(No Model.) 2 Sheets—Sheet 1.

J. J. SULLIVAN.

PUNCHING AND SHEARING MACHINE.

No. 539,493. Patented May 21, 1895.

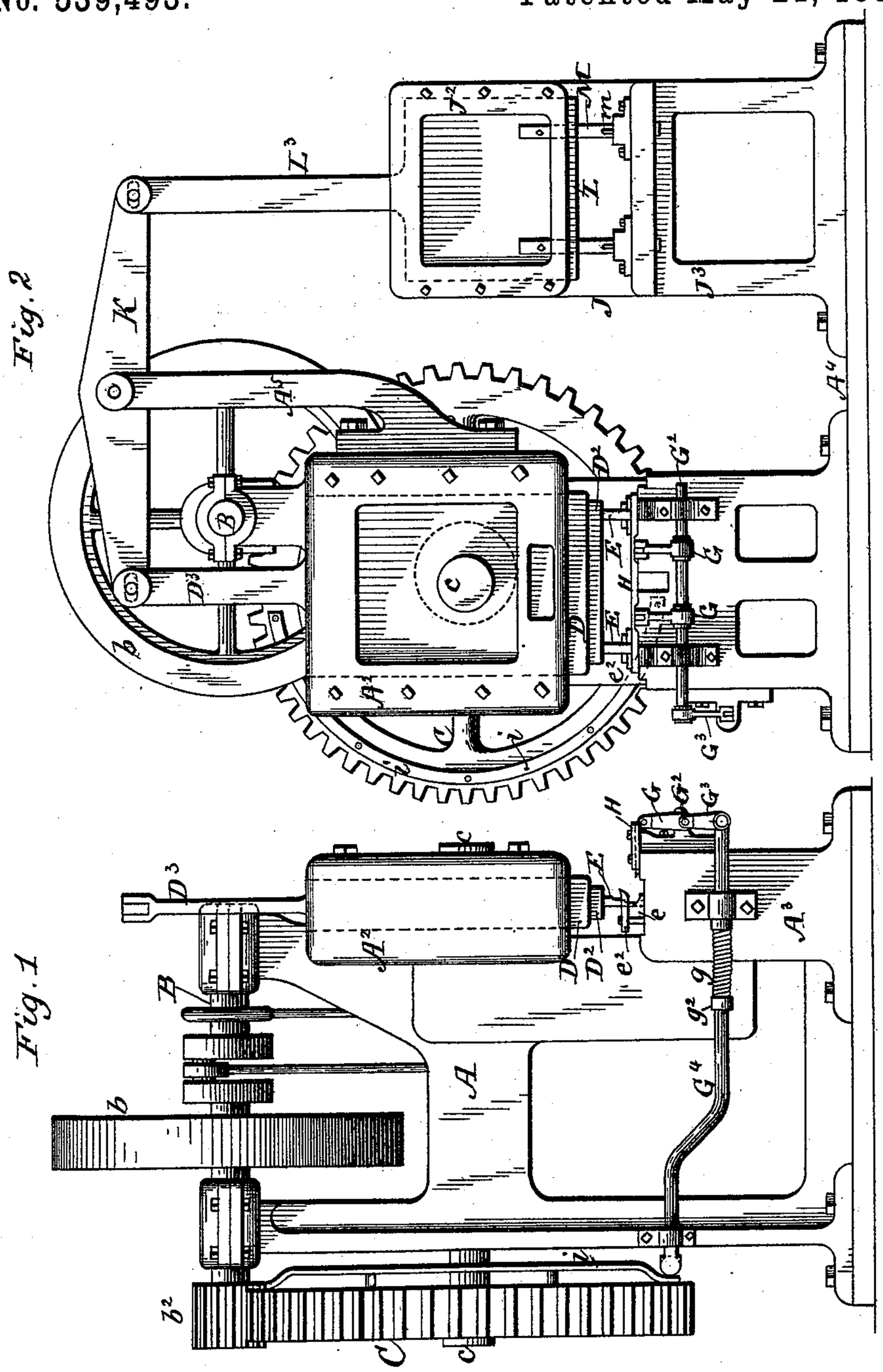

Fig. 1

Fig. 2

WITNESSES

A. D. Driggs

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INVENTOR

John J. Sullivan,

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(No Model.) 2 Sheets—Sheet 2.

