2 Sheets, Sheet 1.

J. S. Hall,

Making Plow Clevises.

No. 107,901. Patented Oct. 4, 1870.

Fig. 1.

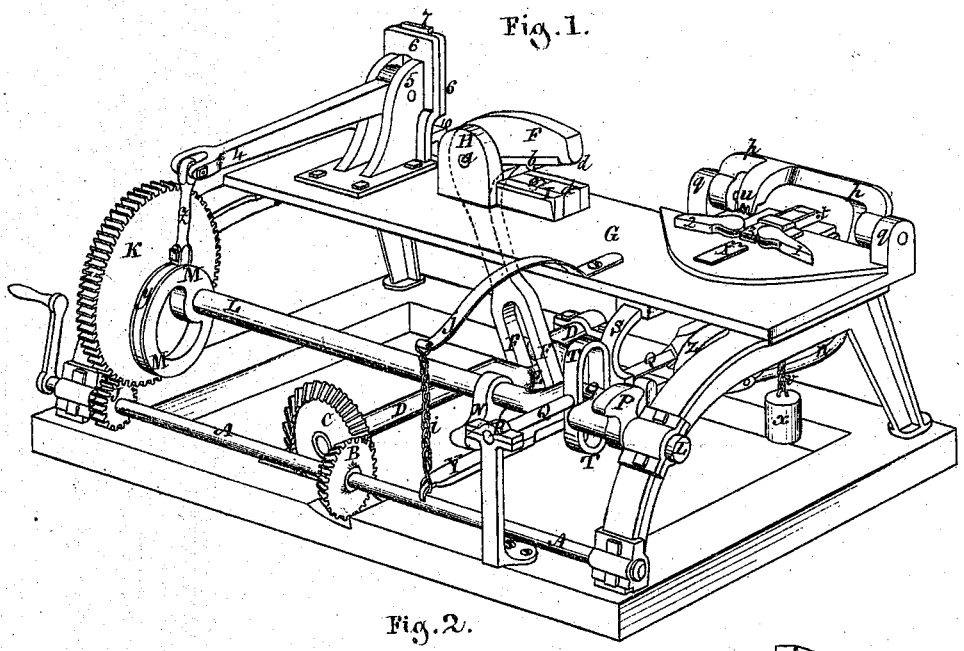
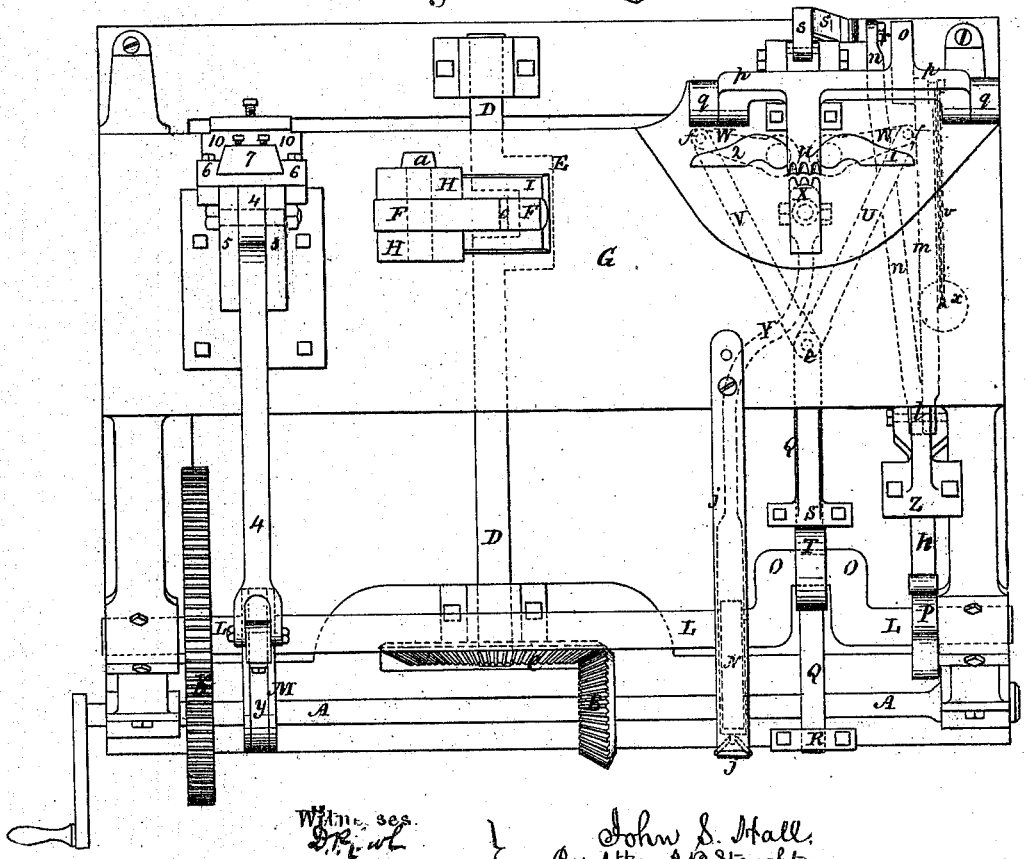


