No. 736,505. PATENTED AUG. 18, 1903.

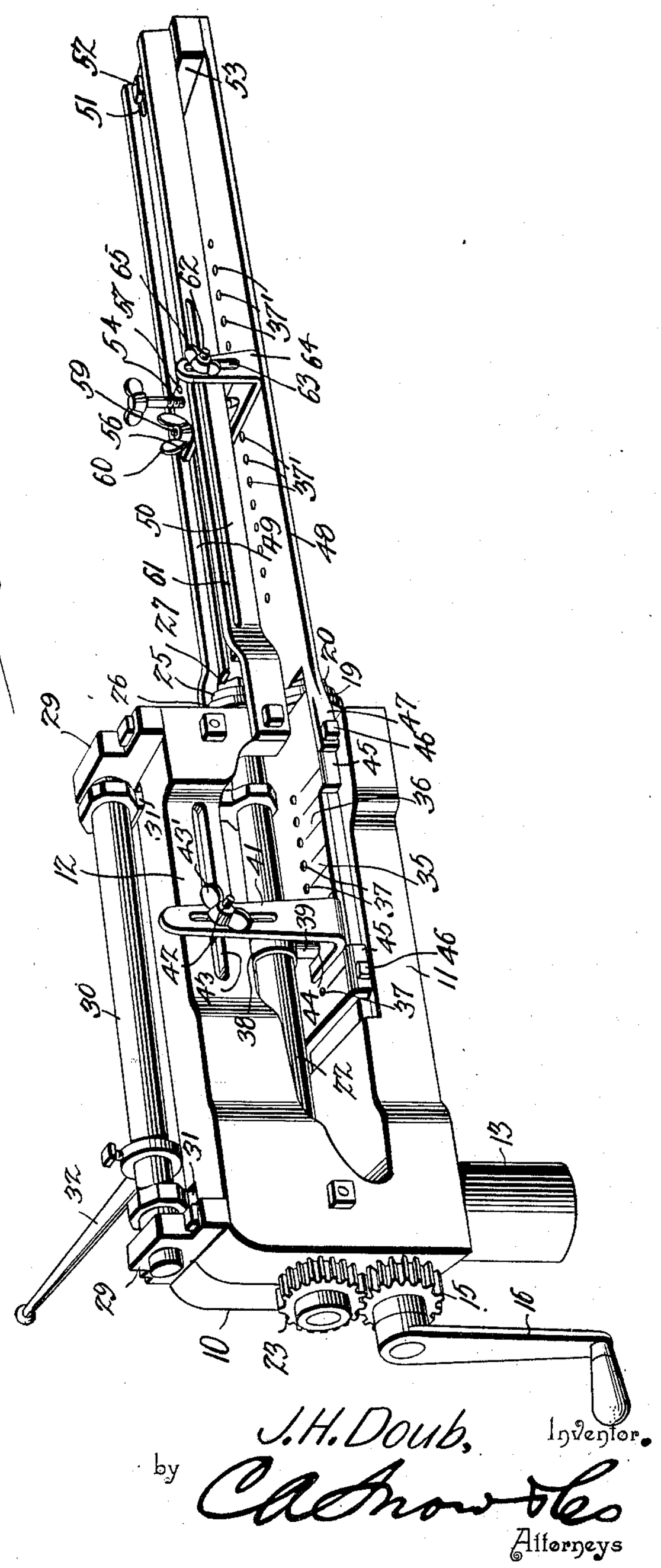
J. H. DOUB.

METAL CUTTING MACHINE.

APPLICATION FILED MAR. 24, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



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NO MODEL. 2 SHEETS—SHEET 2.

