(No Model.)

2 Sheets—Sheet 1.

C. A. BERTSCH.

SHEARING MACHINE.

No. 438,222. Patented Oct. 14, 1890.

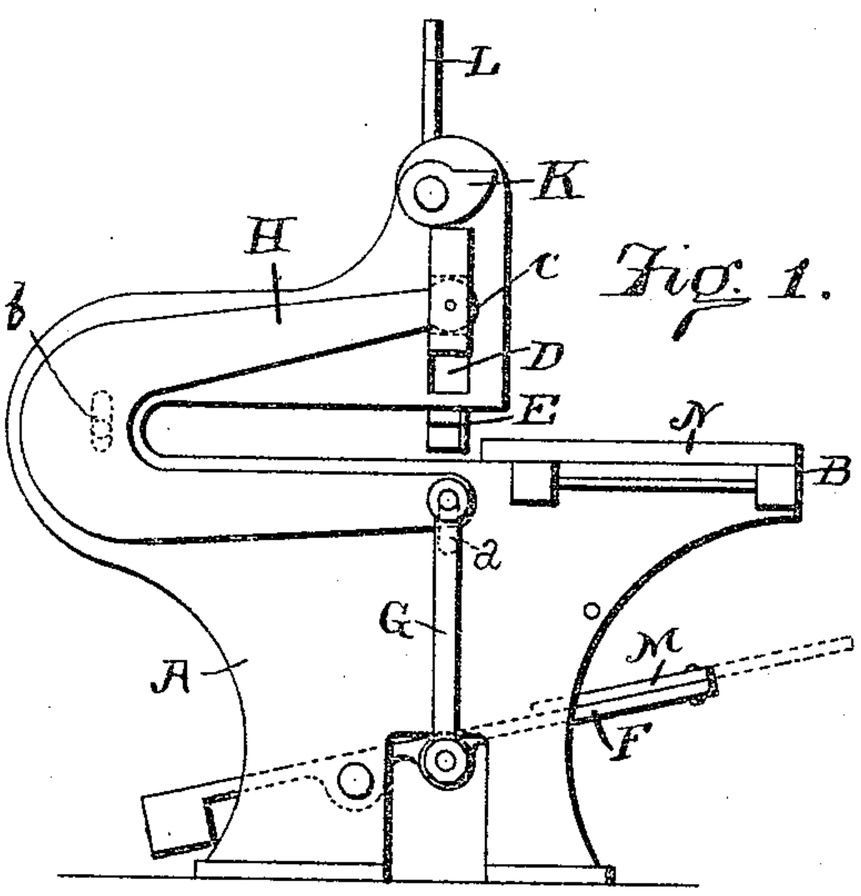

Fig. 1.

