

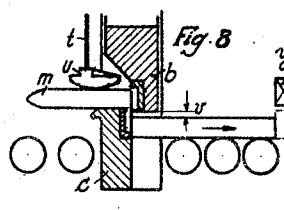
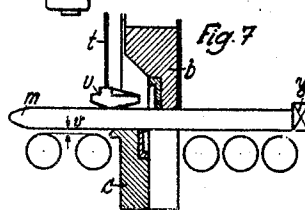
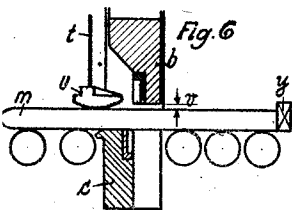
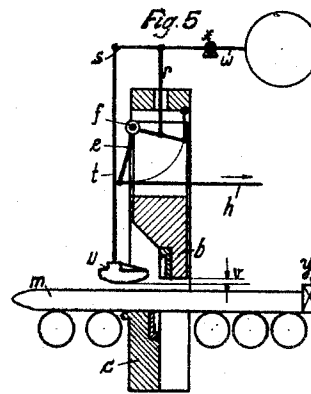
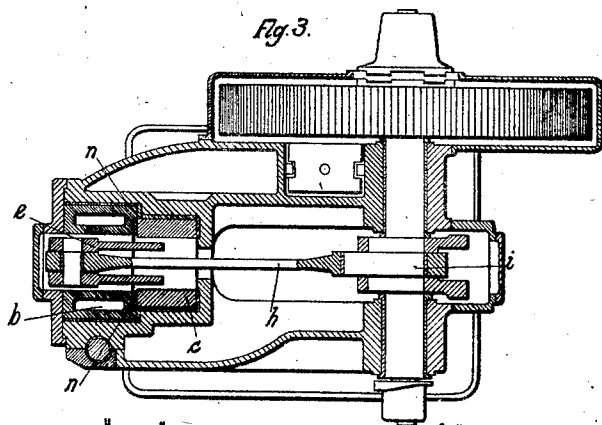
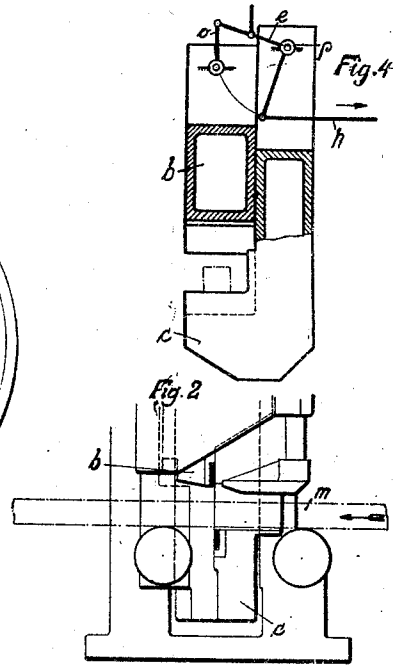
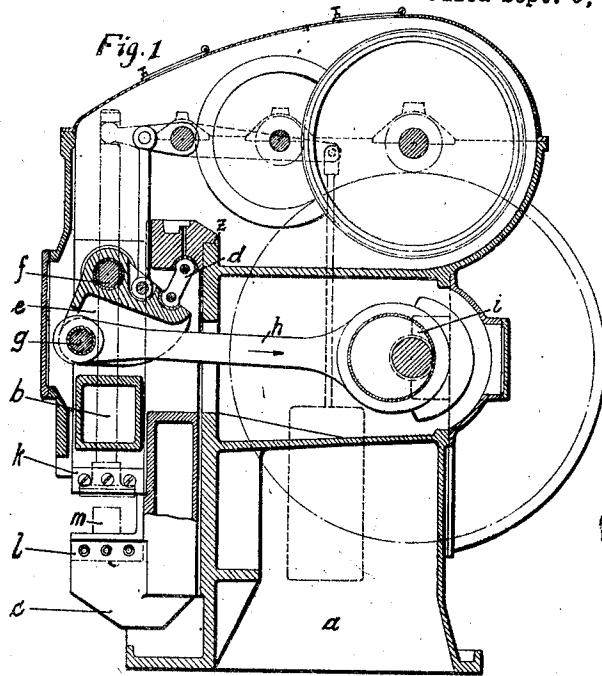
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C. SCHORN

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SHEARS WITH TWO MOVABLE BLADES

Filed Sept. 3, 1924



Carl Schorn
by C. P. Boppel
Attorney

UNITED STATES PATENT OFFICE.

