

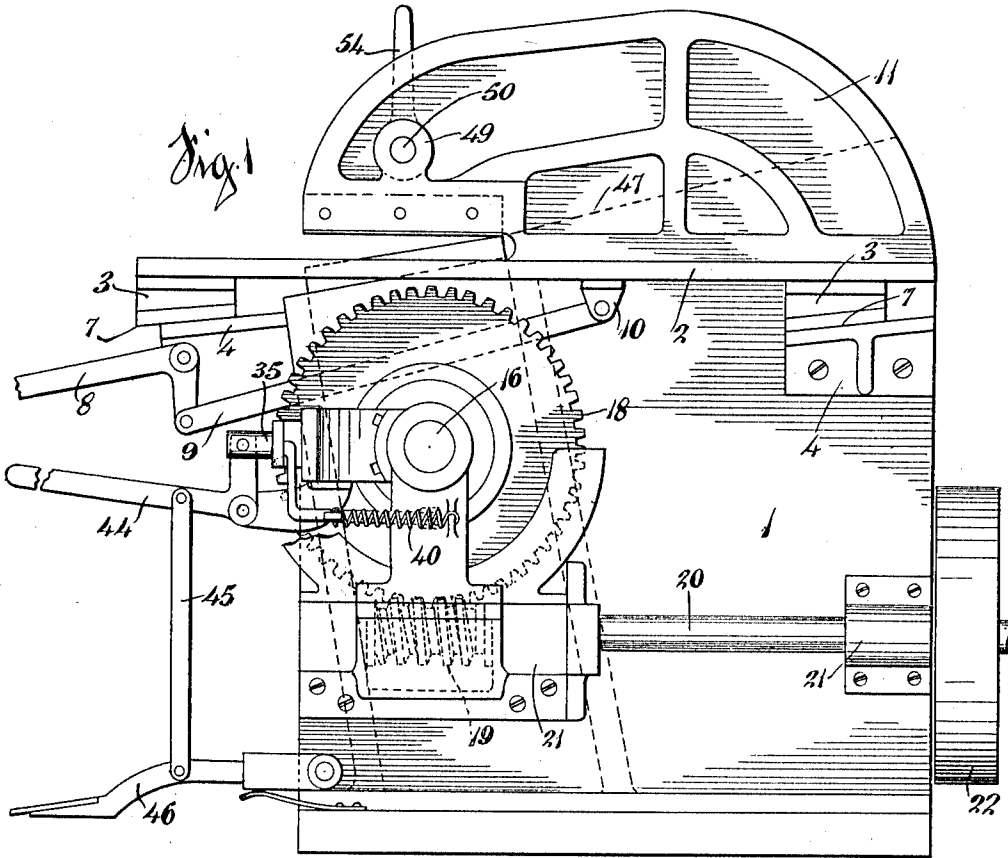
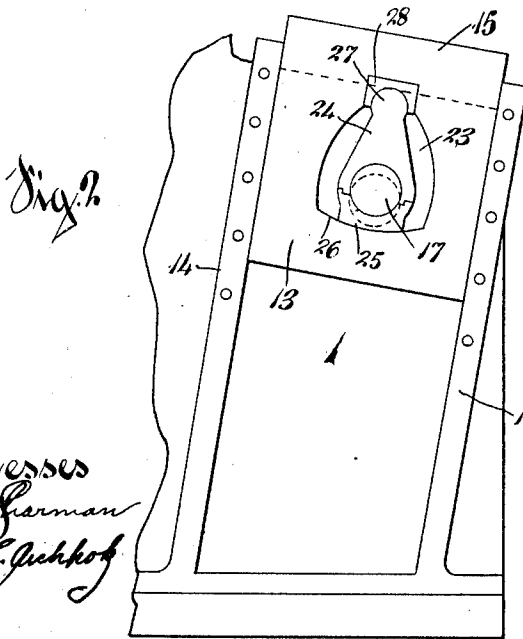
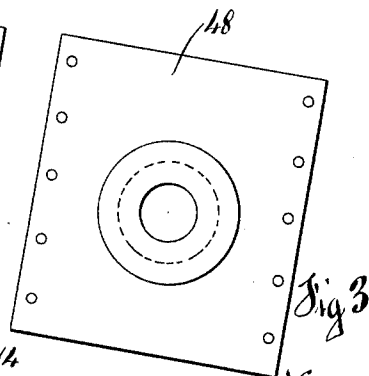
C. F. HEINSS.
METAL SHEARS.

