

(No Model.)

R. ALLSTATTER.
PUNCHING DEVICE.

No. 334,554.

Patented Jan. 19, 1886.

Fig. 1.

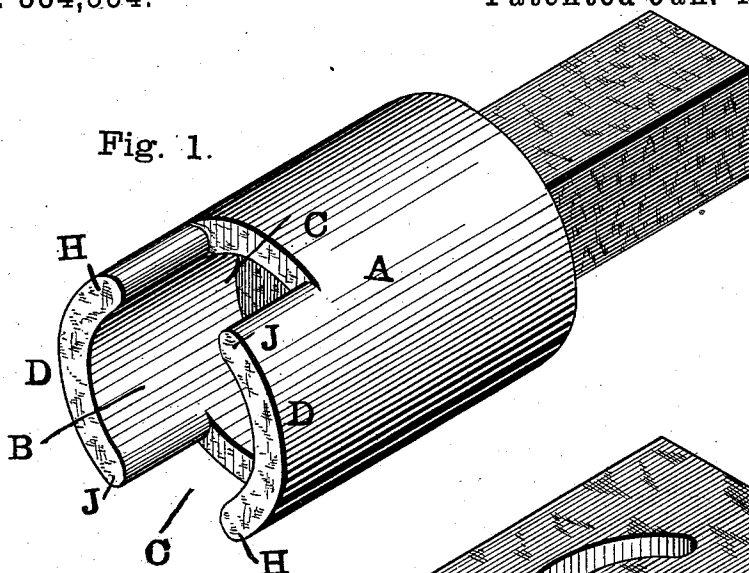


Fig. 2.

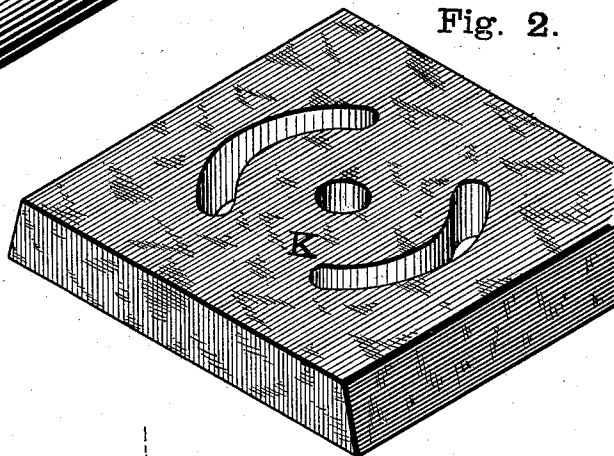


Fig. 3.

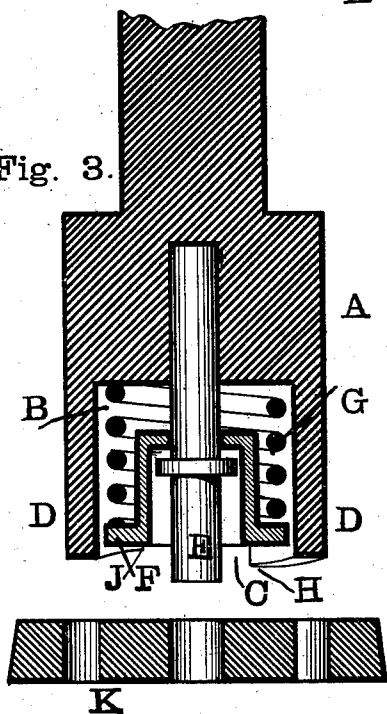


Fig. 4.

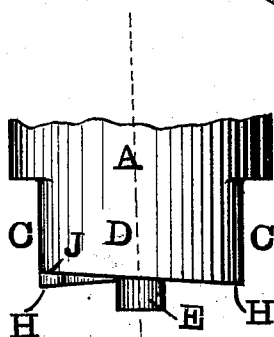


Fig. 5.

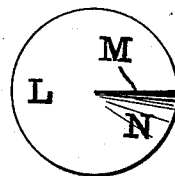


Fig. 6.

Witnesses:

W. A. Seward
M. T. Coleman

Robert Allstatter
by James M. See

Inventor

Attorney

UNITED STATES PATENT OFFICE.

ROBERT ALLSTATTER, OF HAMILTON, OHIO, ASSIGNOR TO THE LONG & ALLSTATTER COMPANY, OF SAME PLACE.

PUNCHING DEVICE.

SPECIFICATION forming part of Letters Patent No. 334,554, dated January 19, 1886.

Application filed December 9, 1885. Serial No. 185,112. (No model.)

To all whom it may concern:

Be it known that I, ROBERT ALLSTATTER, of Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Punching Devices, of which the following is a specification.

This invention pertains to improvements in devices for punching large circular holes in metal sheets—such, for instance, as the flue-sheets of steam-boilers, in which the flue-holes are of large diameter and grouped closely together. It has heretofore been found impracticable to properly punch these flue-sheets, owing to the fact that the small amount of metal standing between the punch-openings is not sufficient to withstand the distorting strains imposed by the usual punching devices.