J. J. SULLIVAN.

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Fig. 9.

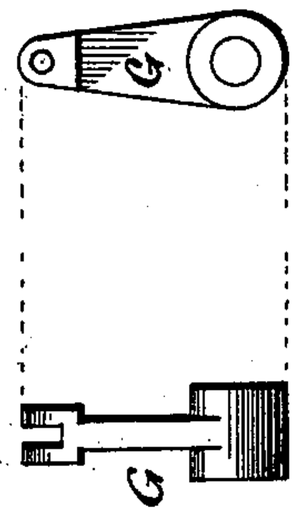

Fig. 12.

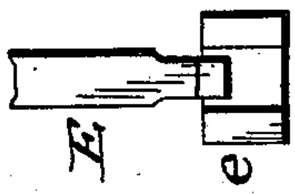

Fig. 14

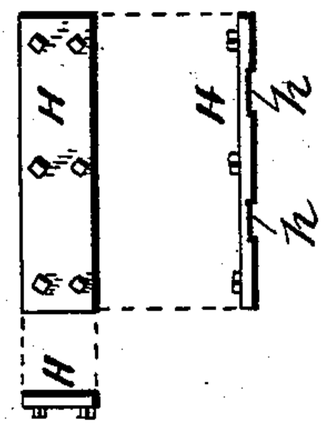

Fig. 8.

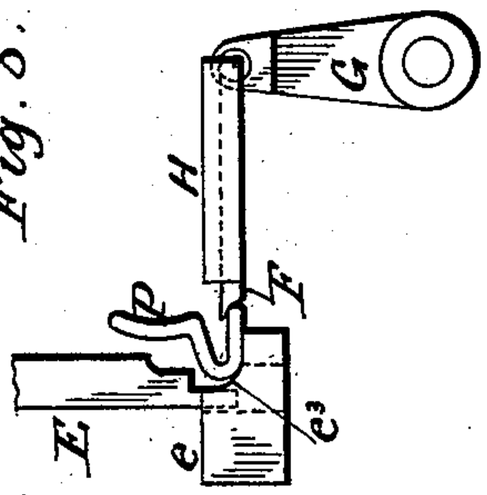

Fig. 11.

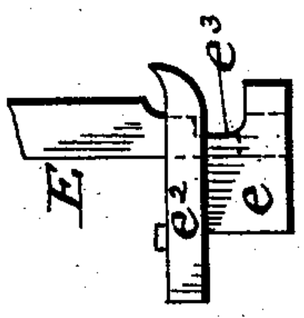

Fig. 13.

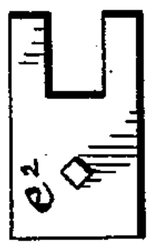

Fig. 7.

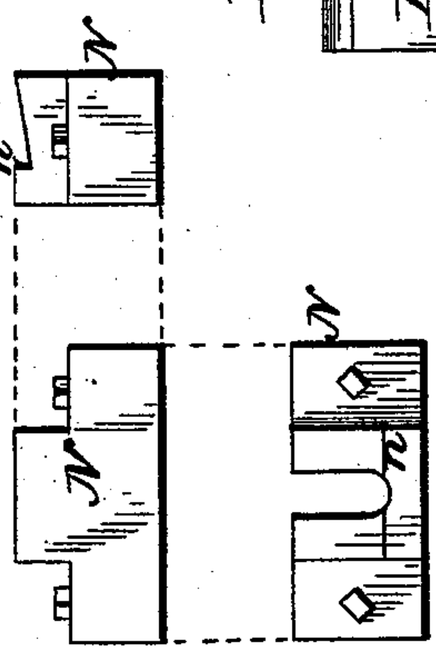

Fig. 10.