APPLICATION FILED NOV. 18, 1912.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

1,066,612.



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2 SHEETS—SHEET 2.

Fig. 4

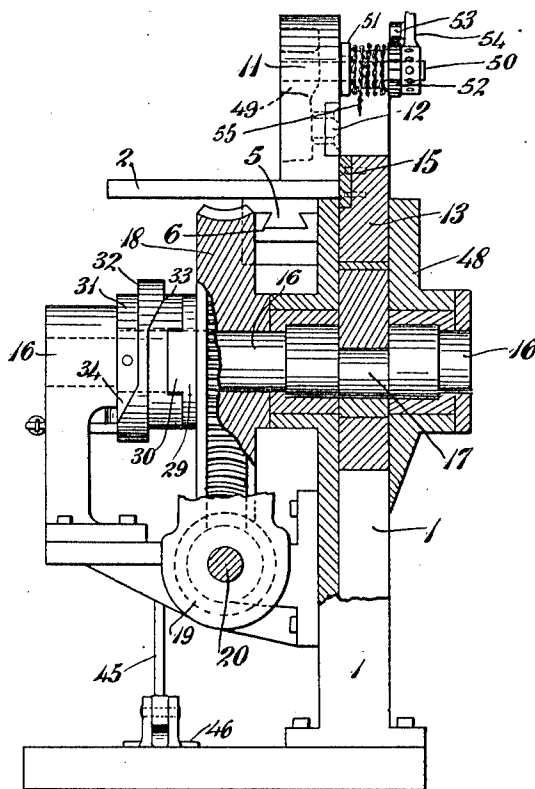
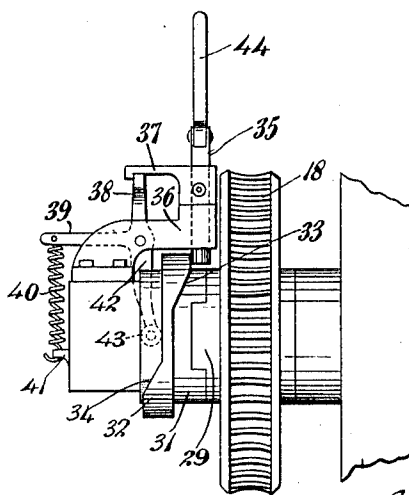


Fig. 5



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UNITED STATES PATENT OFFICE.

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METAL-SHEARS.

1,066,612.

Specification of Letters Patent.

Patented July 8, 1913.

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To all whom it may concern:

Be it known that I, CHRISTIAN F. HEINSS, a citizen of the United States, and a resident of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Metal-Shears, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

The object of my invention is to provide a construction of metal shears for cutting bar and sheet metal in which two cooperating knife blades are provided, one a fixed and the other a movable knife, with the movable knife arranged below the fixed knife so that the cutting shall be done on the up-stroke of the knife. With this construction, I am able to arrange all of the driving mechanism, which in such shears must be heavy and massive, below the plane of the table, with the head for supporting the fixed knife projecting only a slight distance above the table and adapted to be so shaped as to present a minimum amount of interference for overhead traveling cranes and material which has to be transferred from one portion of the factory to the other. In addition to this, inasmuch as the fixed knife is above and the movable knife operates from below, the material to be severed may line up against the cutting edge in full view at all times of the operator.