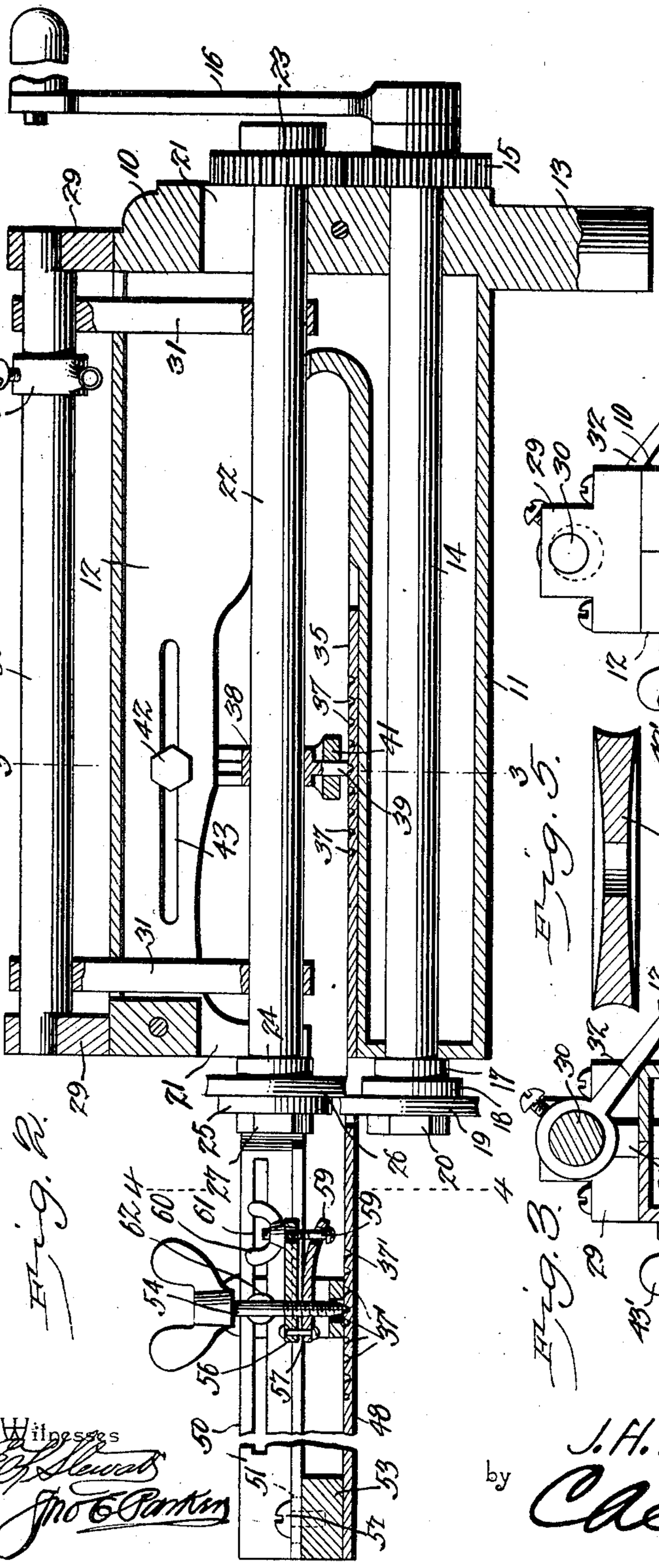

Fig. 2.

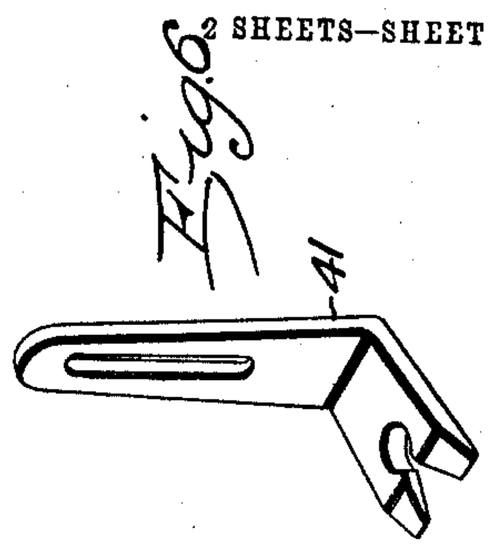

Fig. 6.