Fig. 2.



Witnesses.
D. R. Wark
Edmund Maston

John S. Hall.
By Atty. A. P. Stoughton

J. S. Hall,

2 Sheets, Sheet 2.

Making Plow Clevises.

No. 107,901. Patented Oct. 4. 1870.

Fig. 3.

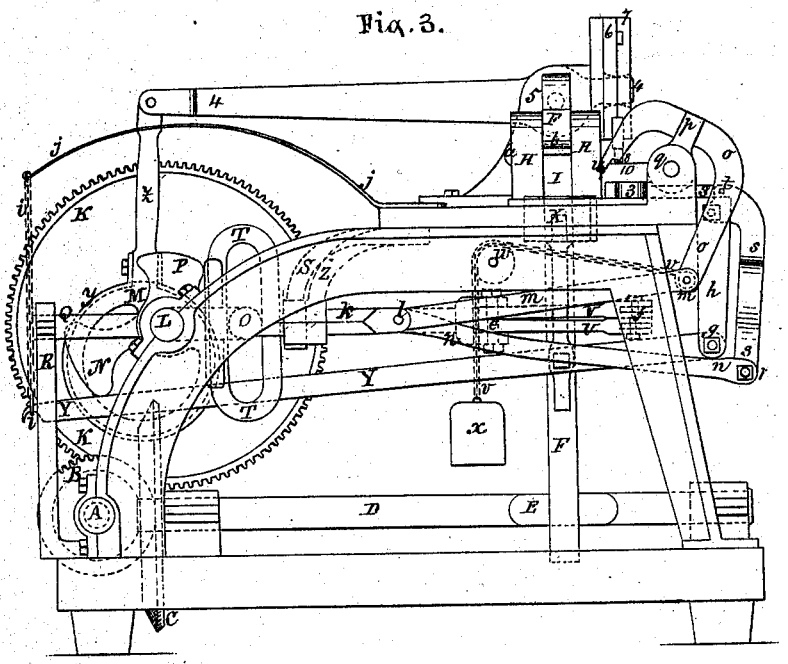


Fig. 4.

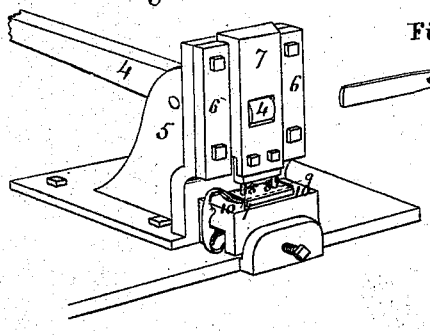


Fig. 5.

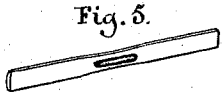


Fig. 6.

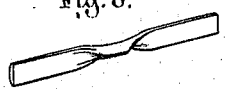
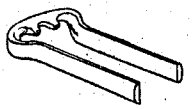


Fig. 7.



Witnesses.
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Edmund Masson

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United States Patent Office.

JOHN S. HALL, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 107,901, dated October 4, 1870.

IMPROVEMENT IN MACHINES FOR MAKING CLEVISES.

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, JOHN S. HALL, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Making Clips, Clevises, Stirrups, and similar articles; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 represents a perspective view of the machine.

