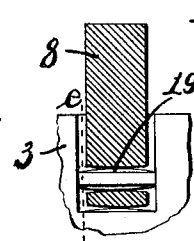
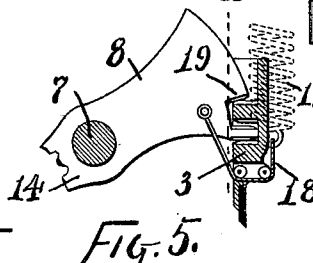
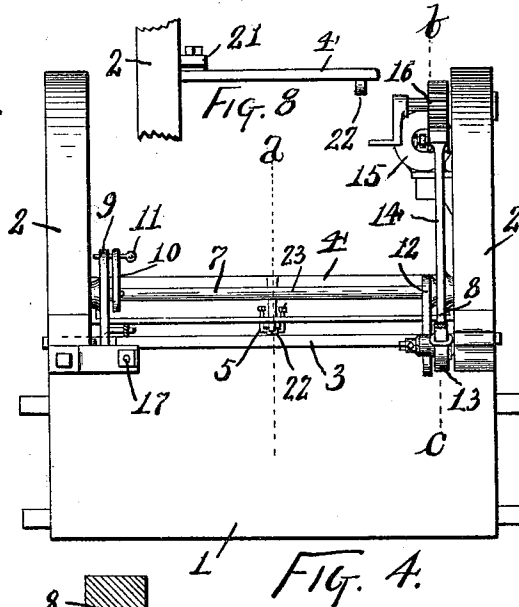
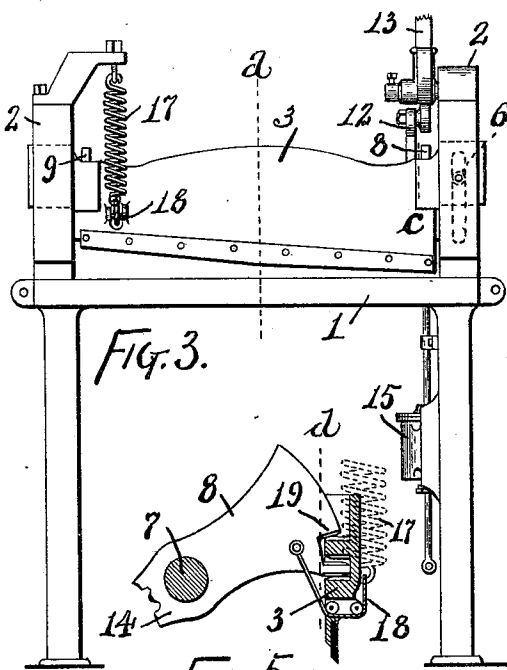
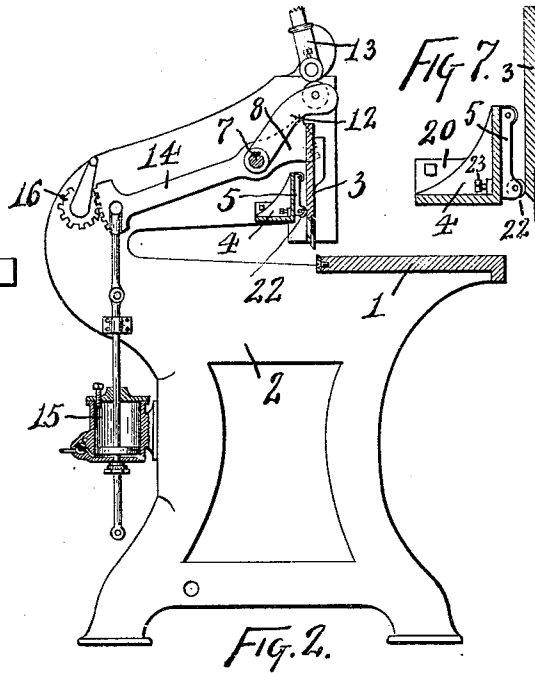
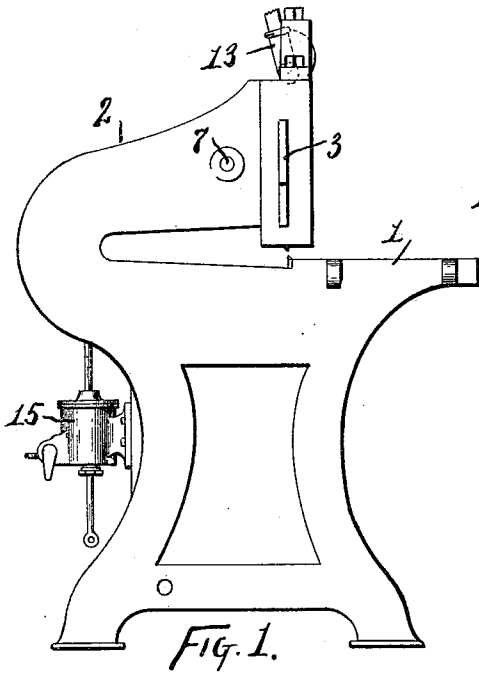


(No Model.)

