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H. PELS

METAL CUTTING MACHINE

Filed Nov. 8, 1924

Fig. 1.

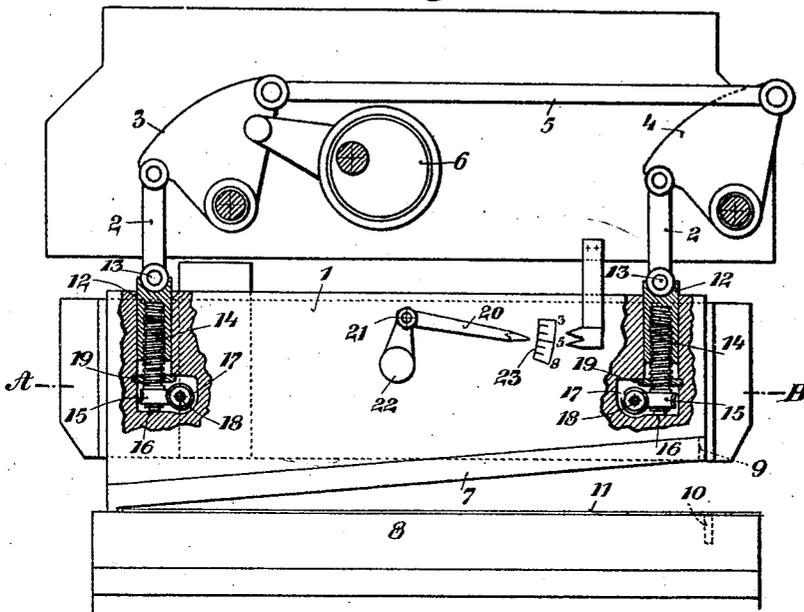


Fig. 2.

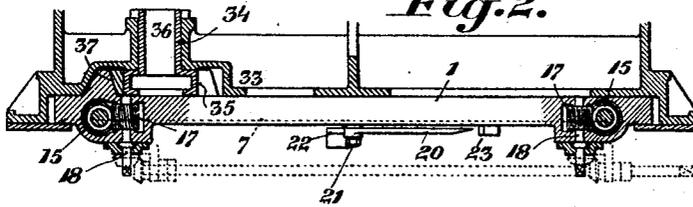
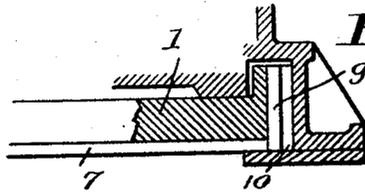


Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY PELS, OF BERLIN-CHARLOTTENBURG, GERMANY.

METAL-CUTTING MACHINE.

Application filed November 8, 1924. Serial No. 748,789.

To all whom it may concern:

Be it known that I, HENRY PELS, a citizen of the German Republic, residing at Berlin-Charlottenburg, in the county of Brandenburg and State of Prussia, Germany, have invented certain new and useful Improvements in Metal-Cutting Machines, of which the following is a specification.

This invention relates to a sheet shearing machine for cutting, edge planing and splitting plates of sheet metal.

The invention has for its object to make variable the angle of inclination of the cutting edge of the upper knife with regard to the lower knife by inclining the upper knife holder.

Sheet shearing machines which serve for cutting, edge planing and splitting of plates of sheet metal, and comprise an upper knife and a lower knife each with one transverse knife, have become known. In these machines of known type the cutting, edge planing and splitting of the work is effected by parallel displacement of the upper knife holder so that the upper knife and its transverse knife may be brought to different positions of height with regard to the lower knife and its transverse knife.

Sheet shearing machines which cut the cut off strip at every stroke of the shears by means of transverse knives have been used for the splitting of plates by giving to the shears a double stroke in order to put out of work the transverse knife or the transverse knives, this being effected in the following manner:

While the greater of the two strokes moves the movable knife so far towards the stationary knife that the transverse knives enter into operation the shorter stroke moves the movable knife not so far down but moves it up again before the transverse knife touches the plate. For each stroke two eccentrics and two connecting rods are provided.

In these shearing machines of known type the splitting is rendered possible by the fact that the upper knife with the transverse knife is brought into different positions of height and that the lower transverse knife is adjustable in vertical direction.

According to this invention this object is attained by enabling the upper knife to be

brought into different inclined positions with regard to the stationary lower knife, the transverse knife mounted on the upper knife co-operating with the transverse knife of the lower knife or not according to the inclination of the upper knife. This possibility to vary the angle of inclination of the upper knife with regard to the lower knife presents essential advantages.

At the cutting of large plates of sheet metal of standard thickness the upper knife is adjusted at the normal angle of inclination, however in such a manner, that the transverse knife of the upper knife does not enter into action. In this case the greatest possible cutting length is obtained at the cutting (splitting) of plates of sheet metal which requires a repeated re-pushing. If strips have to be cut from long plates, viz, if these plates are being edge planed, the angle of inclination of the upper knife is reduced for such an amount that the upper knife cuts also. It severs at every cut the cut off strip so that the feeding of the plate without the strip is ensured. For cutting plates of greater than the standard thickness the one end of the upper knife is raised or the angle of inclination of the upper knife is increased, the cutting length being of course shortened.

