Oct. 27, 1925.

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A. FRIEDERICI

INGOT AND BAR SHEARS

Filed March 25, 1925

Fig. 1.

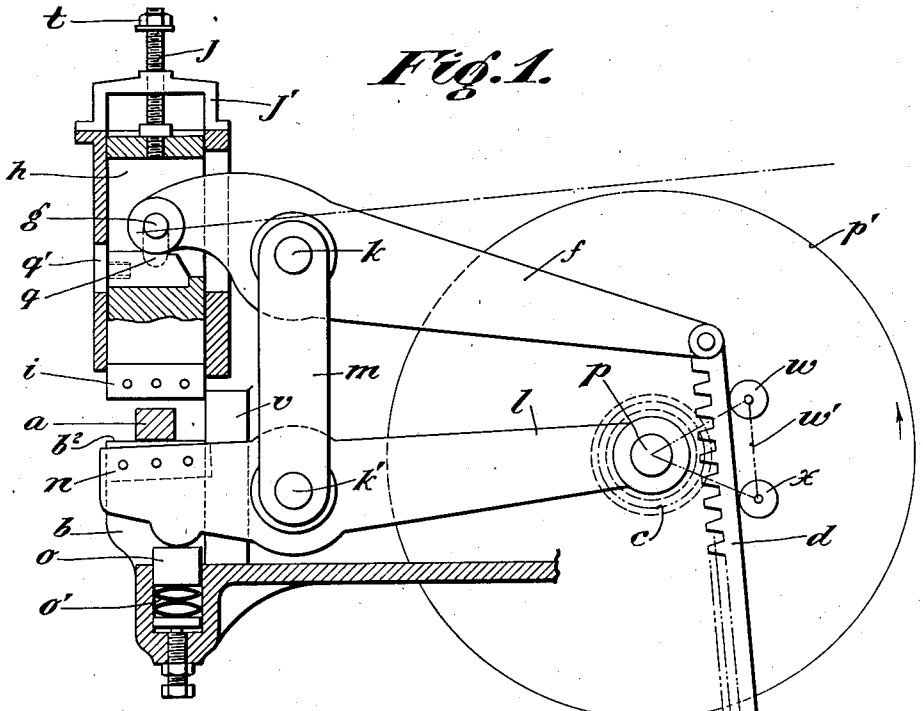
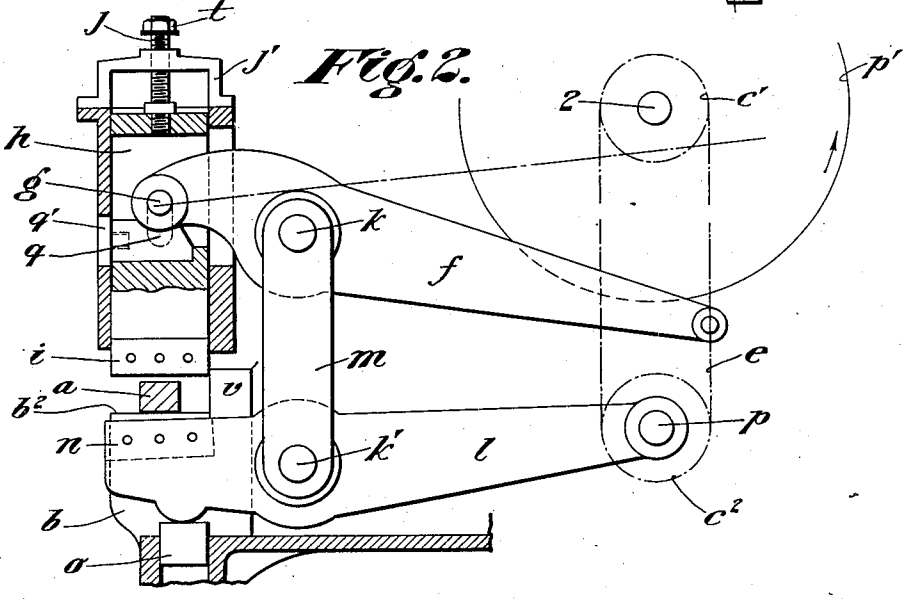


Fig. 2.



