(No Model.) 2 Sheets—Sheet 1.

LA VERNE W. NOYES.

MACHINE FOR SHEARING METAL.

No. 397,020. Patented Jan. 29, 1889.

Fig. 1.

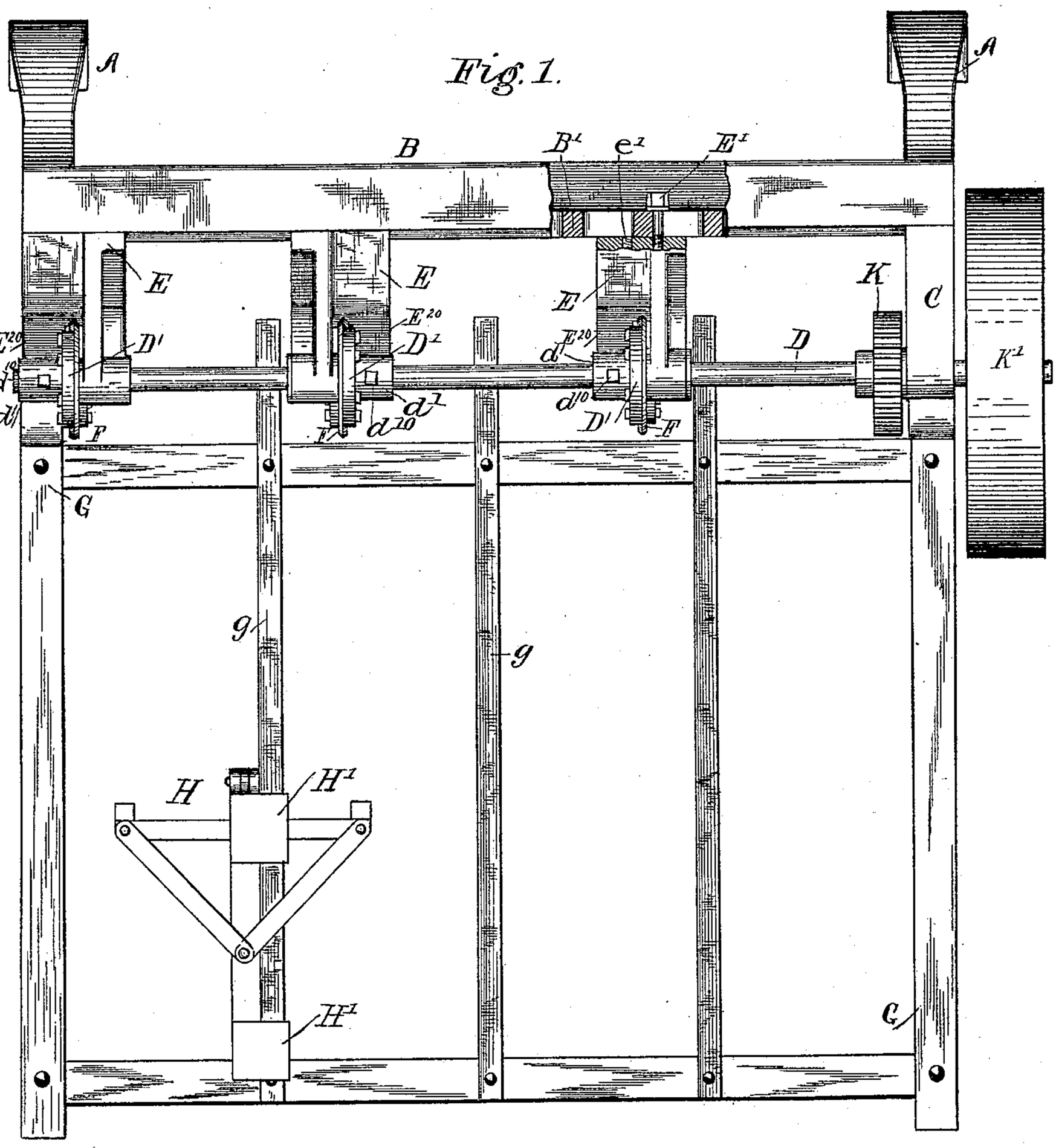
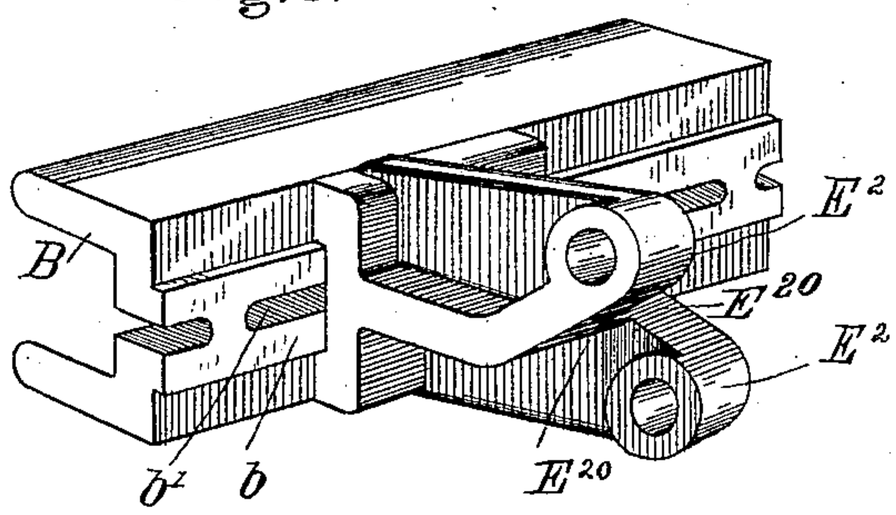