In the more ordinary construction of machines for cutting metal, in which the movable knife operates on the down-stroke, as the metal is cut, the moving parts interfere with the view of the line of cut which may be marked on the metal, and in cutting upon any such marked line, the cut has to be made without a clear view of the marked line. To avoid this objection, and to permit the location of all of the driving mechanism below the table is the purpose of my invention, and it consists of that certain novel construction and arrangement of parts to be hereinafter particularly pointed out and claimed, by which this object is attained.

In the drawings, Figure 1 is a side elevation of my improved machine. Fig. 2 is a detail side elevation of the movable knife and its guiding frame. Fig. 3 is a plan view of the bearing plate for the crank shaft of the machine. Fig. 4 is a central vertical section of the machine. Fig. 5 is a detail plan view of the clutch mechanism.

The operating parts of the machine are mounted in a suitable substantial and massive casting 1, provided with a movable table plate 2, having supporting lugs 3, 3, which are mounted on suitable supports 4, 4, bolted to the side of the frame. The supporting lugs are formed with the dove-tailed tongues 5, and the supports 4 are formed with corresponding dove-tailed grooves 6 to receive these tongues, while the contact surface between the lugs and the supports are formed on an incline as shown at 7, 7, so that by pushing the table forward or back, the table will be raised or lowered. This movement is obtained by means of the hand operated bell crank lever 8, pivoted to the framework, the depending arm of the lever being connected by a connecting bar 9 with the lug 10 depending from the base of the table.

Properly bolted and secured on the casting 1 is the head 11, provided with lateral ribs for strength. This head extends forwardly over the front portion of the table and is provided with the fixed knife blade 12 which is securely bolted horizontally to the head above the plane of the table.

For properly clamping the metal to be cut, the metal sheet or bar is laid on the table and clamped between the table top and the fixed knife blade 12 by operating the bell crank lever 8.

Mounted on the knife carrier 13, adapted to slide back and forth at an angle to the vertical in the guides 14, 14, on the framework 1 is the movable knife 15. This knife carrier and knife is reciprocated by the crank shaft 16, provided with the crank 17. The crank shaft is driven by the worm gear 18 mounted thereon, which meshes with the worm 19 on the driving shaft 20 which is supported in suitable bearings 21, 21, on the side of the frame 1. 22 is the flywheel for this driving shaft, and the shaft is driven either directly by a suitable motor, mounted on the outer end of the shaft, or by belt and pulley. The crank 17 of the crank shaft 16 is connected with the knife carrier 13 by a split coupling block fitted around the crank. The knife carrier 13 has an opening 23 cut therein, and the upper member 24 and the lower member 25 of the split coupling block are mounted in this opening. The lower portion of the coupling block rests upon the segmental surface 26 in the knife carrier, and the upper portion of the coupling block is provided with a semi-cylindrical head 27,

having its seat in the block 28, secured on the knife carrier and forming a bearing for the head. It will be evident from this construction that as the crank is rotated, the coupling block will cause the knife carrier and its knife to reciprocate in the inclined guides 14, 14 of the frame.

The worm gear 18 is loosely mounted on the crank shaft 16 and rotates continually with the rotation of the driving shaft 20. To couple the crank shaft 16 to the driving shaft 20, the hub 29 on the outer face of the worm gear 18 is formed with the teeth 30, to form the male member of the clutch, the other member of which comprises the collar 31 provided with a spline to slide laterally on the crank shaft, but to turn with it. This collar 31 is provided with an annular band 32 formed with the opposite cam surfaces 33 and 34. Normally the clutch is held disengaged by the pin 35 mounted to slide in the bracket 36 secured to the frame. This pin 35 is provided with a catch 37 engaged by the upper arm 38 of a bell crank lever, the other arm 39 of which is connected by the coiled spring 40 to a lug 41 on the framework. The bell crank lever has a depending arm 42 which carries on its lower end a roller 43 engaging the cam ring 32. The pin or plunger 35 normally engages the opposite side of the cam ring 32. The pin 35 is withdrawn from engagement with the cam ring by the hand lever 44, which is connected by the connecting rod 45 with a foot lever 46, so that the clutch can be actuated either by hand or foot. To throw the clutch into engagement to couple the crank shaft to the worm gear, the operator operates either the hand or foot lever, raising the pin 35 and with it the catch 37. The moment this is done, the spring 40 presses the roller 43 against the cam ring and the clutch is thrown into engagement. When the hand or foot lever is released, the plunger or pin 35 then lies in the pathway of the cam 33. The roller 43 also lies in the pathway of the cam 34, and with each rotation of the crank shaft, the clutch 31 is thrown out of engagement at the same time the arm 42 is rocked back to its normal position with the upper member of the lever 38 engaged by the catch and the spring 40 again placed under tension.