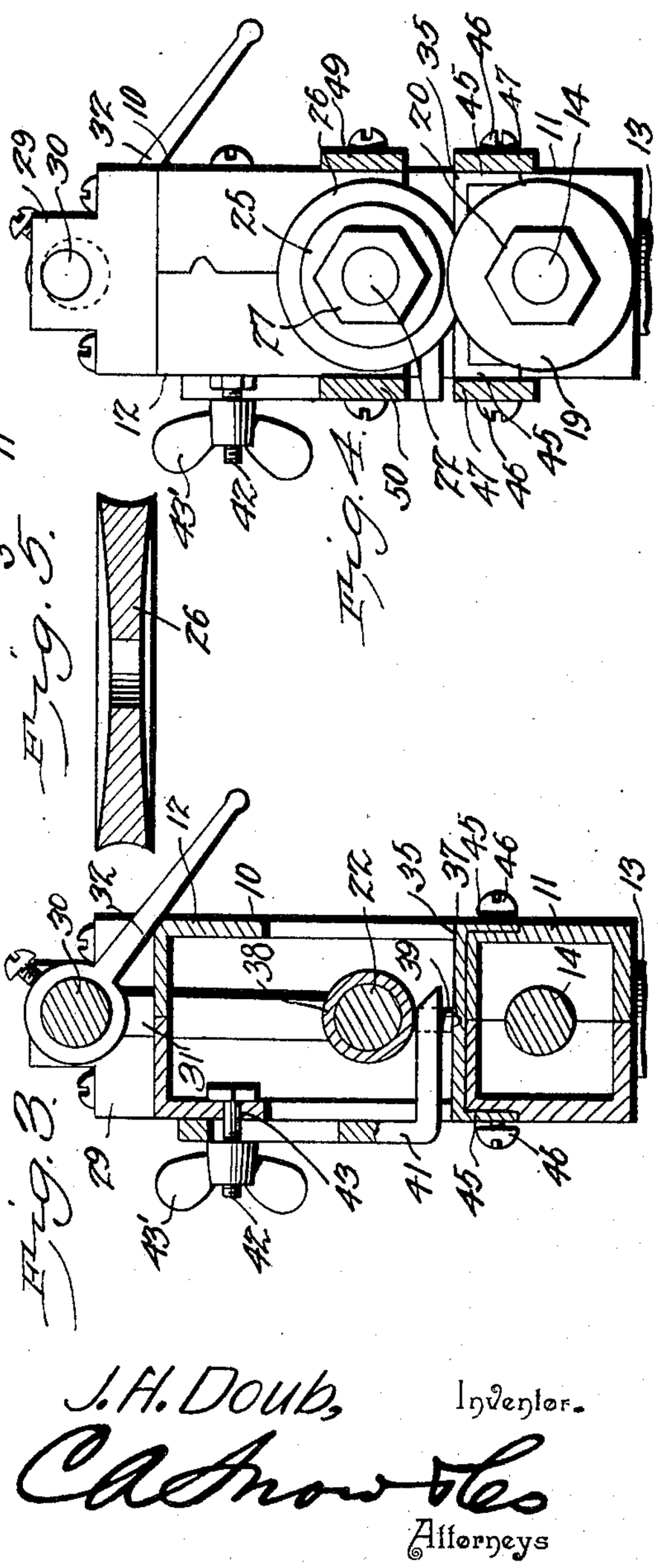

Fig. 4.

Fig. 5.

Fig. 3.

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No. 736,505. Patented August 18, 1903.

UNITED STATES PATENT OFFICE.

JOHN H. DOUB, OF WALNUT, KANSAS.

METAL-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 736,505, dated August 18, 1903.