Fig. 5.



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Edwin T. Yewell.

Inventor:
La Verne W. Noyes
By Burton W. Burton
his Attys.

(No Model.) 2 Sheets—Sheet 2.

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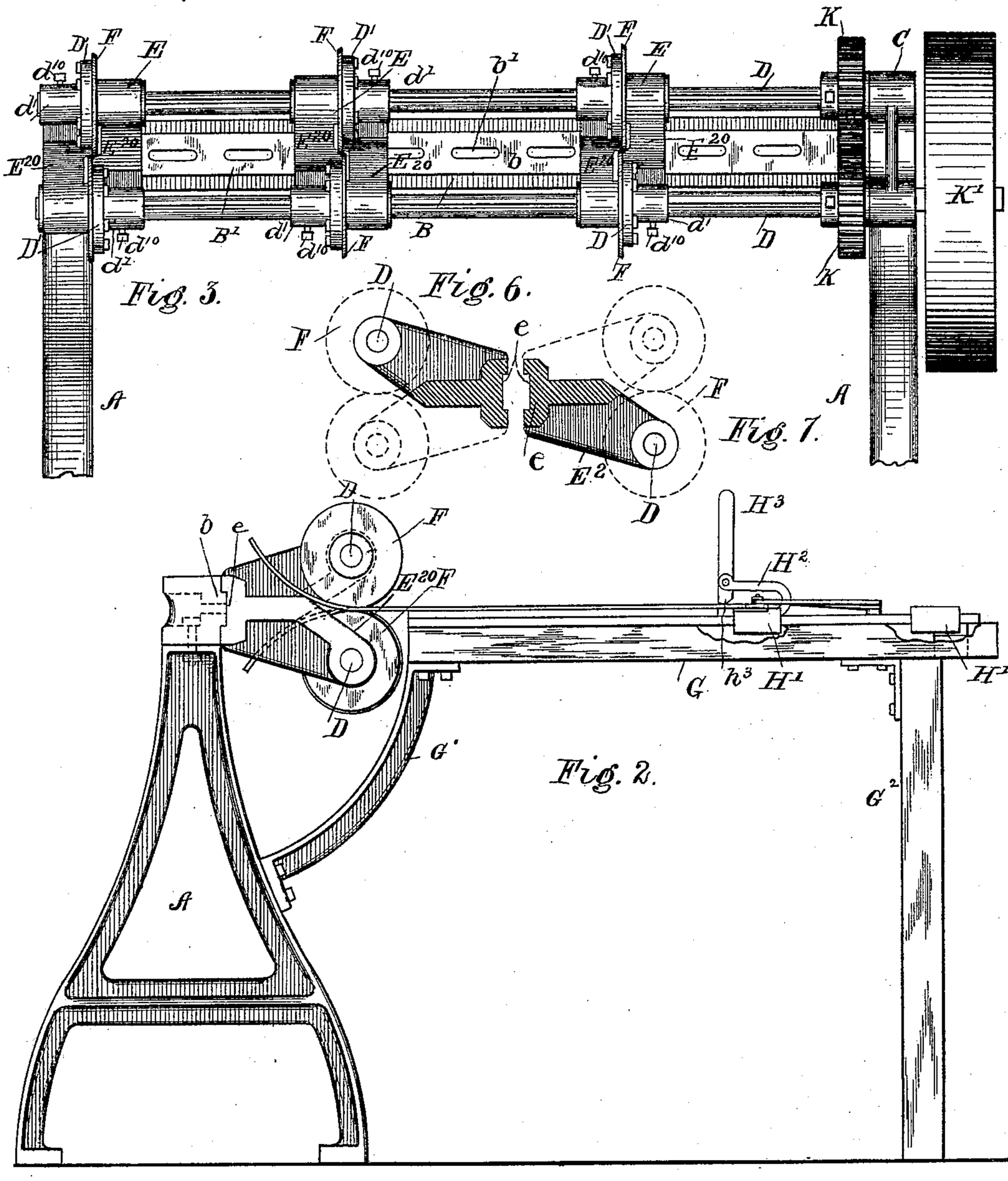

Fig. 3.