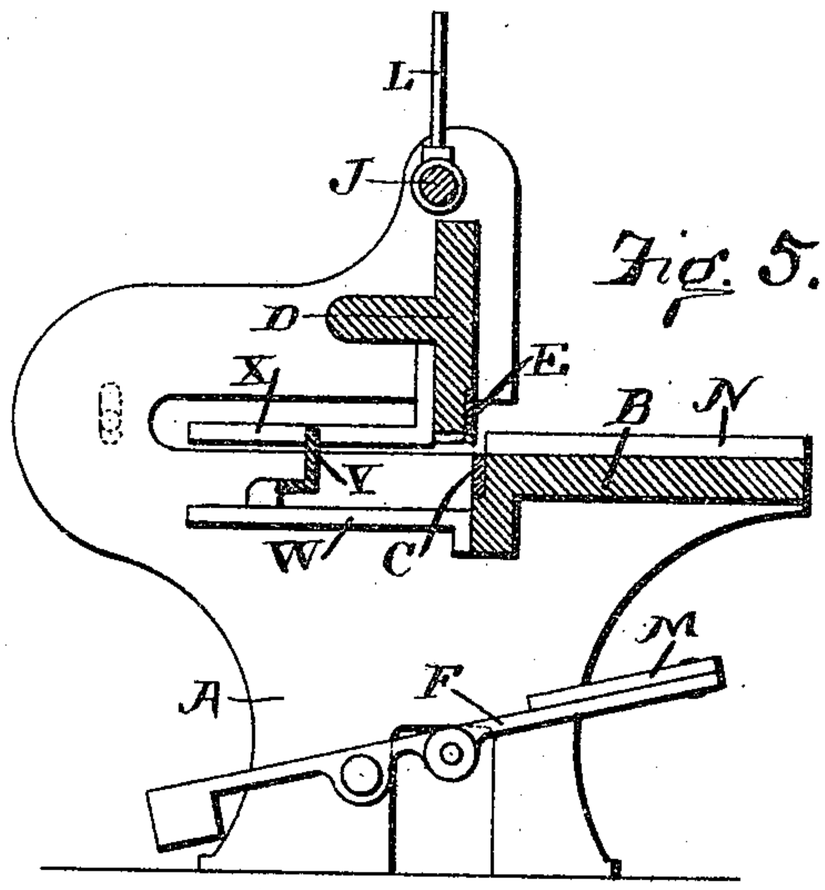

Fig. 5.