Figure 2 represents a top plan thereof.

Figure 3 represents an elevation of one of the ends of the machine.

Figure 4 represents in perspective the punching mechanism, with a clevis in place to have the holes punched in it after it is finished in the dies.

Figure 5 represents one of the blanks as it appears after having been creased in the creasing-dies.

Figure 6 represents the same blank as it appears after its creased portion has been folded in the folding-dies.

Figure 7 represents the clevis as it appears after being operated upon by the "former," holder, "backer," and bending-jaws, and ready for the punching process.

Similar letters of reference, where they occur in the several separate figures, denote like parts of the machine in all of the drawings.

My invention relates to a machine in which rolled blanks are creased, folded, bent, and punched so as to be finished, and ready for market, by the series of mechanical operations hereinafter described.

In or on the main frame of the machine is hung a driving-shaft, A, which may be driven from any first-moving power, and from this driving-shaft all the moving parts of the machine are operated directly or indirectly.

On the shaft A there is a bevel pinion, B, which gears into a bevel-wheel, C, fast on a cross-shaft, D, and through these gears said cross-shaft is driven.

The shaft D has a crank, E, upon it, which is straddled by the forked end of a bending or creasing and folding-lever, F, pivoted on top of the table G, and to pillar-blocks, H, thereon, at *a*, as seen in figs. 1, 2, and 3.

The top of the bending, creasing, and folding-lever F is bent over into a horizontal, or nearly so, position, and has upon its under face a die or creaser, *b*.

Upon the table underneath the lever F there is a female or grooved die or block, I, into the crease or groove *c* of which the creaser *b* works.

The faces of the die-blocks are slightly rounded, so that the dies shall crease from a central point toward the extremities of the blank.

The ends *d* of the moving and stationary die-blocks are formed and designed for folding over and downward the portions of the blank that are first creased by the male and female creasing-dies.

On the driving-shaft A there is a pinion, J, that gears into a large cog-wheel, K, arranged on a shaft, L, supported in the main frame above, and parallel with said driving-shaft.

On this shaft L there is arranged (beginning at its end nearest the gear K) an eccentric, M, a cam-tappet, N, a crank, O, and a second cam-tappet, P, which, though arranged on the shaft in the order of succession named, will be described in the order in which the successive operations upon the blank take place.

Q is a sliding shaft supported in the arms R S, said shaft having upon it an oblong slotted yoke, T, which passes over the crank O, and receives a reciprocating motion thereby in its supports R S.

To this reciprocating shaft Q there is pivoted, at *e*, the two ends of the two rods U V, the other ends of said rods being connected, at *f*, to the arms W, that are on the spindles of the bending jaws 1 2, that are, by these connections, moved horizontally, to bend the blank around the "former" X.

The former X is connected to a lever, Y, which ever is pivoted, at *g*, to a permanent portion, *h*, of the table or frame; and this lever Y extends out and underneath the shaft L, so as to come within the path of the tappet N, and be forced down by said tappet.

The free end of the lever Y is connected, by a chain, *i*, to a spring, *j*, so that after the tappet has left the lever the spring will raise it up again, and the former with it.

The object in moving the former down to the plane of the table is that the bent-shaped and formed article may be readily removed.

In a guiding and supporting piece, Z, there is placed a slide-rod or bar, *k*, against which the tappet or cam P works.

The slide-bar *k* has connected to it, at the point *l*, two rods, *m n*, the rod *m* being pivoted to an arm, *o*, fast on an oscillating shaft or bar, *p*, that is pivoted in the pillar-blocks *q*, on the table G; and the other rod, *n*, is pivoted, at *r*, to a bent arm, *s*, which, in turn, is pivoted, at *t*, to a sliding piece, which I term a "backer," 3, which acts in concert with the bending jaws 1 2.

On the oscillating bar *p* there is a downwardly-bent arm, *u*, which, when the blank is placed in position for being bent around the former, comes down upon the blank, and holds it in position for the backer and for the bending jaws.

The bending or shaping is done by the joint action of five active devices acting in concert with each other, viz.: first, the former X; second, the holder *u*; third, the backer 3, and fourth and fifth, the bending jaws 1 and 2.