Fig. 6.

Fig. 7.

Fig. 2.

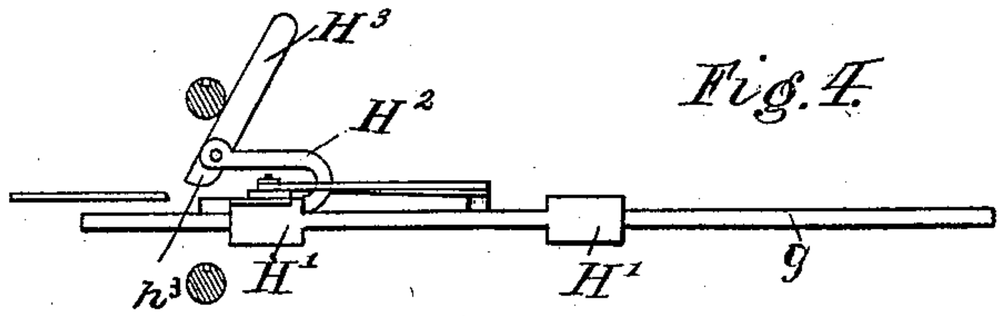

Fig. 4.

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UNITED STATES PATENT OFFICE.

LA VERNE W. NOYES, OF CHICAGO, ILLINOIS.

MACHINE FOR SHEARING METAL.

SPECIFICATION forming part of Letters Patent No. 397,020, dated January 29, 1889.

Application filed April 23, 1888. Serial No. 271,516. (No model.)

To all whom it may concern:

Be it known that I, LA VERNE W. NOYES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Shearing Metal, which are set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings, Figure 1 is a plan. Fig. 2 is a side elevation. Fig. 3 is a front elevation with the bed removed. Fig. 4 is a detail side elevation of the metal-clamping device in the position of unlocking. Fig. 5 is a perspective of one of the shear-wheel-supporting brackets in connection with a portion of the main frame-bar to which it is secured. Figs. 6 and 7 are sectional elevations, respectively, of the two halves of the shearing-wheel-supporting bracket, divided at the plane of the shearing-wheels' cutting-faces, each half being viewed from the side having the section thus made.

A A are standards, one at each side or end of the machine.

B is the main frame-bar which connects said standards, joining their upper ends.

C is a bracket secured to one of the standards A and affording bearings for the driving end of the shearing-wheel shafts D D.

K K are intermeshing gears secured to the shafts D D immediately inside of the right-hand standard A, and K′ is a power-communicating wheel secured to either one of the shafts D (as illustrated, it is secured to the lower one) outside of said standard A. The gears K K are of equal size, and thereby the two shafts receive precisely the same rate of motion.

E E E are brackets which have other bearings for the shafts D, adjacent to which the shearing-wheels F F run.

The brackets E E E are each secured to the upper frame-bar, B, by a bolt, E′, being further kept in proper relation to the bar by the tongue and groove *b e*, Figs. 5 and 6, on the bar and bracket, respectively. In order that they may be adjusted to different positions in the length of the bar B, said bar, which is formed channel-shaped, the channel opening to the rear, has its vertical web provided with the elongated holes *b′*, Fig. 5; and in order that the brackets may be adjusted to any position whatever in the length of the bar B, they are each provided with two holes, *e′*, for the bolts E′, Fig. 1, said holes being separated by a distance equal to the width of the neck of metal B′ which is left between the proximate ends of the consecutive slotted holes *b′*, Fig. 5, as shown in the broken sectional part of Fig. 1.

G is the bed or frame upon which the plate or sheet of metal to be sheared is carried during the process. It is supported by brackets, of which one is shown and denoted by the letter G′, secured to the standards A, and may be further supported by legs, as G^2, at the forward edge.