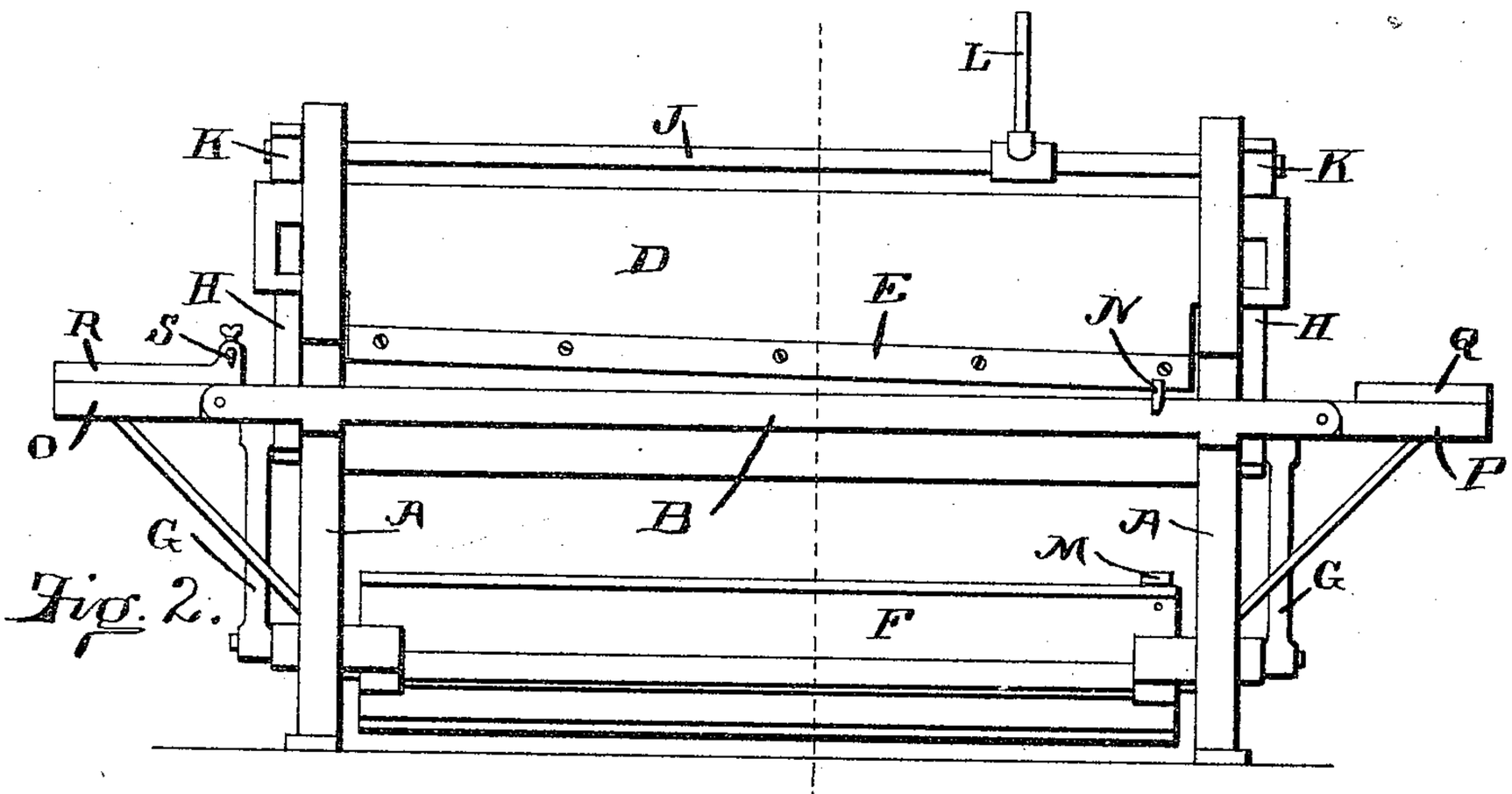

Fig. 2.

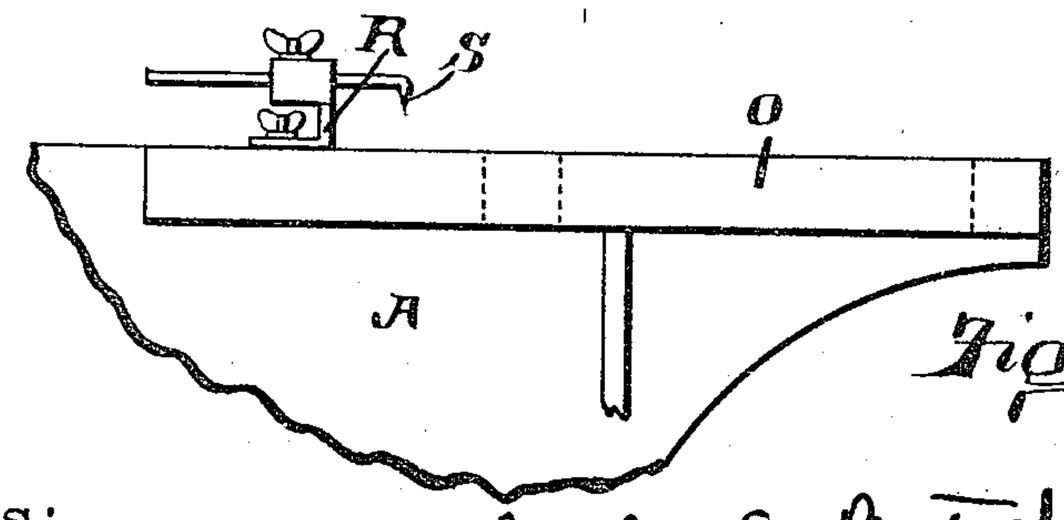

Fig. 6.

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(No Model.)

2 Sheets—Sheet 2.

C. A. BERTSCH.

SHEARING MACHINE.

No. 438,222. Patented Oct. 14, 1890.