To the arm *o*, at its pivoted connection with the

rod *m*, there is fastened a chain, *v*, which passes over a pulley, *w*, and has upon its end a weight, *x*.

When the cam P is forcing the bar *k* and its several connected parts into action, the weight *x* is raised up thereby. When the cam ceases to act upon the bar, or leaves it, the weight falls and draws back the parts into position to be again acted upon by the cam at its next rotation.

The eccentric M works in a collar, *y*, to which a connecting-rod, *z*, is attached.

The upper end of the connecting-rod is attached to a lever, 4, pivoted to the pillar-blocks 5, attached to the table.

On the pillar-blocks are made ways, 6, in which a plate, 7, is caused to move by the movements of the lever 4, and on or in the under side of this plate are arranged the punches 8 8, which work into counter-dies 9 9 on the anvil or bed 10.

These punches and counter-dies are for punching the holes in the finished devices, the bed being so made as that the straps or sides of the clevises can be readily submitted to the action of the punches, which, as well as the counter-dies, are removable, so as to adapt the machine to various dies and punches, or adjustments of them.

The blanks are rolled out into the proper form, and, thus prepared and first heated, are laid in place on the block I, the creasing-die *b* comes down and creases the blank in the line in which it is to be folded. It is next put between the dies *d*, which folds it down, bringing the two edges together.

The article thus folded is laid in place on the table, the former X rises up, and the holder *u* descends upon the piece and holds it to the table, said former and holder being also indented so as to make the indentations in the partially-formed clevises. The backer 3 next comes up, and forces the article against the former, and, finally, the bending jaws 1 and 2 swing around, and bend the clevis into finished form. The shaping, holding, and bending devices now recede, the former drops down through the table, and the article is free to be removed. If a clevis, or other article requiring holes to be punched, it is removed to the anvil or counter-punch, and there, after it is shaped and formed, so as to require no more bending, it is punched.

The anvil or bed 10, as more distinctly seen in fig. 4, has an opening in or through it, into which one of the straps or sides of the clevis is inserted, while the other one lies upon the counter-die 9, to be punched. This admits of the punching after the clevis is otherwise finished.

If the blank were punched before it was bent, the bending would break the blank at the holes. I arrange, therefore, for punching the clevis, or other article, after it is shaped.

The operation of the machine is as follows:

The blanks being cut from the rolled bar into suitable lengths, and heated to a welding heat, are subjected, one at a time, to, first, the creasing-dies *b c*, which creases the blank, as shown in fig. 5. The creased blank is then moved but a slight distance, and subjected to the folding-dies *d d*, which bring the two edges each side of the crease down together and give to the blank the shape or form shown in fig. 6. The partially-formed blank is then laid in place in between the shaping and bending-dies, which are open for its reception, as seen in fig. 1. The former X is raised up to catch the blank on that side.

The backer 3, the holder and shaper *u*, and the bending and shaping jaws 1 2, all move toward the blank, and drive and compress or upset it into the form shown in fig. 7.

The former, holder, backer, and bending jaws, are all of them dies, each imparting to the clevis a portion of its finished shape or form, the former X and holder *u*, by their indentations, forming the indentations in the clevis, while the backer 3 and the wings or jaws 1 2 finish up and shape the exterior of the clevis.

The clevis, thus shaped and formed, as shown in fig. 7, is taken to the punch, and being placed, as shown in fig. 4, on the anvil or bed 10, is punched.

By punching the straps after the clevis is finished, is a very material operation, inasmuch as the punching before the bending caused some twenty per cent. or more of the blanks to break at the holes in the after operation of shaping and bending.

Having thus fully described my invention,

What I claim therein as new, and desire to secure by Letters Patent, is—

1. In combination with a supporting-frame and the table G, the shaping and bending-dies, consisting of the former X, holder *u*, jaws 1 and 2, and the backer 3, arranged and operated substantially as described.

2. The construction, jointly, with the arrangement relative to one another on the table G, of the creasing and folding-dies, and the punching apparatus.

3. The arrangement, relative to one another on the table G, of the creasing and folding-dies, the punching apparatus, and the shaping and bending devices, substantially as set forth.

JOHN S. HALL.

Witnesses:

A. B. STOUGHTON,

JAMES CASSIDY.