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UNITED STATES PATENT OFFICE.

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INGOT AND BAR SHEARS.

Application filed March 25, 1925. Serial No. 18,222.

To all whom it may concern:

Be it known that I, AUGUST FRIEDERICI, a citizen of the Republic of Germany, and resident of Dusseldorf, Germany, have invented certain new and useful Improvements in Ingot and Bar Shears, of which the following is a specification.

This invention relates to shears and while not limited thereto, relates more particularly to billet and bar shears, and has for one of its objects the provision of shears of this class having a pair of blades or jaws, the lower one of which is adapted to move upwardly in the cutting operation.

Another object is to provide an improved form of shear of this class in which the overlap of the shear blades will be automatically adjusted in accordance with the size of the work-piece being sheared.

A further object is to provide a shear of the class described, having its jaws open on three sides, so as to facilitate the handling of the sheared metal without subjecting the shear frame to any tensile or traction efforts in a vertical direction.

A still further object is to provide a shear having the novel design, construction, and combination of parts hereinafter described and illustrated in the accompanying drawings—

In the drawings—

Figure 1 is a sectional side elevation of a shear embodying my invention.

Figure 2 is a similar elevation of a slightly modified form of shear.

Referring more particularly to the drawings, the letter *b* designates the fixed frame of the shear, *f* and *l* designate the shear levers, and *p* designates the main drive shaft which is mounted in fixed bearings (not shown) and carries a main drive member *p'* and a pinion *c*.

The upper portion of the frame *b* is of hollow construction to provide a guide for the reciprocating upper blade carrier *h*. The carrier *h* is adapted to be reciprocated in the guide by the floating lever *f*, which has its forward end projecting through an opening in the guide and into a slot in the blade carrier *h* where it is pivotally connected at *g*, to a pressure block *q* secured in the blade holder *h*. A blade *i* is secured to the lower end of the holder *h*.

The lever *f* has its rear end pivotally secured to the upper end of the rack *d* which is meshed with the pinion *c* on the drive shaft *p*. The rack *d* is guided by guide rollers *w* and *x*, mounted in a frame *w'* which is pivotally mounted on the shaft *p*.

The frame *b* has a depression below the lower blade in which is mounted a spring *o'* and block *o*, which block serves as a rest for the lower blade or carrier lever *l*. The lever *l* carries the lower blade *n* and moves it up against the material to be cut.

The levers *f* and *l* are connected together adjacent their forward ends by a link *m* which is pivotally connected at *k* and *k'* to the respective levers.

In Figure 2 the drive member *p'* is mounted on a shaft 2 which also carries a sprocket *c'* which sprocket is connected to a second sprocket c^2 on the shaft *p* by a chain *e*. The chain *e* and sprocket c^2 being substituted for the rack *d* and pinion *c* of the construction of Figure 1. In the construction of Figure 2 the lever *f* is secured to the chain *e*.

In operation the work-piece *a* is moved onto the work supporting portion b^2 of the fixed frame *b*, and the drive member is then rotated in the direction of the arrow, thus rotating the shaft *p* and pinion *c*, and moving the rack *d* vertically. The vertical movement of the rack *d* will lift the rear end of the shear lever *f* and cause it to act as a double arm lever with a fulcrum at *k*. The movement of the lever *f* about the fulcrum *k* will move the upper blade *i* down onto the work-piece at which time its downward movement will be arrested and the fulcrum point of the lever *f* will change from the point *k* to point *g*. Continued upward movement of the rack *d* will cause the lever *f* to move about the fulcrum point *g* and thereby lift the lower shear lever *l* by means of the link connection *m*, and causing the lever *l* to rotate about the fixed shaft *p* until the blade *n* on the forward end of the lever *l* cuts through the work-piece *a*.