Application filed March 24, 1902. Serial No. 99,799. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. DOUB, a citizen of the United States, residing at Walnut, in the county of Crawford and State of Kansas, have invented a new and useful Metal-Cutting Machine, of which the following is a specification.

My invention relates to certain improvements in machines for cutting sheet metal, and has for its principal object to construct a machine capable of performing a variety of work, as in making straight, curved, or irregular cuts, for the formation of flat disks of varying size, and for the cutting of cylindrical bodies, such as stovepipe, drums, and the like.

A further object of the invention is to provide suitable means for separating the cutting-disks to permit the stopping and starting of the cutting operation at a desired point, and a still further object is to provide for the proper adjustment of the metal-holding clamps during the cutting of a disk or the like.

A still further object of the invention is to provide an improved form of cutting-disk which may be readily sharpened when worn and which may be reversed in order to present a fresh cutting-surface.

With these and other objects in view the invention consists in the novel construction and combination of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a metal-cutting machine constructed in accordance with my invention. Fig. 2 is a central longitudinal sectional elevation of the same. Figs. 3 and 4 are sectional elevations of the machine on the lines 3 3 and 4 4, respectively, of Fig. 2. Fig. 5 is a detail sectional view, on an enlarged scale, of one of the metal-cutting disks. Fig. 6 is a perspective view of one of the presser-feet.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The frame of the machine is preferably formed of two mating castings secured together by suitable bolts to form a frame 10, comprising a lower bar or base 11 and an arm 12. The machine, while it may be so arranged as to rest on any suitable base or support, is preferably provided with a depending lug 13, which may be fitted into the socket of a universal standard such as is usually found in metal-working shops and adapted for the reception of beading and other tools.

In the base portion of the machine are suitable bearings for the support of a longitudinal shaft 14, both ends of which extend beyond the ends of the frame. At one end of the shaft 14 is a gear-wheel 15, which preferably is arranged closely against the outer surface of the base in order to prevent longitudinal movement of the shaft in one direction, and at the extreme end of the shaft is a crank 16, by which the shaft may be turned, or a belt-wheel or other power-operated device may be employed as a substitute for the crank. At the opposite end of the shaft 14 are a pair of collars 17 18, the smaller collar bearing against the end of the frame to prevent longitudinal movement of the shaft and the larger collar 18 serving to space at a slight distance from the end of the frame a suitable cutter-disk 19, which is confined in place by a bolt or nut 20. In the upper arm of the frame are two elongated slots 21 in vertical alinement with the axis of the shaft 14 and serving as guides for a second shaft 22, extending parallel with the shaft 14 and movable from and toward said shaft. At one end of the shaft 22 is a gear-wheel 23, intermeshing with the gear 15, and at the opposite end are arranged a pair of spacing-collars 24 and 25 and a cutter-disk 26 of a character similar to the disk 19 of the lower shaft and confined in place by a suitable nut or bolt 27. The disks are so arranged that the inner edge of the lower disk and the outer edge of the upper disk will be in close contact with each other to form a sharp cutting-face.

On top of the arm 12 are two pillar-blocks 29 for the support of the ends of an eccentric shaft 30, the bearing portions of the shaft being arranged eccentrically to the axis of the shaft, and extending between the shaft 22 and the upper shaft 30 are a pair of pitmen 31, which when the shaft 30 is turned, as by a suitable crank-arm 32, serve to raise or lower the shaft 22 and move the upper cutter from contact with the lower, or vice versa.

The machine as thus far described forms a practically complete and operative device by which sheet metal may be cut in either straight, curved, or irregular lines, and the metal may be introduced or removed from the cutter-disk by the raising and lowering of the shaft 22. By arranging the lower disk outside the upper disk I am enabled to introduce stovepipes, air-pipes, drums, and articles of similar construction between such disks for the purpose of trimming the same.