CARL SCHORN, OF DUSSELDORF-RATH, GERMANY.

SHEARS WITH TWO MOVABLE BLADES.

Application filed September 3, 1924. Serial No. 735,689.

To all whom it may concern:

Be it known that I, CARL SCHORN, a citizen of Germany, residing at Dusseldorf-Rath, in the State of Prussia, Germany, have invented certain new and useful Improvements in Shears with Two Movable Blades; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in shears with two movable blades. The shears with two movable blades hitherto known, in which the slides are worked by motor power, have the drawback of a complicated driving gear.

The present invention relates to a new mechanically driven shearing machine, the driving gear of which is of very simple design. As per this invention, the two slides are actuated by a swinging lever, which in its swinging movement presses in opposite directions against both slides. According to the degree of resistance encountered by the slides, the pivotal axis of this lever will be now in the one, now in the other slide, i. e. always in the one that is at rest while the other one is being actuated by the swinging motion of the lever. This lever may be designed, for instance, as an angle lever connected with the driving gear, it will be supported in one of the slides and connected with the other slide in such a way that it may have its bearing or axis of rotation in this slide as well. For instance, the angle lever may be connected with the second slide by means of a link bar.

Owing to this design of the driving gear, the shears can be fitted with an efficient holding-down gear in a most simple manner. The shears hitherto known, could not be fitted with such a gear, unless a hydraulically operated holding-down gear had been provided; this however necessitates a second source of power, thus making the shears more complicated in design and operation. Mechanically operated shears have, so far mostly been provided with a simple holding-down beam, which had to be adjusted by hand against the blank to be cut, in order to obtain a useful effect. As in these shears the blank is clamped between the top slide and a fast support, it follows that it will only be released by the shears when the bottom blade has reached its lowest

position and the top blade has started its upward movement.

As per this invention, the shears are provided with an automatically operated holding-down gear, which by means of the swinging lever actuating the two slides is operated in such a way, that it will clamp the blank on to the bottom blade carrier in any position of the blades. Advantageously, the holding-down shoe is connected with the swinging lever by means of levers and spars carrying a counter-weight for balancing the holding-down gear and the slides. The holding-down shoe follows the motion of the slides and adapts itself automatically to the thickness of the blank. It is so arranged that as soon as it sits down on the blank, it will slightly project underneath the bottom edge of the top slide. Advantageously it is made adjustable in height by fastening it to a rod that can be adjusted in length.

Two designs of construction are shown in the accompanying drawing, wherein:

Fig. 1 is a vertical section through the shears showing the holding-down gear in dotted lines;

Fig. 2 is a front view of the blades,

Fig. 3 is a horizontal section through the shears,

Fig. 4 is a shearing machine in which the swinging lever is supported in the bottom slide,

Fig. 5 is a schematic view of a shearing machine fitted with a holding-down gear,

Fig. 6 shows the position of the holding-down shoe when clamping the blank, before the cutting operation,

Fig. 7 shows the beginning of the cut, and

Fig. 8 shows the position when the cut has been effected.

In the shears as per Figs. 1, 2 and 3 there are arranged in the frame or body *a* the top slide *b* with the blade *k* and the bottom slide *c* with the blade *l*. The bottom slide has the shape of a hook and is connected by means of an articulated piece *d* with an angle lever *e*, which, at the point *f*, is supported in the top slide *b*; the lever *e* is connected at the point *g* by means of a draw bar *h* with the driving eccentric *i*. When the draw bar *h* is being moved in the direction of the arrow, the angle lever *e* will have its point of rotation in the articulated piece *d*, because of the top slide being lighter than the bottom slide. Therefore, the top

slide will move downward until the top blade *k* rests on the blank *m* to be cut. Hereby increases the resistance which the slide offers to the lever and the angle lever *e* changes therefore its point of rotation by turning round the point *f*; consequently, the bottom slide now moves upwards thus effecting the cutting of the blank *m*.

When the draw bar *h* is being moved in the direction opposite to the arrow, the heavy bottom slide *c* will be moved downward first until it pushes against a stop *z*, after which the angle lever will cause the top slide *b* to move upward.