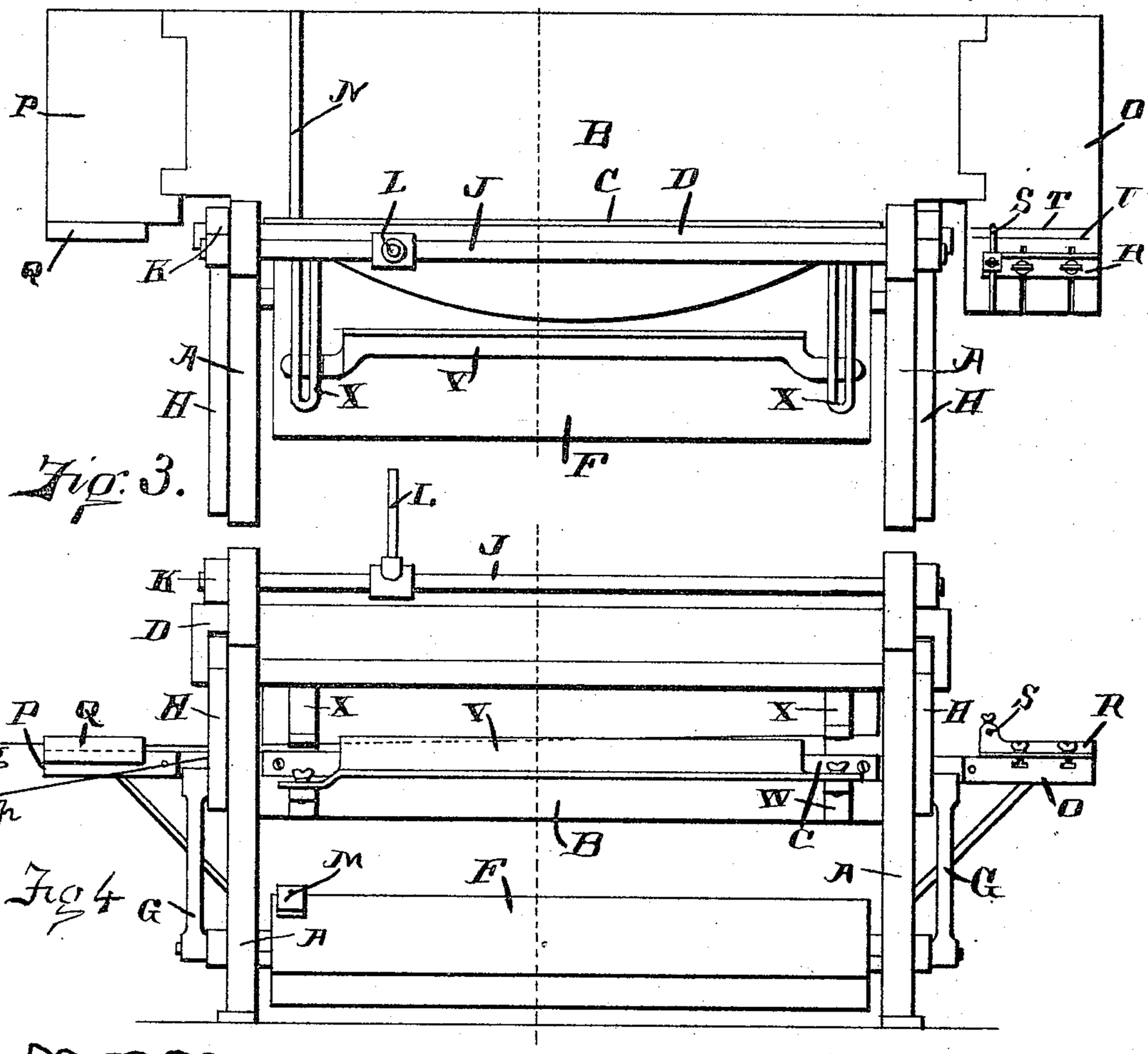

Fig. 3.