It has been proposed to lessen the duty of the penetrating punch by arranging its cutting-edge spirally. This spiral arrangement has not, however, lessened at all the distorting tendency of the punch. On the contrary, in many cases the distorting influences of the spiral punch is greater than is the case with the plain punch. Thus, in Figure 6 of the drawings, L represents the cutting end of a common spiral punch, M being that part of the face of the punch which projects the most, and N the part which is farthest back, the face of the punch presenting a spiral progression from the highest to the lowest point. Such a punch enters an ordinary circular die, and of course the periphery of the punch performs a shearing action, the shore of the die forming the counter-shear; but it will be readily understood that when this punch first reaches the metal the initial portion M only touches, this portion descending into the metal. The periphery of this portion of the punch shears against the corresponding peripheral portion of the die; but the portion M presents a radial cutting-line, which must be forced bodily downward into the metal. This radial portion is a proper cutter; but there is no opposing cutter on the other side of the sheet to form the counter-shear. The consequence is, that the punch produces an offsetting and a bulging downward of the metal during the initial penetration of the punch. This offsetting bulge distorts the metal below the punch and

distorts the metal around the part which is to be punched.

By my improvements I secure the full benefit of a spiral punch in connection with a complete counter-shearing die, and I also produce a punching device which needs to remove but little metal in punching comparatively large holes.

My improvements will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Fig. 1 is a perspective view of my improved punch free from its accessories; Fig. 2, a perspective view of the die; Fig. 3, a vertical diametrical section of the punch with its center pin and stripper, this section being taken centrally through the punching-segments; Fig. 4, a vertical section of the die centrally through the segmental slots; Fig. 5, a side view of the punch; and Fig. 6, a face view of an ordinary spiral punch, as hereinbefore referred to.

In the drawings, A indicates the body of the punch, having the usual shank; B, a circular concentric cavity bored within the cutting end of the punch; C, side gaps cut through the annulus left by the bore; D, the two punching-segments resulting from the bore and gaps, the length of the arc of these segments exceeding the length of the arc of the gaps; E, a centering-pin firmly secured in the punch and projecting somewhat below the face of the segments, this pin being preferably hardened, so as to serve also as a punch; F, a cup-like stripper fitted to slide upon the center-pin, and limit it in its downward motion by an upwardly-facing shoulder upon the pin; G, a spring disposed within the bore of the punch, and serving to press the stripper downward; H, the leading points, or points of first penetration, of the punching-segments, which segments have their faces arranged spirally; J, the least advanced points of the segments, and K the die, having segmental slots to fit the segments and the central hole to fit the center-pin.

The sheet to be punched may have a hole drilled or punched at the center of the circle to be punched, such hole to fit the center-pin E. As the punch descends, the center-pin

properly holds the sheet from side displacement, and the punching-segments punch out segmental wads the shape of the slots in the die. The punch then rises and the sheet is
 5 given a quarter-revolution on the center-pin, after which the punch again descends, thus removing the annular metal left by the preliminary punching, and leaving a truly cylindrical hole. As the punch first descended
 10 into the sheet, all portions of the segments were opposed by die-edges serving as countershears. The portions H of the punch were the first to penetrate the metal, and these penetrating portions acted in conjunction with
 15 the countershearing edges upon the die, and the shearing action is maintained throughout the operation.

Instead of revolving the sheet after the preliminary punching, the punching apparatus
 20 may be caused to revolve while the sheet remains fixed.

Instead of drilling or punching a central hole as a preliminary to the punching operation, the center-pin E, hardened to act as a
 25 punch, may punch this central hole during the first descent of the main punch, a central hole in the die, as shown, serving as the counter for the central punch. There are numerous contrivances—such, for instance, as sliding
 30 cone-pointed center-pins—adapted for the centering of punches upon the sheet to be punched, and many of them are available in connection with the form of main punch shown.

It will be understood that the first opera-

tion of the main punch removes two segmental
 35 wads, the second operation removing also two segmental wads, and leaving a circular disk within the bore of the punch upon the center-pin. The stripper F pushes this disk-like wad
 40 out of the bore of the punch by the action of the spring G. I prefer this form of stripper; but it is not essential, as the gaps in the punch permit the presence of ordinary strippers projecting outward from the punch and attached
 45 rigidly to any portion of the punching-machine.

I claim as my invention—

1. A cylindrical annular punch gapped at its cutting-face to leave two punching-segments, in combination with a centering pin
 50 and a die, substantially as and for the purpose set forth.

2. A cylindrical punch formed with two spiral-faced punching-segments, in combination with a counter-die having slots to fit the
 55 segments of the punch, substantially as and for the purpose set forth.

3. The punch A, formed with the punching-segments D, the centering-pin E, secured centrally therein, the stripper F, fitted to slide
 60 upon the pin between the segments, and a spring between the segments over the stripper, combined substantially as and for the purpose set forth.

ROBERT ALLSTATTER.

Witnesses:

J. W. SEE,

W. A. SEWARD.