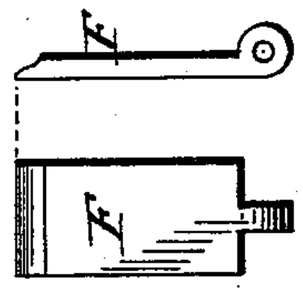

Fig. 5.

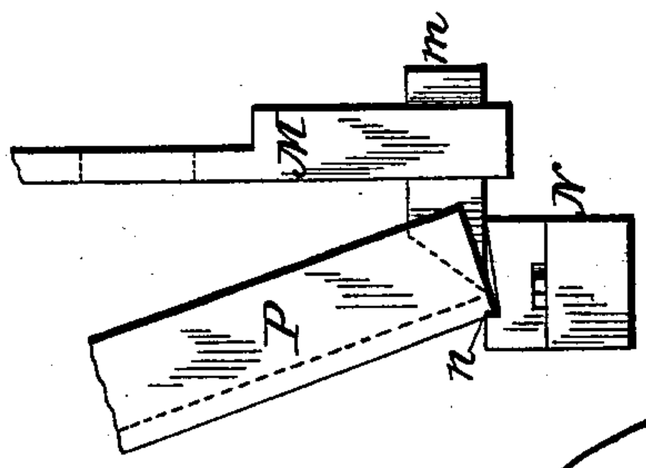

Fig. 6

Fig. 3

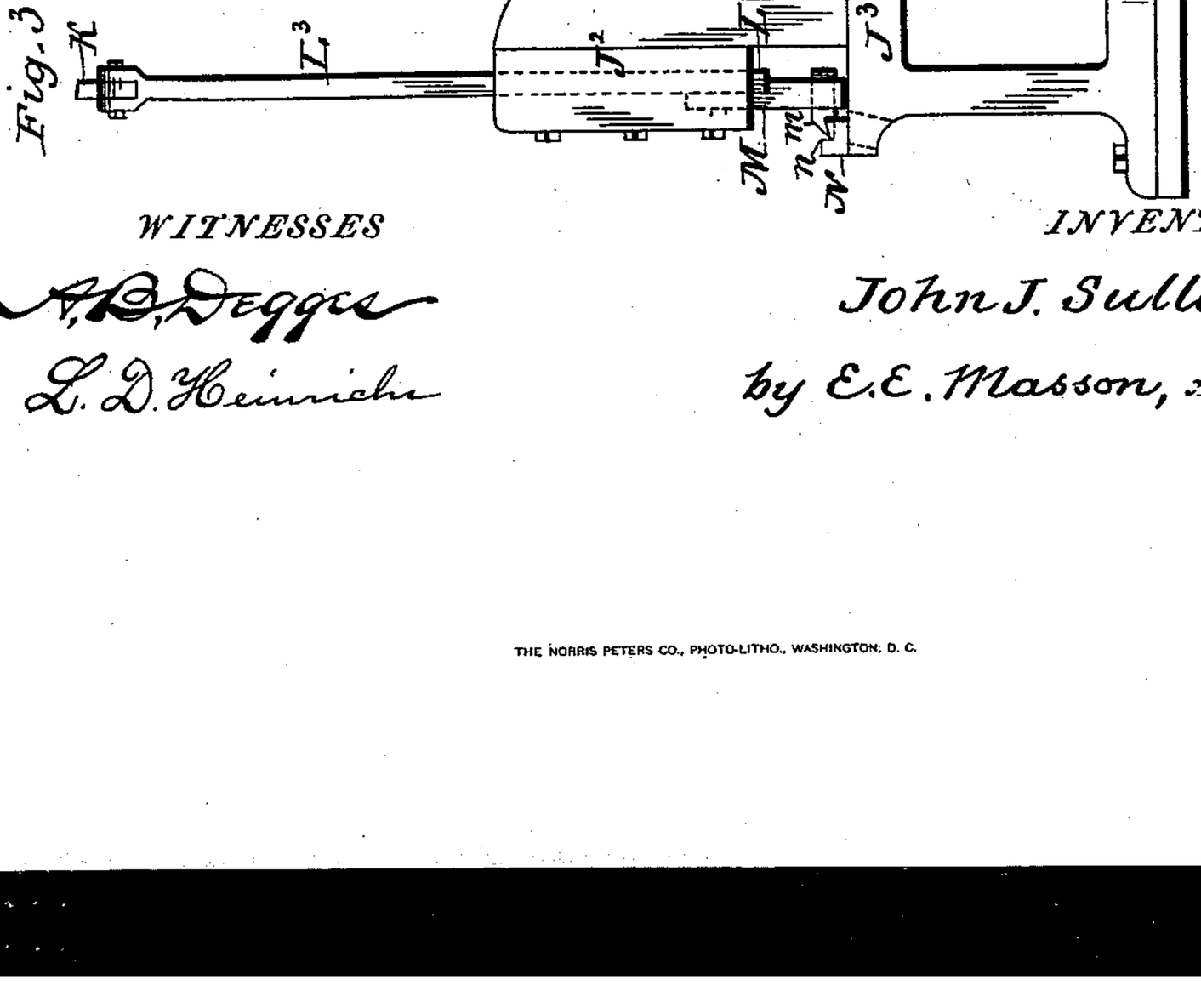

Fig. 4.

WITNESSES

A. D. Deggs

L. D. Heinrichs

INVENTOR

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UNITED STATES PATENT OFFICE.

JOHN J. SULLIVAN, OF TROY, NEW YORK.

PUNCHING AND SHEARING MACHINE.

SPECIFICATION forming part of Letters Patent No. 539,493, dated May 21, 1895.

Application filed February 18, 1895. Serial No. 538,756. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. SULLIVAN, a citizen of the United States, residing at Troy, in the county of Rensselaer, State of New York, have invented certain new and useful Improvements in Punching and Shearing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The objects of my improvement are to produce a combined punching and shearing machine mainly intended for use in punching two slot holes at the same time in the rounded edge of fish-plates, and in which said fish-plate is so retained as to prevent it from tipping up while being punched, and thereby preventing breaking the punches or damaging the fish plate, and consequently causing a great saving in expense. Another object is to provide the machine with means for removing, without any material increase of power, the burr generally found on the ends of the fish plates that have been sawed off in certain lengths while hot, said burr otherwise preventing a proper fit of the inner side of the fish plate against the bottom flange of railroad rails. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the punch side of the machine constructed in accordance with my invention. Fig. 2 is a front view of the machine, showing both the punching and shearing parts thereof. Fig. 3 is a side view of the shearing or burring part of the machine. Fig. 4 represents in side view and also in perspective railroad-rails having fish-plates attached thereto, the rounded edge of which is punched and the burrs removed from their ends with a machine constructed in accordance with my invention. Fig. 5 is a side view of a portion of a fish-plate, its support, and the burring-knife on a larger scale. Fig. 6 is a top view of the burring-knife with its outer end received in the groove of a fish-plate. Fig. 7 represents in front, in side, and in top view the knife-die and support for the fish-plate. Fig. 8 is a side view of one of the punches, its die supporting a fish-plate, the slide-clamp for said fish-plate, and the crank-arm pivoted to one end of said slide-clamp. Fig. 9 represents in front and side view the crank-arm of the slide-clamp. Fig. 10 represents a bottom view, and also a side view, of the slide-clamp. Fig. 11 is a side view of one of the punches, its die, and its stripper. Fig. 12 is a front view of one of the punches and its die. Fig. 13 is a top view of the stripper. Fig. 14 represents in end view, top view, and front view the plate used to guide the slide-clamps on top of the anvil of the machine.