At the moment when the top blade *k* rests on the blank *m*, the top slide *b* will be firmly pressed against the supporting faces *n* of the body *a* in accordance with the shearing action which now takes place. Consequently, the top blade will exercise no pressure on the bottom slide *c* so as not to increase the shearing effort by high friction.

Instead of eccentrics, the draw bar can of course also be put in motion by any other suitable means such as hydraulic cylinders and the like.

As the body of the shears is only put to compressive stress and not to tensile stress or bending load, it can be made of a lighter design and therefore carried out more economically in spite of the heavy compressive stress to which it will be subjected.

In the shears as per Fig. 4, the angle lever *e* is supported at the point *p* in the bottom slide, whereas its free end is connected with the top slide *b* by means of the articulated piece *o*. Of course, the design of this may be carried out in different ways.

Figs. 5 to 8 show a shearing machine with two movable blades, fitted with an automatically operated holding-down device. The angle lever *e* is connected by means of a rod *r* with the lever *s*, the free end of which is in contact with the rod *t* extending to the holding-down shoe *u*. The axis *x* of the lever *s* is provided with a lever *w* for the counter-weight. The holding-down shoe *u* will be so adjusted that when resting on the blank *m* it will project beneath the bottom edge of the top slide *b*. Advantageously, the rod *t* is made adjustable in length in order to permit an adjustment of the holding-down shoe *u*.

The working operation will be as follows: When the top blade moves downward, the point *f*, in which the angle lever *e* is supported, will likewise descend; consequently, the lever *s* is swung down by the rod *r* and the holding-down shoe descends with the top slide. The blank will be clamped between the holding-down shoe *u* and the bottom slide *c*. When the point of rotation of the angle lever is now changed and the bottom slide *c* is lifted, the holding-down shoe *u* moves upwards with the latter, as the point

of rotation of the angle lever is now at *f*, and the lever *s*, carrying the rod *t*, is pulled upwards. The blank *m* remains therefore in a clamped position in exactly the same manner even during the cutting process.

Figs. 6 and 7 show the position of the holding-down shoe before and after the cut. In its upward movement, the bottom slide lifts at first the blank by the measurement *v*, by which dimension the holding-down shoe projects beneath the bottom edge of the top slide, and the cutting operation then commences.

As soon as the cut has been effected, the piece cut off can be readily carried off by the roller table when the gage *y* is in its raised position. The blank at the left hand of the blades, i. e. in front of the shears is however still clamped-in. The bottom blade now moves downward and with it the holding-down shoe, which immediately afterwards returns in its original position and releases the blank in front of the shear. In its descent, the holding-down shoe straightens the bent end of the blank and the blank then passes through the shears advanced by the roller table,—the cut piece having been carried off before by the roller table, as mentioned heretofore,—whereas in the shears hitherto known, the cut piece at the rear of the shears will only be released at the moment when the blank is released and carried off by the roller table at the same time when the blank is being advanced, which means a considerable loss of time that is entirely avoided in my design.

I claim:

1. A shearing machine having a pair of blades, a linkage device interconnecting the blades, and an operating member connected intermediate the linkage device for moving said blades toward and from each other, said linkage device being adapted to initially yield at either end whereby when one of said blades engages the work ahead of the engagement of the other blade, the first blade may be maintained at rest during the closing movement of the other blade and said blades may then be uniformly engaged with the work.

2. In a shearing machine, a pair of cutting blades, one of said blades being heavier than the other, a linkage device interconnecting said blades, and an operating member connected intermediately to the linkage device for actuating the same and drawing said blades together, the heavier blade being adapted to initially anchor one end of the linkage device and provide a pivotal axis therefor while advancing the lighter blade, said heavier blade being adapted to be moved into operation subsequent to the resting of the lighter blade against the work.

3. A shearing machine having a pair of blades with one blade heavier than the other

blade, a linkage device interconnecting the blades, a presser foot connected to said linkage device intermediate the pivotal connections thereof with the blades, and an operating member pivotally connected to an intermediate portion of the linkage device for actuating the same to primarily advance the

presser foot and one of said blades into engagement with the work and to subsequently draw the opposite blade into shearing position against the work. 10

In testimony whereof I hereunto affix my signature.

CARL SCHORN.