H is a gage for the edge of the metal plate. It is arranged in any simple manner to slide toward and from the shear-carrying shaft, as by means of the clasps H′, running upon one of the bars *g* of the bed G. To this gage-bar H there is secured or formed integrally with it the bracket H^2, which reaches up around the edge of the metal plate when the latter is in position on the bed, and at the overhanging end there is pivoted to it the clamp-lever H^3. The lower end, h^3, of this lever is shaped eccentrically with respect to the pivot of the lever, so that when the metal plate is in position underneath the end of said clamp-lever, if the upper end of the lever is pushed toward the shear-carrying shafts, the lower end will bite the plate and clamp it firmly to the gage-bar H.

The essential feature of this invention is found in the brackets E and their relation to the shearing-wheels F. Heretofore in all metal-shearing devices which have employed rolling cutters or shearing-wheels such wheels have been supported at the extremities of arms or frame-bars reaching from the side of the sheet to be cut, over and under said sheet, respectively, to the line along which the cut was to be made. With such a construction the length of the overhanging and under-reaching arms is the limit of width of a strip which the machine will cut out from the sheet of metal being operated upon, and when it is desired to cut very wide strips it is necessary that the machine should have those arms very strong, in order that they may not spring and so destroy the efficiency of the shearing-wheels. This necessitates very heavy ma-

chinery for all large work of that class, and even for quite moderate-sized work, when the plates being cut are of considerable thickness, as from one-eighth to one-quarter of an inch. I aim to avoid this defect and to provide a machine which will have a capacity for cutting strips of any desired width from sheets of any width, limited only by the entire length of the machine without requiring any greater strength of frame-work for cutting wide strips than for cutting narrow strips, and this result I accomplish by providing the brackets E with the bearings E^2 E^2 for the shearing-wheels F, the proximate ends of said bearings being on opposite sides of a plane transverse to the direction of the shafts—that is, one bearing extending from that divisional plane toward one end of the shafts, and the other bearing extending from said plane toward the other end, and providing abutments E^{20} E^{20}, formed as a continuation of the bearings E^2, the abutment which proceeds from the lower bearing, E^2, sloping upward therefrom, and that which proceeds from the upper bearing sloping downward therefrom. The angle of the slope of these abutments should be such that the planes in which they extend, produced, will pass respectively above and below the frame-bar B and clear, also, of all intervening portions of the bracket E, and said brackets should be cut away, if necessary, so that such planes produced would not encounter any portion of the bracket. The shearing-wheels are fastened to their shafts D D in any secure manner, as by being bolted to the flanges D′ of the collars d', which are secured to the shafts D by suitable set-screws, d^{10}.

The operation of this machine is such that when the sheet or plate of metal is placed on the bed and clamped to the gage and advanced by the hand of the operator until it enters the jaw formed by the abutting shearing-wheels F F, above and below it, being engaged by said wheels, it will be fed and at the same time cut after the ordinary manner of shearing-wheels, and the divided parts, striking, respectively, the abutments E^{20} E^{20}, are guided by them on one side upward and on the other side downward and pass out beyond the bar B, one strip passing above and the other below said bar. When two or more of the brackets E and their corresponding cutters are put into use at once, the construction of the adjacent brackets will be reversed, so that, considering any two adjacent pairs of shearing-wheels, the two wheels on the same shaft will be either both inside or both outside of the two wheels on the other shaft, so that the strip cut between two such proximate pairs of shearing-wheels would diverge at both edges the same way, either above or below the bar B, as the case might happen.

In order that the sheet may be released from the clamp-lever H^3 when it has been cut clear across, said clamp-lever is made long enough so that it collides with the upper shaft, D, when the sheet has reached that position, and while the sheet is still in the grasp of the shearing-wheels, and with sufficient force yet remaining in that grasp to pull the lever against the shaft, and thereby rock it back and release the sheet, as shown in Fig. 4.

In the machine constructed as illustrated in the drawings it is not designed that the left-hand bracket E shall be adjusted, but rather that the others shall be adjusted with respect to it, when it is desired to operate with more than one at a time.