In order to provide a suitable scale for determining the width of the strip to be cut, and, further, for the purpose of permitting the cutting of metal in the form of disks, I arrange on the upper surface of the bed a plate 35, having suitable designating-marks 36 to form a scale, by which the distance of the edge of the material from the cutter may be readily determined. In this scale-plate are also formed a series of centering-recesses, preferably arranged at equidistant intervals, and on the shaft 22 is placed a collar 38, which permits the free rotation of the shaft and is longitudinally movable on said shaft. This collar carries a depending pin 39, having a tapering point adapted to fit in any one of the recesses 37, the relative arrangement being such that when the shaft 22 is in elevated position the pin will be moved above the plate 35 and when the shaft is depressed the pointed pin will be forced through the sheet metal and into one of the recesses 37. As the scale 36 and recesses 37 are arranged at frequent intervals, it is possible to form a disk of any desired size by properly adjusting the pin 39 after first raising the shaft, and then when the shaft is depressed the pin will puncture the metal and the upper cutter-disk will coact with the lower disk to form the first cutting action, after which the shaft 14 is turned in the usual manner, and the metal turns on the pin as an axis during the cutting operation. To properly hold the metal at the center of the disk, I employ a presser-foot 41 of substantially L-shaped form, the vertical member of said foot extending up alongside the arm 12 and being vertically slotted for the reception of an adjusting-bolt 42, adapted to a longitudinal slot 43 in the arm, the threaded portion of the bolt extending through both of the slots and adapted for the reception of a thumb-nut 32, by which the presser-foot may be locked in any position to which it may be adjusted. The lower portion of the presser-foot is bifurcated and has an enlarged opening 44 for the passage of the larger diameter of the pin 39, while the open space between the bifurcated members is of a less width than the diameter of the pin, so that said pin is rigidly held and braced and any movement of the sheet metal is prevented. The space between the two portions of the presser-foot is sufficiently wide to permit the passage of the pointed lower end of the pin 39 when said pin is oscillated with the shaft 22 as a center; but when it becomes necessary to separate the pin and presser-foot the thumb-nut 43′ is loosened or is altogether removed and the presser-foot and pin are moved longitudinally of the shaft until the base of the presser-foot is beyond the end of the scale-plate 35. The scale-plate is arranged slightly above the level of the frame, or a suitable space is formed beyond the end of the plate to permit a slight downward movement of the presser-foot, after which the collar 38 and pin may be turned on the shaft and moved to the rear portion of said shaft until it is again needed. The presser-foot may be altogether removed, or it may be adjusted to a position above the shaft 22 where it will not interfere with the insertion of sheet metal to be cut. It has not been found practicable to make the centering-recesses 37 at a less distance from each other than about one-eighth of an inch, and in order to provide for the cutting of a disk of a diameter in which less than an eighth of an inch is included I provide for the longitudinal adjustment of the scale-plate. In the present instance the plate is provided with a number of downwardly-projecting portions 45, fitting over the edges of the base and confined in position by a number of set-screws 46. By loosening these screws the plate may be adjusted to or from the cutting-disks for any desired distance, and thus permit the cutting of a disk of metal or of other material of any desired diameter within the capacity of the machine.

The length of the arm or gooseneck 12 is in some cases less than the radius of a disk to be cut, and in order to provide for the cutting of disks of larger diameter I employ a secondary centering device of the character best shown in Figs. 1 and 2. To the side flanges 45 of the scale-plate 35 is secured a pair of arms 47, projecting from an elongated bar or plate 48. The arms 47 may be secured in position in any desired manner; but preferably two of the set-screws 46 are employed for this purpose, so that the plate 48 may be adjusted longitudinally without the employment of any auxiliary adjusting mechanism. To the depending portion of the arm 12 are secured two bars 49 and 50, arranged above and parallel with the plate 48, the outer ends of both arms being provided with slots 51, through which may pass securing screws or bolts 52 to a block 53, carried by the bar or plate 48, this arrangement permitting of the slight longitudinal adjustment of the plate 48 when necessary. The plate 48 is provided with a series of equidistantly-spaced centering-notches 37′ for the reception of the pointed end of a centering-pin 54, the end of the pin being forced through the sheet of metal to be cut and received in any predetermined notch or recess. The side bars 49 and 50 are preferably in the form of angle-bars, their lower horizontal webs being spaced to form a continuous slot from end to end of the bars. At a point above the hori-

