No. 871,739. PATENTED NOV. 19, 1907.

E. SOUTHWORTH.

PUNCHING MACHINE.

APPLICATION FILED JUNE 17, 1907.

Fig. 1.

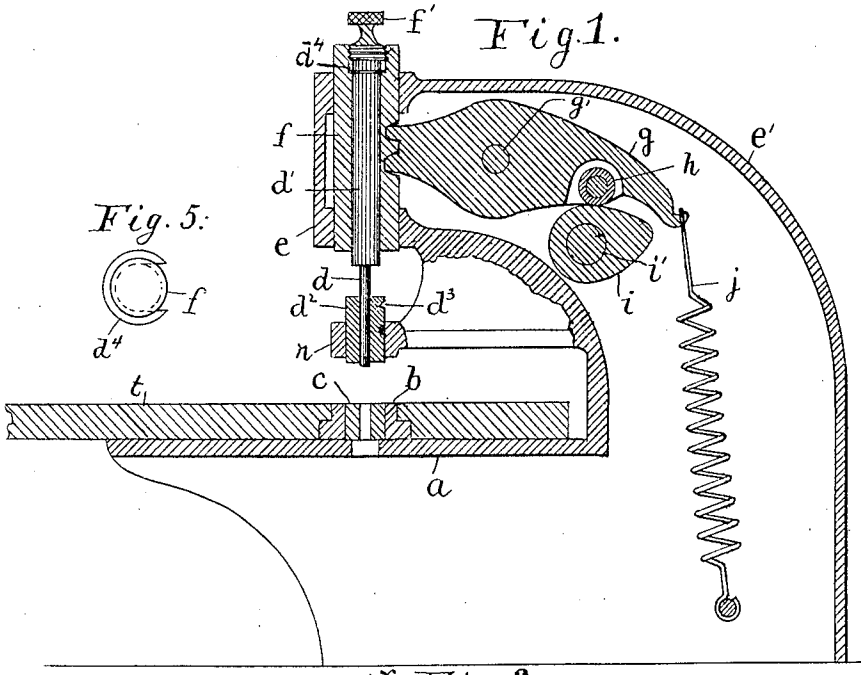


Fig. 5.

Fig. 2.

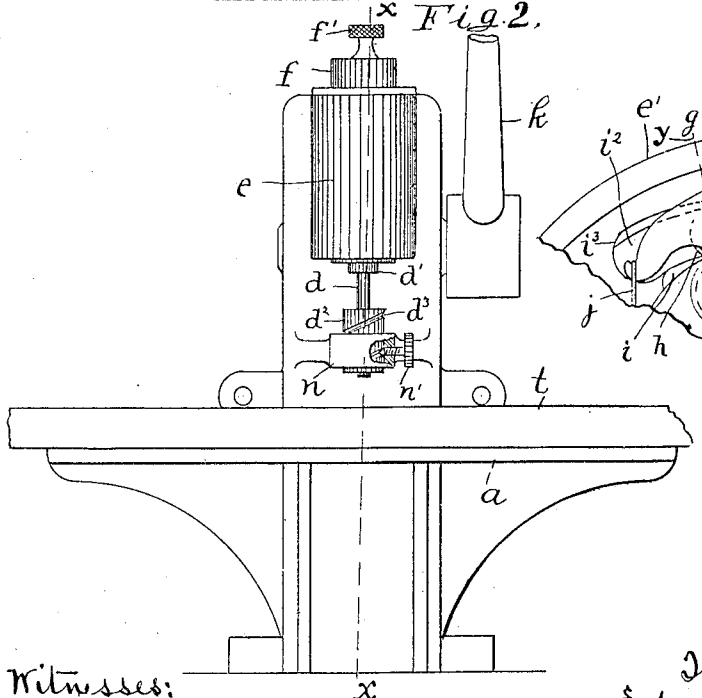


Fig. 3

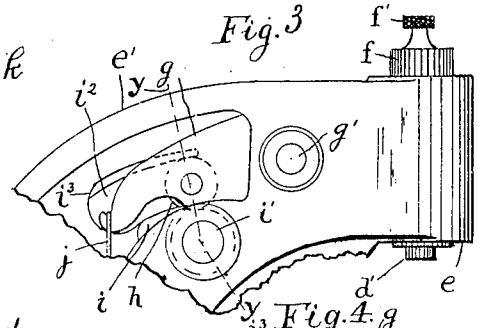
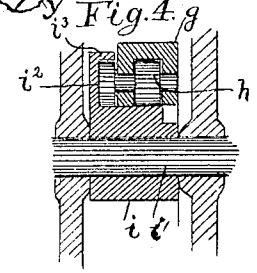


Fig. 4.