Fig. 4

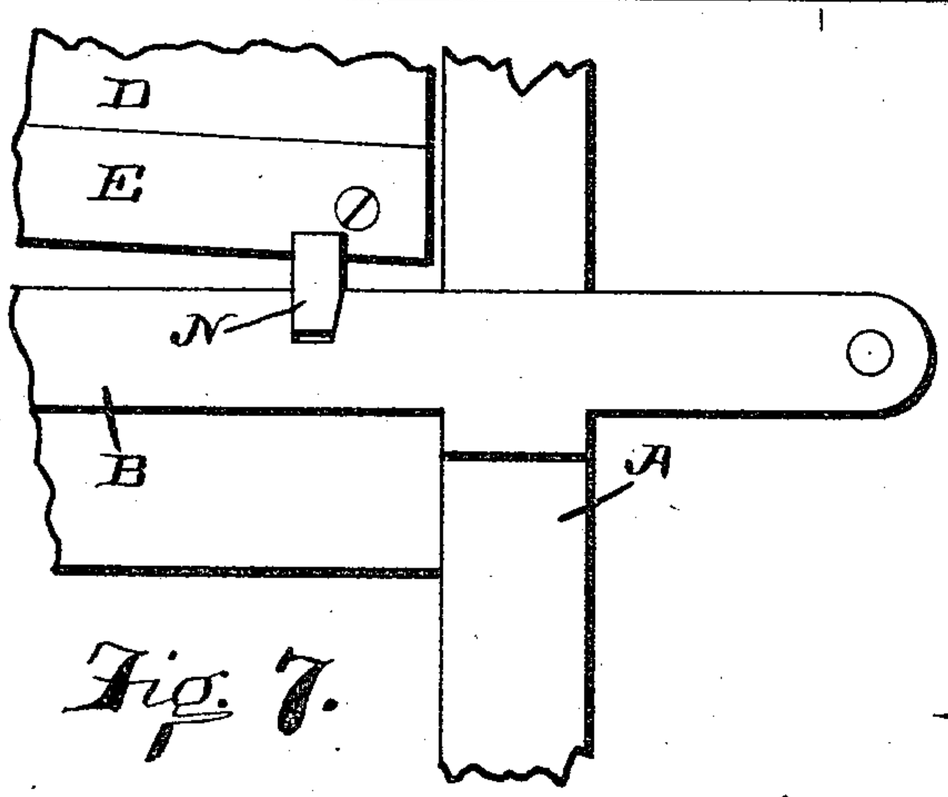

Fig. 7.

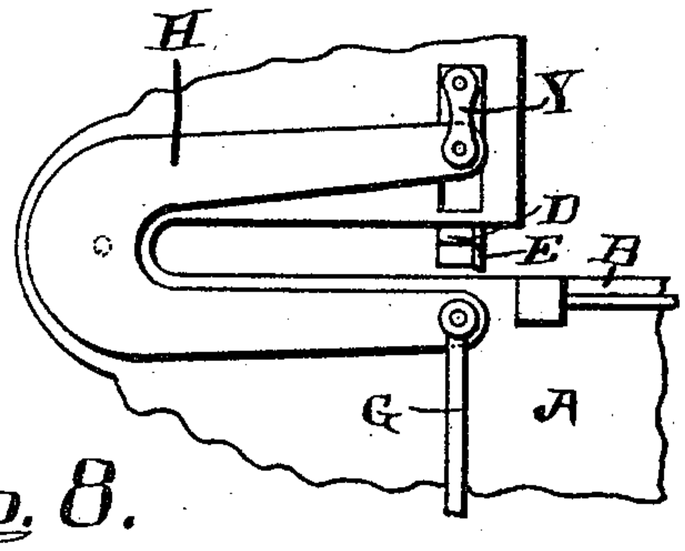

Fig. 8.

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UNITED STATES PATENT OFFICE.

CHARLES A. BERTSCH, OF CAMBRIDGE CITY, INDIANA.

SHEARING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 438,222, dated October 14, 1890.

Application filed February 6, 1890. Serial No. 339,488. (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 Shearing-Machines, of which the following is a specification.

This invention pertains to that class of metal-shearing machines involving a horizontal table carrying a fixed shear-blade and a vertically-moving stock or gate carrying a movable shear-blade, such machines being often spoken of as "squaring-shears." My improved machine is adapted for the working of squaring, trimming, slitting, &c.

My 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 machine exemplifying my improvements; Fig. 2, a front elevation of the same; Fig. 3, a plan of the same; Fig. 4, a rear elevation of the same; Fig. 5, a vertical transverse section of the same; Fig. 6, an elevation, upon an enlarged scale, of the extension-table O as that extension-table would appear in Fig. 1 were it not omitted from that figure; Fig. 7, an enlarged front elevation corresponding in direction of view with Fig. 2 of the right-hand portion of the main table, and exhibiting the squaring-gage N; and Fig. 8, an end elevation corresponding in direction of view with Fig. 1 of certain end portions of the machine, but exhibiting a modification in the method of connecting the gap-blocks with the stock.

