c^1, to bring the die below the bed of the machine. Another cam, a^2, made like the cam a^1 and placed by the side of it, having also a single projection nearly opposite to the projection on the cam a^1, works against the outer end of a horizontal arm, F, fastened to a rock-shaft, f', which is mounted on studs h h, at the tail end of the machine, and which is connected with and operates the presser or clamping-gauge H. At the opposite end of the machine, by means of the arm F′ and pitman g, the gauge H bears down upon the blank, and holds it firmly in place while the edge is turned up, and then guides it while the bending of the knuckle is completed, as shown in place, fig. 2, and enlarged details, figs. 8 and 9. The clamp-gauge H is hinge-jointed to an adjustable block, H′, fastened at the head of the machine. When the arm F is raised by the cam a^2, the clamp H is pressed down to pinch the blank, when the die c rises to turn up the edge, as before described and shown clearly in fig. 8, sheet 4; but the instant this is done the clamp rises slightly and releases the blank, to allow it to be pushed forward to finish the knuckle and act as a guide during the operation of bending. The clamp H is thrown up by a spiral spring, c^2, that bears on the under side, as seen in fig. 2, to release it. For pressing the blanks into the die, two cams or eccentrics, k k', fig. 1, are placed on the driving-shaft a within the framing, both of which cams work against a horizontal compound slide, K, placed in the middle of the bed of the machine. The cam k makes the first movement with every revolution of the shaft, and pushes the slide K forward with the blank just far enough into the die c for it to catch the edge and turn it up when the die rises, which movement is followed up by the action of the cam k' on the slide K, to press the blank into the die and bend the knuckle completely, as shown clearly in fig. 9, sheet 4. The slide K is provided with a spiral spring, m, as shown in figs. 18 and 19, sheet 4, by which it is drawn back to its original position the instant the bending operation is finished. All parts of the machine are provided with adjusting and tightening-screws for effecting the nicest and most positive movements, and for adaptation to hinges of different sizes. The side plates 1, 2, 3, and 4 of the feeding-box C have set-screws passing through slots, by which they may be set nearer or further apart inside to admit hinge-blanks of different sizes, when required, as shown clearly in the drawings. The feeding slide-plate b is also provided with set-screws for adjustment. The transverse feeding-slide b^1 is made adjustable by a set-screw, which secures it in a slot, n, in the end of the lever D, seen in fig. 1. On the upper side of the arm E is a flat plate, p, that is pressed higher or lower by a set-screw in the end of the arm, to bear against the cam a^1, and thus adjust the operation of the arm E, for raising and lowering the die c exactly. And on the under side of the arm F is also a similar plate, p', pressed against the cam a^2 by a set-screw in the end, for the purpose of adjusting the movement of the clamping-guide H, which is also regulated by a screw in the end of the pitman G, where the upper end of the guide is pivoted in a slot. The clamp-guide H is further adjusted by means of a set-screw in the end of the block H′, to which the rear end of the clamp is jointed. Thus every part of the machine may be perfectly adjusted. The compound slide K is made in two main parts, which are connected by adjusting-screws r r, similar to the clamp-screws used by cabinet-makers, by which the slide is accurately regulated in its movement for pushing the hinge-blank up to the die for bending the knuckle.

The operation of the machine as a whole, is as follows: The hinge-blanks are placed in the feeding-box C in a pile horizontally, with the lower plate resting on the slide b. The slide-plate b carries a blank opposite the slide b', which pushes it across the bed of the machine to a position opposite the die c, where the blank first receives a slight push forward by the slide K partly into the die, which at that moment is sunk below the bed of the machine. The clamp-guide H then by a simultaneous movement bears down upon the blank the instant it advances far enough, and holds it fast, while at the same time the die c rises and turns up the edge of the blank, to prepare it for the next operation, which is made by the further progression of the slide K, which presses the blank directly into the die, to give the knuckle the finishing turn, thus performing the bending of the knuckle of a hinge-blank at one operation with one die, by continuous and simultaneous movements of the several parts of the mechanism hereinbefore described.

I am aware that the knuckles of butt-hinges have been previously bent by machinery, but the operation of the machinery is different from that of my invention. By the old method the knuckle is bent in two distinct and separate operations by two different dies, one of which first performs a part of the bending and the other finishes it. The blank after being acted on by one die is transferred by machinery to be acted on by the other die to complete the bending, and this movement of the blank from one position to another is attended with liability to become slightly displaced, so that the knuckle, which requires the greatest nicety in bending, is often mal-

formed and the blank damaged and wasted. Another disadvantage of bending the knuckle in two separate operations arises from the fact that certain kinds of hinges cannot be made in this manner on account of the liability to derangement in position by being moved from one die to another, whereas by my improved machinery for bending knuckles at one operation, with a single die, strap and other irregularly-shaped hinges can be made by it as well as the common rectangular butt-hinge.

I therefore disclaim the bending of knuckles of butt-hinges by separate dies in two operations, and the machinery for accomplishing this object in this manner; but having described the construction and operation of my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination of the single bending die, the clamping-gauge, the cams, the rock-shafts and their arms, the pitman, the feeding apparatus, and the pushing slides, or their equivalents, or either of them, the said combination being organized substantially as described.

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