It will be obvious that with this machine a sheet of any length may be laid upon the bed G with its length transverse thereto and the excess of its length above the length of the machine extending to the left, and that a strip may be cut off from the right-hand end of such sheet, whose width is limited only by the entire space between the left-hand standard (or the shearing-wheels which stand immediately adjacent to the vertical plane of that standard) and the gear-wheels K, which are adjacent to the right-hand standard, and that in so doing the width of the strip cut off does not in any degree affect the strain which the cutting process brings upon the cutting mechanism or its bearings or supports. It will also be obvious that several strips may simultaneously be cut from the same sheet or plate by the employment of several brackets E and pairs of shearing-wheels pertaining to them, respectively, and setting such brackets at distances apart corresponding to the width of the strips that are designed to be cut; and it will also be obvious that no greater difficulty will be experienced in cutting by means of shearing-wheels adjacent to brackets which are intermediately located between the standards on account of their distance from either standard or from the end of the shaft. This advantage is due to the fact that the brackets which afford the bearings for the shearing-wheels have their arms which contain said bearings extended not from a connecting portion located in the plane of the axes of the wheels, (that is, at the ends of the shafts,) as has heretofore been usual, but from a connecting portion located in the plane of the shearing-faces of the wheels and on the discharge side of said wheels, and that therefore said arms need be scarcely longer from the portion of the bracket which connects them than the radius of the shearing-wheels. In addition to the fact that the portion of the bracket which connects the shearing-wheels' bearing is located in the plane of the shearing-faces of the wheels, it is also necessary, in order that the two severed parts of the metal which is cut may pass out freely beyond the wheels, that such connecting portion shall be entirely traversed by that plane—that is, so that if division should be made through the bracket in that plane such division would completely sever from each other the bearings, respectively, of the two co-operating shearing-wheels.

It is not essential that the bearings should be at opposite sides of this plane, though that is the most convenient construction, and when that construction is adopted, as shown in the drawings, the above-described feature is necessarily obtained—that is, when the bearings are on opposite sides of the plane the plane produced will necessarily sever them and thus fulfill the conditions stated. It is not absolutely essential, either, that there should be the abutments E^{20} to guide the severed strips, since the action of the wheels themselves tends to cause the strips to diverge, so that they would clear the connecting-neck of the bracket and the supporting-frame if those parts were not unduly large; but the presence of the sloping abutments is a great advantage and convenience in giving certainty to the action, and requiring less attention of the operator in operating with metals of different thicknesses and different degrees of elasticity and rigidity.

I claim—

1. In a shearing-machine, in combination with a pair of shearing-wheels, a bracket having the bearings for said wheels, respectively, the portion of said bracket which connects said bearings being located on the discharge side of the wheels and extending transversely to the plane of their shearing-faces, and completely traversed by said plane produced, so that severance of the bracket in that plane would sever from each other the bearings of said wheels, respectively, substantially as set forth.

2. In a shearing-machine, in combination with a pair of shearing-wheels, a bracket having the bearings for said wheels, the portion of said bracket which connects said bearings being located on the discharge side of the wheels in the plane of their shearing-faces and completely traversed by said plane, said bracket having also two abutments extending, respectively, in opposite directions from said plane and having divergently-sloping faces in planes which intersect beyond the contact of the shearing-wheels, substantially as set forth.

3. In combination with the frame-bar B, a bracket, E, and the shearing-wheels journaled thereon, said bracket having the portion which connects the bearings of the wheels, respectively, located on the discharge side of the wheels in the plane of the shearing-face of the wheels and completely traversed by said plane, the bracket being connected to the frame-bar beyond said portion which connects the bearings, substantially as set forth.

4. In a shearing-machine, in combination with the frame-bar B, two or more brackets, E, a pair of shearing-wheels journaled on each of them, the portion of the brackets which connects the bearings of said wheels being located on the discharge side of the wheels and extending across the plane of their shearing-faces and completely traversed by said plane, said brackets being secured to the frame-bar beyond that connecting portion, and one or more of them being adjustable longitudinally with respect to the frame-bar, substantially as set forth.

5. In a metal-shearing machine, in combination with the shearing-wheels, a bed to support the plate or sheet to be cut, a gage-plate upon said bed, and interfitting ways and guides on the bed and gage-plate, parallel to the plane of the shearing-face, and a clamp to bind the plate which is to be cut to the gage-plate, substantially as set forth.

6. In combination, substantially as set forth, the frame, the shearing-wheel shaft D, supported on it, the bed rigid with it, and the gage-plate sliding on the bed and having the clamp-lever H^3 to bind the plate which is to be cut, said lever extending far enough from the bed to collide with the shaft D, whereby the feeding action of the shearing-wheels causes the shaft to unlock the sheet at the end of the cut.

7. In a shearing-machine, in combination, substantially as set forth, the frame-bar B, having elongated bolt-holes b', with intervening necks of metal, B', a bracket, E, having bearings for the shearing-wheels, and having two bolt-holes, e', as far apart as the width of the necks B', and the bolts E', adapted to pass through the holes b' and into one of the holes e'.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 21st day of April, 1888.

LA VERNE W. NOYES.

Witnesses:
JESSIE E. SPRAGUE,
MYRTLE GIFFEN.