Witnesses:
Benj. G. Stard
Eleanor W. Dennis.

Inventor:
Edward Southworth
by S. W. Bates
Atty.

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWARD SOUTHWORTH, OF PORTLAND, MAINE.

PUNCHING-MACHINE.

No. 871,739. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed June 17, 1907. Serial No. 379,361.

To all whom it may concern:

Be it known that I, EDWARD SOUTHWORTH, a citizen of the United States of America, and resident of Portland, county of Cumberland, State of Maine, have invented certain new and useful Improvements in Punching-Machines, of which the following is a specification.

My invention relates to a punching machine and particularly to a punching machine for the use of printers and others and designed to be used for punching holes in paper.

The object of the invention is to so arrange the parts that the punch, die and stripper may be quickly and readily changed for punching different sizes of holes.

A further object of the invention is to so construct the stripper that it may be readily inserted in place and quickly and accurately adjusted as to its vertical position.

A further object of the invention is to provide a compact and powerful machine capable of being operated by hand as well as by foot or power.

I carry out these objects by means of the punching machine hereinafter described and claimed.

I illustrate my invention by means of the accompanying drawings in which

Figure 1 is a section on the line $x\,x$ of Fig. 2. Fig. 2 is a front elevation, and Fig. 4 is a section on $y\,y$ of Fig. 3. Fig. 3 is a side elevation of the head of the machine. Fig. 5 is a top view of the shank.

In the drawing, a represents the bed plate, b the bolster, c the die, t the table, e the head and e' the curved neck of the machine.

The punch member is carried in a vertically movable punch holder f, cylindrical in form, having a vertical cylindrical opening in which fits the cylindrical shank d' on the lower end of which is the punch proper d. The cylindrical opening containing the shank is enlarged at the upper end of the punch holder and a supporting ring d^4 fits in a groove in the upper end of the shank and in said recess. The ring d^4 has a section cut out so that it may be slipped laterally out of the groove of the shank. The shank and its punch are held down by means of a plug f' which engages a screw thread cut in the upper end of the recess.

The stripper is composed of a short cylinder d^2 which is held in an arm n which extends horizontally out from the neck of the machine between the head and the table. It is adjusted vertically in a cylindrical recess and is held in position and adjusted by means of a set screw n' which engages a spiral groove d^3 formed in the outer surface of the stripper. This groove acts as a screw thread and by turning the stripper it may be moved up and down and adjusted with great accuracy. The space between the lower end of the punch holder and the arm n is such that the stripper may be slipped out above the arm n when it is to be changed.

The punch holder is moved up and down by means of a lever g pivoted on a shaft g' and connected with the punch holder, as here shown, by gear teeth formed in both members. The rear end of the lever is provided with a cam roll h which is acted on by a cam i mounted on a shaft i'. The lever is pressed downward in contact with the cam and all lost motion prevented by means of a spring j which hooks over a projection on the rear end of the lever.

In order to withdraw the punch when there is relatively great resistance to its upward movement as when it is punching considerable thickness of paper, I provide a groove i^2 in the cam in which groove fits one end of the cam roll h so that the movement of the lever is positive in both directions, the spring acting in conjunction with the cam groove to keep the lever and cam always in contact.

The machine may be operated by power but it is specially designed to be operated by hand and for this purpose I secure to the cam shaft i' a suitable handle k.

It will be seen that the interchangeable parts, namely, the die, stripper and punch may all be quickly removed by simply removing the plug f', loosening the set screw n' and slipping the punch, the stripper and the die upward.

The cam and the lever give a powerful purchase and enable the punch to cut through a considerable thickness of paper.

I claim;—

1. In a punching machine the combination of a die and punch, a cylindrical stripper for said punch having on its outside surface a spiral groove, an arm having a vertical recess through which said stripper passes and an internal projection in said recess for engaging said spiral groove.

2. In a punching machine the combination of a die and punch, a cylindrical stripper for

said punch having on its outside surface a spiral groove, an arm having a vertical recess through which said stripper passes and a set screw in said arm having its end adapted to engage the said groove.

3. In a punching machine, the combination of a vertical moving punch holder having a cylindrical opening extending downward from the upper end a punch shank adapted to slip into said opening from the upper end, a punch proper on the lower end of said punch shank a plug adapted to fit in the upper end of said cylindrical opening to hold the punch shank therein and a die adapted to coöperate with the punch proper.

Signed by me at Portland, this 12th day of June, A. D. 1907.

EDWARD SOUTHWORTH.

Witnesses:
S. W. BATES,
ELEANOR W. DENNIS.