C. A. BERTSCH.
METAL SHEARING MACHINE.

No. 544,281.

Patented Aug. 13, 1895.



Charles A. Bertsch
Inventor
by James M. See
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Witnesses:
E. P. Shipley
C. M. Shuman

UNITED STATES PATENT OFFICE.

CHARLES A. BERTSCH, OF CAMBRIDGE CITY, INDIANA.

METAL-SHEARING MACHINE.

SPECIFICATION forming part of Letters Patent No. 544,281, dated August 13, 1895.

Application filed January 24, 1895. Serial No. 535,998. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. BERTSCH, of Cambridge City, Wayne county, Indiana, have invented certain new and useful Improvements in Metal-Shearing Machines, of which the following is a specification.

This invention pertains to metal-shearing machines; and the improvements will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a shearing-machine embodying my improvements; Fig. 2, a vertical section of the same in the plane of line *a* and *c* of Figs. 3 and 4; Fig. 3, a front elevation; Fig. 4, a plan; Fig. 5, a side elevation of one of the gate-actuating arms, the gate operating in vertical section in the plane of line *c* of Figs. 3 and 4; Fig. 6, a rear elevation of a portion of the gate, one of the gate-actuating levers appearing in the plane of line *d* of Fig. 5; Fig. 7, a vertical section of gate and bridge-tree in the plane of line *a* of Figs. 3 and 4; and Fig. 8, a plan at one end of the bridge-tree, showing a modified construction for adjusting the abutting roll.

In the drawings, 1 indicates the usual table of a gate shearing-machine; 2, the gapped housings, one at each end of the table; 3, the shear stock or gate, arranged to slide vertically in the housings and having at its lower edge a shear-blade to co-operate with the shear-blade which is fixed to the table; 4, a bridge-tree firmly secured at each end to the housings to the rear of the gate; 5, an apron pivoted at its upper end to the front of the bridge-tree and bearing at its lower end a roller bearing against the rear lower portion of the gate to prevent the backward springing of the gate under heavy shearing strains, set-screws being provided to adjust the apron and roller forwardly; 6, Fig. 3, a roller and guide-slot where one end of the gate engages one of the housings to prevent the endwise shifting of the gate; 7, a rock-shaft journaled in the housings to the rear of the gate; 8, an arm secured to this rock-shaft near one end and projecting forward into segment-and-rack engagement with the gate; 9, a similar arm at the other end of the rock-shaft, but loose thereon; 10, an arm fast on the rock-shaft

near arm 9; 11, a removable clutch-pin engaging arms 9 and 10 and serving, when engaged, to lock arm 9 to the rock-shaft; 12, an arm fast on the rock-shaft near one of the housings and projecting up over the gate, and provided with an antifriction-roll; 13, a cam with a hand-lever pivoted to the housing over and engaging the roller of arm 12; 14, an arm fast on the rock-shaft and projecting rearwardly, this arm being shown in the exemplification as formed integrally with arm 8; 15, a steam-cylinder rigidly supported by the framework of the machine and having its piston connected by rod with arm 14; 16, a pinion carried by a cranked spindle and journaled in the rear of one of the housings and engaging a segment of teeth at the extremity of arm 14; 17, a spring with its upper end attached to a housing-bracket at one end of the gate, the machine to have such a spring at each end of the gate, if desired; 18, a flexible connection, as a cable or chain, extending from the lower end of the spring through a hole in the gate, preferably under rollers in such hole, and then up to a connection with the actuating-lever through which the rocking shaft moves the gate; 19, the segmental and rack teeth by which arms 8 and 9 engage the gate, these teeth being in such position that their pitch-line will be vertically over the cutting-plane of the shear-blades and the teeth engaging by convex faces and flanks, as seen in Fig. 6, so as to permit of some angular motion of the gate with reference to the actuating-arms 8 and 9; and 20, end flanges on the bridge-tree by which the bridge-tree is firmly secured to the housings.

Roller 22 prevents the rearward springing of the gate. Set-screws 23 may be employed in adjusting the roller forward to its work, apron 5 swinging to permit of the adjustment. If the bridge-tree is bolted to flanges projecting inwardly from the housings, as is indicated at 21 in Fig. 8, instead of by end flanges on the bridge-tree bolted flat against the housings, as indicated in Figs. 2 and 7, then roller 22 may be mounted directly in the bridge-tree instead of in apron 5, and the adjustment of the roller may be effected by shims, where the the bridge-tree is bolted to flanges 21.