In the drawings, omitting Fig. 8 from present consideration, A indicates the ordinary end housings of the machine; B, the usual table supported by the front of the housings, the housings being horizontally slotted upon the same general level with the table, so that wide sheets of metal supported by the table may be passed endwise through the machine; C, the lower shear-blade, the same being rigidly attached to and forming the rear edge of the table; D, the vertically-moving shear-stock fitted for movement in suitable guides in the housings, this stock consisting of a massive bar extending across the machine from housing to housing; E, the upper shear-blade, the same being attached to the lower edge of the shear-stock and arranged to act in conjunction with the fixed blade, which is secured to the rear edge of the table, the upper shear-blade being arranged, as is usual, at a greater or less shearing angle, one end of this blade being set very much lower than the other end, so that the shearing action is a progressive one along the length of the blades; F, a foot-treadle pivoted at the base of the machine and extending forwardly, so as to be conveniently reached by the operator's foot as he stands at the front of the machine; G, links reaching from the treadle at each end of the machine upwardly toward the shear-stock D, the lower points of connection of the links being disposed vertically below the shear-stock; H, gap-blocks connected with the ends of the links G and serving to furnish a connection and means of transmission of motion between the links and the stock, these gap-blocks having the form of a letter U, with its closed portion disposed to the rear; J, a hand-shaft journaled in the housings over the shear-stock; K, a cam near each end of said shaft and engaging directly over the shear-stock; L, a hand-lever attached to the shaft; M, an extension-piece pivoted to the front of the treadle and adapted to be normally turned back upon the treadle out of the way and arranged to be swung forward when necessary, as indicated by dotted lines in Fig. 1, so as to project forward of the general treadle and form a frontal extension thereof; N, an upwardly-projecting gage-rib secured to the upper surface of the table B exactly at right angles to the line of cut of the shear-blades, this rib having a cross-section slightly tapering at its lower edge and engaging a corresponding groove formed in the table; O, an extension-table at the left-hand end of the machine, the left hand of the machine being assumed as that portion which appears at the left of the front view found in Fig. 2, this extension-table being formed as a prolongation of the main table beyond the left-hand housing and formed, preferably, with a hinged juncture thereto, so that this extension may be lowered out of the way when desired; P, a similar extension-table, similarly formed at the right of the machine; Q, a gage-ledge formed at the rear of the extension P and projecting above the same, the front face of this gage-ledge coinciding exactly with the cutting-lines of the shear-blades and the inner

end of the ledge being disposed some distance outwardly from the end of the shear-blades, the lower edge of this gage-ledge being disposed but a short distance below the upper surface of the extension-table of which it forms a part; R, a sliding gage supported by the extension-table O and disposed with its face parallel with the line of cut of the shear-blade and adjustable a greater or less distance to the rear of that line; S, a point-gage illustrated as supported by this sliding gage, the point of this gage projecting downwardly to near the level of the table, this gage being formed, preferably, of a rod supported in an eye in the sliding gage and secured adjustably therein by a set-screw and having a downwardly-turned gage-point at its forward end; T, (see Fig. 3,) a gage-line formed upon the extension-table O in line of cut of the shear-blades; U, a similar line a trifle to the rear of line T; V, a back gage disposed adjustably to the rear of the shear-blades and projecting above the surface of the table; W, a pair of brackets extending rearwardly from the rear edge of the table and serving as a support for the gage V, which attaches to them, in the ordinary manner, by means of bolts engaging slots in the brackets, as usual, and X a similar pair of brackets attached to the rear of the shear-stock D.

By inspecting Fig. 1 it will be noticed that a depressing motion of the treadle will result in a downward movement of the links G, and it will be obvious that if the upper ends of those links were attached directly to the shear-stock then the effect would be to produce a downward movement of the shear-stock and upper shear-blade; but it is often desirable to employ these machines in the slitting of wide sheets of greater length than the machine, or to pass the sheets endwise to the shears. Links passing directly upward to the shear-stock would obviously interfere with such employment of the machine. It has therefore become customary to construct such machines with gaps in the housings, and to transfer motion from the treadle or other power device to the shear-stock through the medium of pivoted arms. Instead of such pivoted arms, I employ the gap-blocks H. These blocks are U-shaped structures, so as not to interfere with the passage of the sheets, and the forward extremities of the blocks are attached to the shear-stock and to the upper ends of the links. The downward movement of the links results in the direct downward transmission of the motion to the shear-stock. Owing to the extreme rearwardly overhanging of the gap-blocks H, some means must be provided to prevent the improper dropping of the rear portion of their bodies. From Fig. 1 it will be understood that if the gap-block H be unsupported its left portion will drop and throw the upper end of the link forward. This may be guarded against by any suitable support for the gap-block. As, for instance, the pin at the upper end of the link may move in a vertical guideway, as at *a;* or any portion of the gap-block may thus have a guiding-support, which will prevent the disorganization referred to. The support may be disposed at *b*, if desired. The upper forward extremity of the gap-block may be attached in any desired manner to the shear-stock, as by pin or knuckle, as indicated in Fig. 1, or by tension-link, as illustrated in Fig. 8.