In said drawings A represents the frame of the punching machine having a head A^2 and the work supporting anvil A^3. The upper portion of the frame A has two pillars formed thereon that carry the bearings for the driving shaft B. Said shaft carries about the middle of its length the driving pulley *b* and upon its rear end the pinion b^2 that meshes with a gear wheel C mounted upon the punch operating shaft *c*, the latter carrying on its front end an eccentric or other suitable well known means to vertically reciprocate in the head A^2 the slide box D, to which the punch holder D^2 is suitably secured. Said holder D^2 carries at a predetermined distance apart, two slotting punches E having preferably the form shown in Figs. 8 and 11. On top of the anvil A^3 are secured the punch-dies *e* and the punch stripper plates e^2. The upper portion of each punch-die is shaped to not only support the bottom of the fish plate P, but to present on its front side a bearing shoulder e^3 for the folded round edge *p* of said fish-plate to rest against.

The means employed to firmly retain the fish plate against the shoulder e^3 of each punch-die constitute one of the features of my invention. Said means consist of two horizontal clamping plates F, adapted to slide upon the top of the anvil A^3, being guided in grooves *h* formed in the under side of the plate H, that is secured on top of said anvil. The front end of the clamping plates F is undercut to rest upon the bottom web of the fish-plate, and at the same time force it toward the shoulder e^3 of the punch-die. The rear end of each clamping plate is pivoted to the upper end of an arm G that has its lower end attached to a horizontal shaft G^2, that is mounted in bearings secured to the front of the anvil. One end of said shaft has a pendent arm G^3 that has pivoted to its lower end, one end of a substantially horizontal rod G^4, that is guided in

bearings secured to the side of the anvil. The rear end or head of the rod G^4 extends in the path of a semi-annular cam *i* that is secured to, and projects from the inner face of the gear wheel C, to force the clamp-plates against the fish plate and retains it in position while being slotted, after which the cam *i* leaves the head of the rod G^4, and the coiled spring *g* upon said rod forces it back toward the wheel C and releases the clamp-plates F from engagement with the fish plate. For this purpose one end of the coil spring *g* rests against one of the bearings of the rod G^4 while the other end presses against a collar g^2 secured upon said rod.

To remove the burrs from the ends of the fish plates, during the alternating ascending motion of the punches, so as not to materially increase the expenditure of power in removing them, the frame J of the burr-removing portion of the machine is bolted upon the base plate A^4 of the punching machine alongside of the latter. Said frame J has a head J^2 within which is placed a slide-box L to the bottom of which are secured the knife holders M that carry the knives *m*. The slide box L has projecting centrally from its top a stem L^3, and the slide box D of the punching machine has projecting from its top a similar stem D^3. A walking-beam lever K has one of its ends pivoted to each of these stems and its central portion is pivoted to the vertical arm of a bracket A^5 that is secured to one side of the head A^2. The pivot-pin at the upper end of each stem D^3, L^3, is received in a slotted pivot hole to give allowance for the short arc of a circle traveled by the ends of the lever K.

The frame J has an anvil J^3 to the top of which is secured the knife-die N. It has centrally a vertical groove for the passage of the knife and its top is inwardly beveled and provided with a shoulder *n* to constitute an abutment for the fish plate to rest against and receive the thrust of the knife, by which means all strains are removed from the operator's arms and hands.

Having now fully described my invention, I claim—

1. In combination with the frame of a punching machine, its punches and the dies thereof having a shoulder e^3, the clamp-plates F, arms pivoted to said plates, a sliding rod pivoted to one of said arms, and a cam having its path opposite one end of said rod substantially as described.

2. In combination with the frame of a punching machine, its punches, and the dies thereof having a shoulder e^3, a guide-plate secured to said frame, clamp plates F passing under said guide plates, arms pivoted to said clamp plates, a sliding rod pivoted to one of said arms, a spring upon said rod, and a cam having its path opposite one end of said rod substantially as described.

3. In combination with the frame of a burr-removing machine, its vertical slide, a knife-holder secured to said slide, a knife carried by said holder and projecting laterally therefrom and a knife-die vertically grooved and having its top inwardly beveled and provided with a shoulder *n* substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN J. SULLIVAN.

Witnesses:
MICHAEL MAHONY,
JAMES O'NEIL.