The variable inclination of the upper knife with regard to the lower knife is preferably obtained by making variable the length of the pressing rods of the upper knife holder which are moved up and down by the rockers of the upper arm. Either both pressing rods at the two ends of the upper knife holder may be made variable in length or only one of the same, preferably that which is situated at the end of the upper knife in which the transverse knife of the upper knife holder is mounted. The same object might be attained by varying the amplitude of the oscillations of the rockers with regard to one another. The inclination given to the upper knife can be indicated by a hand with counterweight playing on a scale of the upper knife holder.

The invention is illustrated in the accompanying drawings in which:—

Fig. 1 shows, partly in elevation, partly in section a plate shearing machine of this type in which the variability of the inclina-

tion of the upper knife is obtained by the lengthening or shortening of the pressure rods.

Fig. 2 is a horizontal section on line 2—2 of Fig. 1 and

Figure 3, an enlarged detail fragmentary sectional view showing the position of the transverse knives 9 and 10 at right angles to the dotted line indication thereof in Fig. 1.

The upper knife holder 1 of the plate shearing machine is moved up and down through the intermediary of the pressure rods 2 and of the rocker arms 3, 4. The rocker arms are connected the one with the other by a rod 5 and oscillated by means of an eccentric 6. The upper knife is designated 7, the stationary lower knife 8, the upper transverse knife 9 and the lower transverse knife 10. 11 is the plate of sheet metal to be cut. In order to vary the inclination of the upper knife with regard to the lower knife the length of the pressure rods 2 can be altered. With this object in view the pressure rods 2 have internally threaded sleeves 12 hingedly mounted on the pressure rods 2 by studs 13. Screws 14 adapted to be turned in the one or other direction by a worm gear are screwed into these sleeves 12. The screws 14 have for instance worm wheels 15 mounted in convenient bearings 16. The worm 17 of a shaft 18 adapted to be revolved by means of a crank handle mesh with these worm wheels. Counter nuts 19 prevent the accidental turning of the screws 14.

As the adjusting devices for the pressure rods are arranged at both ends of the upper knife one of these devices or the two can be operated in order to alter the inclination of the upper knife. The two adjusting devices might also be coupled the one with the other so as to be operated simultaneously, the one end of the upper knife holder being raised when the other end is being lowered.

A hand 20 pivotally mounted on an axle 21 in the upper knife holder 1 and balanced by a counter weight 22 serves to indicate the angle of inclination of the upper knife with regard to the lower knife or the cutting angle of the two knives. The point of hand 20 moves over a scale 23 marked on the upper knife holder. When the position of the upper knife holder is altered the hand 20 remaining in its position indicates the angle of inclination of the upper knife on the scale 23.

Claims:

1. A sheet shearing machine of the type described comprising in combination a stationary lower knife, an upper knife holder movable along a straight line, two rockers, a pressure rod for each rocker designed to act upon said upper knife holder, screw bolts rotatably mounted in said upper knife holder, internally threaded sleeves on said pressure rods into which said screw bolts are screwed, and worm wheel gears acting upon said screw bolts for rotating the same for raising and lowering the corresponding rods of said upper knife holder.

2. A sheet shearing machine of the type described comprising in combination a stationary lower knife, an upper knife holder movable along a straight line, two rockers, a pressure rod for each rocker designed to act upon said upper knife holder, screw bolts rotatably mounted in said upper knife holder, internally threaded sleeves on said pressure rods into which said screw bolts are screwed, worm wheel gears acting upon said screw bolts for rotating the same for raising and lowering the corresponding rods of said upper knife holder, intermediate gears and a connecting shaft coupling said worm wheel gears.

3. A sheet metal shearing machine comprising an upper knife movable solely in a vertical plane, a stationary lower knife, transverse knives mounted on the upper and lower knives for cutting, edge-planing and splitting plates of sheet metal, a holder for the upper knife, and pressure rods for supporting said holder, each said pressure rod comprising an internally threaded sleeve, and a screw-bolt rotatably mounted in said holder and engaging the thread of said sleeve, whereby the length of the said rods may be varied to alter the angle of inclination of said holder and the knife carried thereby.

4. A sheet metal shearing machine comprising an upper knife mounted for movement solely in a vertical plane, a holder for said upper knife, means for varying the inclination of the latter, a pointer pivotally mounted on said holder, a counterweight for said pointer, and a scale on said holder for indication thereon by the pointer of the degree of inclination of said holder and the knife carried by the latter.

In testimony whereof, I have signed my name to this specification at Berlin, Germany, this 13th day of October, 1924.

HENRY PELS,