If power of any character, as hand-power, steam-power, treadle-power, or crank-power, be applied to the rear end of arm 14 it will result in the rocking of shaft 7 and the active motion of the shear-gate. In the illustration the steam-cylinder is arranged to act as the motive power, the piston-rod being connected with arm 14, and the piston-rod being prolonged downwardly to permit of other attachments if steam is not used. Hand-crank pinion 16 may also be employed to operate the gate, and this pinion may slide endwise upon its spindle to be out of engagement with the teeth of arm 14 when not needed. Hand-lever 13 may also be employed to operate the gate either alone or in conjunction with other power for extra heavy cutting.

Spring 17 gives the lifting motion to the gate, and by its peculiar connection serves to take the backlash and shock out of the teeth through which the gate is actuated. For extraordinary heavy cutting or narrow cutting clutch-pin 11 may be disengaged, thus freeing arm 9 from the rock-shaft and permitting one end of the gate to remain up while the other end of the gate has full operative motion, the convexing of teeth 19 permitting of this motion, this convexing of the teeth being also useful in any event in compensating for distortions due to unequal strains. When the gate is thus used, with power applied at one end only, guide-roller 6 gives endwise support to the gate, leaving it free in the opposite housing.

While I illustrate and describe a shearing-machine in which the vertically-reciprocating gate bears a plain shear-blade co-operating with a lower shear-blade secured to the table, I wish it understood that I view a row of punches secured to the gate and co-operating with a multiple-die secured to the table as an equivalent of the cutting-tools specifically set forth.

The disposition of the pitch-line of the teeth 19 directly in the vertical plane of the cutting resistance causes the power-thrusts to be vertical, thus avoiding the usual damaging twisting or "canting" of the shear-stock when the blades are doing heavy work.

I claim as my invention—

1. In a shearing machine, the combination, substantially as set forth, of a table, lower shear blade, housings, a gate bearing the upper shear blade, mechanism for operating the shear blade, a bridgetree extending from housing to housing to the rear of the gate, a roller carried by said bridgetree and bearing against the rear lower portion of the gate, and mechanism, substantially as described, for adjusting said roller forwardly.

2. In a shearing machine, the combination, substantially as set forth, of a table bearing a lower shear blade, housings, a gate mounted therein and bearing an upper shear blade, a rock-shaft journaled in the housings to the rear of and parallel with the gate, forwardly

projecting arms on said shaft and engaging said gate, a power-arm on said shaft, and mechanism, substantially as set forth, for giving motion to said power arm.

3. In a shearing machine, the combination, substantially as set forth, of a table bearing a lower shear blade, housings, a gate guided thereby and bearing an upper shear blade, a rock-shaft mounted in the housings to the rear of and parallel with the gate, an arm fast on said rock-shaft and engaging the gate, a second arm clutched to said rock-shaft and engaging the gate, a power arm fast on said rock-shaft, and means, substantially as described, for giving motion to said power arm.

4. In a shearing machine, the combination, substantially as set forth, of a table bearing a lower shear blade, housings, a gate guided thereby and bearing an upper shear blade, actuating arms engaging said gate by teeth having convex flanks and faces, and mechanism, substantially as set forth, for giving motion to said arms.

5. In a shearing machine, the combination, substantially as set forth, of a table bearing a lower shear blade, housings, a gate guided thereby and bearing an upper shear blade, a pivoted arm engaging said gate, mechanism, substantially as set forth, for giving motion to said pivoted arm, a spring having its upper end supported by the framing of the machine, and a flexible connection passing from the lower end of said spring to said pivoted arm and under a part of said gate.

6. In a shearing machine, the combination, substantially as set forth, of a table bearing a lower shear blade, housings, a gate guided thereby and bearing an upper shear blade, a rock-shaft mounted in the housings to the rear of and parallel with the gate, arms extending forwardly from said rock-shaft into engagement with the gate, a power arm projecting from the rock shaft, and a steam cylinder supported by the framing of the machine and having its piston rod connected with said power arm.

7. In a shearing machine, the combination, substantially as set forth, of a table bearing a lower shear blade, housings, a gate guided thereby and bearing an upper shear blade, a rock shaft mounted in the housings to the rear of and parallel with the gate, arms on said rock-shaft and engaging the gate, a power arm projecting from said rock shaft and having a segment of teeth, and a pinion mounted on a housing and having a crank and engaging said segment of teeth.

8. In a shearing machine, the combination, substantially as set forth, of a table bearing a lower shear blade, housings, a gate guided thereby, a rock-shaft mounted in the housings to the rear of and parallel with the gate, arms upon said rock shaft engaging the gate, an arm upon said rock shaft projecting forwardly over the gate near one end of the gate, and a cam lever mounted on one of the

housings and engaging said forwardly projecting lever.

9. In a shearing machine, the combination, substantially as set forth, of a table bearing
5 a lower shear blade, housings, a gate guided thereby and provided upon its rear face near each end with rack teeth, a shear blade secured to said gate below and with its cutting edge in the vertical plane of the pitch line of

said rack teeth, arms pivoted to the housings 10 and having segments of teeth engaging said rack teeth, and means for giving motion to said arms.

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Witnesses:

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