My present invention contemplates any manner of support to prevent the improper dropping of the overhanging rear portion of the gap-blocks.

For machines to be employed in light work the foot-treadle will answer as the means for applying the power; but of course for very heavy work or very large machines the usual cam-shaft, revolving by power, may be used to create the downward pull upon the links; but even with the treadle-machines it sometimes becomes desirable to operate the machines by hand-levers, it being quite common to provide a hand cam-shaft for such purposes. In the present case the hand-lever L is to be thus employed, the cams K on its shaft engaging directly over the shear-stock. I sometimes introduce anti-friction rollers on the shear-stock where it is engaged by these cams.

The cross-gage N is only used where squaring is to be done. It is removable from the table and is held therein by the engagement of its tapered foot with the tapered groove in the table. The taper of the groove should be very little and the gage-rib should so fit the taper as never to engage the floor of the groove. This will always insure a proper binding fit, which will retain the gage in place and at the same time permit its ready removal.

Referring now to Fig. 5, attention is called to the rear gage V. This gage, supported on the lower brackets W, is to be used in the ordinary manner in regulating the width of pieces to be sheared from sheets. The gage is to be adjusted back and forth on its brackets W to suit the desired width, and the gage-wall projects above the general level of the table, so that a sheet laid on the table and pushed to the rear will strike against the gage; but by inspecting Fig. 5 it will be noticed that there is a limit to the narrowness of the work that can be done with the gage V thus used. If the gage be adjusted forward near to the lower shear-blade, then the shear-stock in its descent will strike the gage. I therefore provide the upper brackets X, attached directly to the shear-stock, which brackets are to be employed when the gage is to be set very close to the cut. The gage is simply removed from the brackets W, turned end for end and upside down and bolted in desired position to the brackets X. These brackets set low down on the shear-stock and permit the adjustment of the gage close to the shearing-line; but the upper shear-blade and the lower edge of the shear-stock are on an incline and the setting of the brackets X at the lower

edge of the shear-stock necessarily results in the two brackets X being on different levels, as indicated in Fig. 4. The gage V is so constructed as to be level when attached to the two brackets X, the gage having a horizontal offset, as clearly shown. In order to have the same gage set upon the brackets W, I arrange the two brackets W upon different levels, the same as brackets X, the offset-gage V thus fitting either pair of brackets.

Referring to Fig. 3, attention is called to the table-extension O. This extension may be formed rigid with the main table B, or it may form a drop-leaf extension, as illustrated. It extends outwardly to the left beyond the left housing of the machine and it extends to the rear of the cutting-line of the shear-blades. It thus serves to support sheets fed endwise into the machine to be slitted. It is to be understood that this extension is at that end of the machine corresponding with the high end of the upper shear-blade. Upon the upper surface of this extension there is provided a mark T, corresponding exactly with the cutting-line of the shear-blades. This mark may be employed in adjusting long work for certain kinds of trimming. At the opposite end of the machine the upper shear-blade will set so low as to serve as a guide in adjusting the sheet; but at the high end of the upper shear-blade the shear-blade itself can furnish no guide. In many cases a mere trifle of metal is to be trimmed from the edge of the long sheet, in which case the edge of the sheet would cover and hide the mark T. I therefore provide a second trimming-mark U, parallel with and slightly to the rear of the mark T, which second mark may serve as a guide-line during the trimming operation.

For long slitting the gage R may be employed in an obvious manner. For slitting to a line the point-gage S will be found of great value, this point-gage being taken as one guide, while the extreme opposite end of the upper shear-blade is used as the other guide. This point-gage S need not be attached in the particular manner indicated. It is only essential that it be supported above the level of the table, but near the table and at a point endwise beyond the housing which is located at the high end of the upper shear-blade.

Sometimes extra-wide sheets prevent access to the treadle, and sometimes additional power is wanted in an emergency. In such cases the treadle-extension M is to be turned forward, as indicated by dotted lines in Fig. 1.