The operation of the shears will be evident from the foregoing description. The operator places on the table 2, under the fixed knife 12, the bar or plate to be cut, and clamps the material between the knife and the table by the hand lever 8. In order that as the material is cut, the free portion may separate to allow for further cutting on the same line, an inclined surface is provided as indicated by the dotted line 47 in Fig. 1, to allow this portion of the sheet to ride up on this surface, as the sheet metal

is severed. The operator throws in the clutch and the knife 15 is raised and severs the sheet by a shearing cut on the upstroke against the fixed cutting knife 12.

It is evident, inasmuch as the moving parts are all below the table, that if any line is marked on the sheet of metal upon which it is desired to cut, that the sheet can be accurately adjusted before it is clamped with the fixed knife edge as a gage, and it will also be evident that during the cutting operation, this line for the cut will be in full view. Inasmuch as no portion of the gearing is above the table top and the shearing knife moves from below upward, there is no part of the moving machine above the table, and no part of the mechanism to interfere with the shifting of the material throughout the shop by overhead cranes or the like.

The knife carrier 13 is covered by the plate 48, which is securely bolted to the standard and which forms a bearing for the outer end of the crank shaft 16.

It frequently happens in shearing heavy plates that it is very difficult for the operator to feed the plate to the shears, after the first cut has been made, as the material is too stiff to readily separate on the cut line. To obviate this difficulty, I form a boss 49 on the head 11 near the front and form an opening therein for the reception of a spindle 50 upon which a pulley 51 is mounted to rotate. One of the side flanges of the pulley is formed with the ratchet teeth 52 which are engaged by a pawl 53 on the hand lever 54, mounted on the end of the spindle. A chain 55 is wound on this pulley and the end of the chain is provided with a hook which can be caught over the outer end of the plate so that a few turns of the pulley will draw the plate into the shears. The spindle is held in place by a nut, and when not in use, the spindle and pulley with the chain can be removed and laid aside.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a machine of the character specified, a framework with a fixed knife secured in the upper portion thereof, a knife carrier mounted in the frame to reciprocate below the fixed knife, with knife mounted therein to cooperate with the fixed knife to give a shearing cut, a table adapted to be raised and lowered to clamp the material to be cut against the fixed knife, and means for actuating the movable knife from below upward, for the purpose set forth.

2. In a machine of the character specified, a framework with a fixed knife secured in the upper portion thereof, a knife carrier mounted in the frame to reciprocate below the fixed knife, with knife mounted therein to

coöperate with the fixed knife to give a shearing cut, a table adapted to be raised and lowered to clamp the material to be cut against the fixed knife, a crank shaft with
5 crank engaging the knife carrier to operate the same, a driving shaft and intermediate gearing, with clutch connecting the two shafts, all of the operating mechanism being located below the table, for the purpose
10 set forth.

3. In a machine of the character specified, a framework with a fixed knife secured in the upper portion thereof, a knife carrier mounted in the frame to reciprocate below

the fixed knife, with knife mounted there- 15
in to coöperate with the fixed knife to give a shearing cut, a table below the fixed knife, with inclined supports and guides therefor and lever for shifting the table to clamp the material to be cut against the fixed knife, 20
and means for actuating the movable knife from below upward to cut the clamped material.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