As will be readily understood from the drawings, the lever *l* carrying the lower blade *n* has a smaller leverage than the lever *f* carrying the top blade *i* when the fulcrum is about the point *g*, and the thicker the work-piece the higher the fulcrum point *g* will be, and the greater the leverage of the lever *f*. It will also be understood that the greater the leverage of lever *f*, the greater the overlap of the blades will be and, therefore, the overlap of the

blades will vary proportionately with the thickness of the work-pieces.

After the work-piece has been sheared, the drive member p' is rotated in the reverse direction to return the parts to normal position, or if desired suitable springs, cylinders, counterweights, or the like may be used to return the parts to normal position, as is well known in the art.

The operation of the shear of Figure 2 is the same as described above, except that the chain e moves the lever f instead of the rack d.

When it is not desired to use the shears, that is, when work-pieces are to be passed without shearing, the upper shear blade is moved up out of the way so as to facilitate the handling of such pieces by disconnecting the lever f from the block q and removing the block q through the opening q' by screwing a suitable bolt or tool in the threaded opening r in the block. After the block q is removed, the nut t is screwed down on the threaded rod J until it bears against the yoke J' and lifts the blade holder h and blade i upwardly within the frame.

While I have shown and described specific embodiments of my invention, it will be understood that I do not wish to be limited thereto, since various modifications may be made without departing from the scope of my invention as defined in the appended claims.

I claim—

1. In an upcut ingot and bar shear, a stationary work support, upper and lower shear levers, blades secured to the forward ends of said levers, said upper lever being pivotally connected to said upper blade, a link connecting each of said levers adjacent their forward ends, a power shaft, a pinion on said shaft, and a rack in mesh with said pinion and movable substantially vertically thereby, said lower shear lever being materially shorter than said upper shear lever and having its rear end pivotally connected to said power shaft, said upper lever having its rear end pivotally connected to the upper end of said rack, whereby an upward movement of said rack will first rock said upper lever about its connection with said link so as to force its forward end downwardly until the upper blade engages the material to be sheared, and continued upward movement of said rack will cause said upper lever to fulcrum at its pivotal connection with said upper blade and to lift said link connection and said lower lever so as to force said lower lever to shear the material being sheared.

2. An ingot and bar shear of the upcut type comprising a stationary work support, upper and lower shear levers, upper and lower shear blades secured to the forward ends of said levers, said upper lever being pivotally connected to said upper blade, a link connecting each of said levers adjacent their forward ends, said lower shear lever being materially shorter than said upper shear lever and having its rear end mounted for pivotal movement about a fixed pivot, means for moving the rear end of said upper lever upwardly whereby at the start of said upward movement said upper lever will be rocked about its connection with said link so as to force its forward end downwardly until the upper blade engages the material to be cut, and continued upward movement of the rear end of said upper lever will cause said upper lever to fulcrum at its pivotal connection with said upper blade and to lift said link connection and said lower lever to shear the material being cut.

3. An ingot and bar shear of the upcut type comprising a stationary work support, upper and lower spaced shear levers, an upper shear blade pivotally connected to the forward end of said upper shear lever, a lower shear blade rigidly connected to said lower shear lever, a link extending between and pivotally connected to each of said shear levers adjacent their forward ends, said lower shear lever having its rear end mounted for pivotal movement about a fixed pivot, and means for moving the rear end of said upper shear lever upwardly whereby at the start of said upward movement said upper lever will be rocked about its connection with said link so as to force its forward end downwardly until the upper blade engages the material to be cut, and continued upward movement of the rear end of said upper lever will cause said upper lever to fulcrum at its pivotal connection with said upper blade to lift said link connection and said lower lever and shear blade to shear the material being cut.

In testimony whereof I have hereunto set my hand.

AUGUST FRIEDERICI.