The table-extension P has preferably the drop-leaf form, as indicated in the drawings. Its gage-ledge Q serves as a slitting-gage, the rear portion of the slit sheet being pressed down by the descending upper shear-blade and passing under the lower edge of that gage-ledge. The passage of the rear slit of the sheet being cut will be understood from Fig. 4, *g* representing the front slit of the sheet as it passes over the top of the table-extension P and in front of the gage-ledge Q. The rear slit *h* of the sheet, which would ordinarily be interfered with by the gage-ledge, is naturally depressed by the action of the top shear-blade, and the resulting downward curve of the rear slit in conjunction with the distant position of the inner end of the gage-ledge causes the rear slit of the sheet to pass to the rear of the table-extension P and under the lower edge of the gage-ledge Q. The slits of metal are shown in this figure only for the purpose of showing how the rear slit passes the gage-ledge Q, and the metal being cut is not illustrated inwardly beyond the housing, as such illustration would obscure other work.

I claim as my invention—

1. In a shearing-machine, the combination, substantially as set forth, of a table, a shear-blade fixed thereto, a shear-stock, a shear-blade attached to the shear-stock, a link disposed vertically below each end of the shear-stock, power mechanism, as a treadle, connected with the lower ends of said links, a gap-block at each end of the shear-stock, connected with the shear-stock and with the upper ends of said links and with their bodies overhanging rearwardly, and supports to prevent the improper tipping of said overhanging gap-blocks.

2. In a shearing-machine, the combination, substantially as set forth, of a frame, a shear-stock, a shear-blade secured to said stock, a table supported by said frame and provided with a transverse groove of tapering cross-section, a shear-blade fixed to said table, and a gage-rib projecting above said table and fitting said transverse groove and standing clear of the floor of said groove.

3. In a shearing-machine, the combination, substantially as set forth, of a frame, a stock provided with a shear-blade, a table provided with a shear-blade, a pair of gage-brackets projecting rearwardly from said stock and disposed at different levels, a pair of gage-brackets projecting from the rear of the table and disposed at different levels corresponding with the difference of levels of the first-mentioned gage-brackets, and an offset-gage adapted to engage either of said pairs of brackets.

4. In a shearing-machine, the combination, substantially as set forth, of a pair of housings, a table supported thereby and provided with a shear-blade, a vertically-reciprocating shear-stock, a shear-blade secured thereto and arranged with one end higher than the other end, and an extension to said table at the end corresponding with the high end of said shear-stock blade, said table-extension projecting outwardly beyond the housing nearest thereto and rearwardly beyond the cutting-line of said shear-blades.

5. In a shearing-machine, the combination, substantially as set forth, of a pair of housings, a table, a stock, a shear-blade on the table, a shear-blade on the stock arranged with

one end higher than the other, and an extension of said table at the high end of the stock-blade, said table-extension projecting outwardly beyond the nearest housing and to the rear of the cutting-line of said shear-blades and having on its upper surface one or more gage-marks parallel with said cutting-line.

6. In a shearing-machine, the combination, substantially as set forth, of a pair of housings, a table, a stock, a shear-blade on the table, a shear-blade on the stock arranged with one end higher than the other, an extension of said table outwardly beyond the housing at the high end of said stock-blade, and an adjustable gage on said table-extension to the rear of the cutting-line of the shear-blades and parallel therewith.

7. In a shearing-machine, the combination, substantially as set forth, of a frame, a table, a shear-blade at the rear edge thereof, a stock, a shear-blade thereon, a treadle below the table and connected with said stock, and an extension to said treadle adapted to project forward thereof and to be turned back thereon.

8. In a shearing-machine, the combination, substantially as set forth, of a pair of housings, a table supported thereby, a stock, a shear-blade on said stock arranged with one end higher than the other, and a point-gage disposed outwardly beyond the housing at the high end of said stock-blade and having a point projecting downwardly in the line of cut of the shear-blades.

9. In a shearing-machine, the combination, substantially as set forth, of a pair of housings, a table, a shear-blade thereon, a stock, a shear-blade on the stock arranged with one end higher than the other, an extension of the table beyond the housing at the lower end of said stock-blade with its rear edge in the cutting-line of the shear-blades, and a gage-ledge projecting above and below the upper surface of said table-extension and having its inner end disposed outwardly so far beyond the end of the shear-blades that the bent cutting will pass under said ledge.

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