zontal webs of said bars is a rectangular plate 56, which is secured by loose rivet or pin 57 to a slightly-curved plate 58, arranged below said webs, the upper plate 56 being threaded for the reception of the similar threads on the pin 54, so that the latter may be turned and forced down through the metal. To hold the plates 56 and 58, with the pin, in proper position, the lower plate 58 is provided with a threaded bolt 59, extending through a suitable opening in the upper plate 56 and provided with a thumb-nut 60, which may be turned to clamp the curved plate 58 against the lower face of the webs, and thus securely bind the plates in position. In the vertical web of the bar 50 is an elongated slot 61, adapted for the reception of a threaded bolt 62, which extends through the slot 61 and the vertical slot 63, formed in the vertical arm of a presser-foot 64, which may be of a character similar to the presser-foot 41 and serves to properly hold the metal and to act as a support for the lower portion of the centering-pin 54. The bolt 62 is provided with a thumb-nut 65, by which the presser-foot may be held in any adjusted position.

The cutter-disks are of the same size and the same construction, each comprising a disk of hardened steel or other suitable metal and having their peripheral portions slightly concaved to form two cutting edges, so that when one cutting edge is worn the disk may be removed and reversed for the employment of the opposite cutting edge. To provide for the ready sharpening of the disk, each face is concaved, as indicated in Fig. 5, and when worn a fresh cutting edge may be readily formed by placing the disk on a flat stone or other grinding-surface, as will be readily understood.

It is not always necessary for the centering-pin to actually pass through the material to be cut, a slight indentation in the metal being sufficient to hold the work in position.

While the construction herein described, and illustrated in the accompanying drawings, is the preferred form of the device, it is obvious that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of my invention.

Having thus described my invention, what I claim is--

1. A metal-cutting machine comprising a frame, a pair of disk-carrying shafts, cutting-disks on said shafts, gearing connecting the shafts, an eccentrically-mounted shaft carried by the frame at a point above the upper disk-carrying shaft, and pitmen connecting the eccentric shaft to said upper disk-carrying shaft.

2. In a metal-cutting machine, the combination of the disk-carrying shafts, cutting-disks thereon, gearing connecting the shafts, vertically-disposed guiding-slots for the upper shaft, an eccentrically-mounted shaft carried by the frame, pitmen connecting the eccentric shaft to said upper shaft, and an operating-arm carried by said eccentric shaft, substantially as specified.

3. In a metal-cutting machine, the combination of the disk-carrying shafts, cutting-disks thereon, means for raising and lowering the upper shaft, and a centering-pin carried by said upper shaft and movable vertically therewith.

4. In a metal-cutting machine, the combination of the upper and lower disk-carrying shafts, cutting-disks thereon, a supporting-bed having centering notches or recesses, means for raising and lowering the upper shaft, and a centering-pin adjustable longitudinally of the upper shaft and movable vertically therewith.

5. In a metal-cutting machine, the combination of the disk-carrying shafts, cutting-disks thereon, means for raising and lowering the upper shaft, a supporting-bed having a series of centering notches or recesses, a centering-pin adjustable longitudinally of the upper shaft and movable vertically therewith, and a presser-foot adapted for contact with the upper surface of the material to be cut and serving as a lower bearing for said centering-pin.

6. In a metal-cutting machine, the combination of the upper and lower disk-carrying shafts, cutting-disks thereon, means for raising and lowering the upper shaft, a supporting-bed having a series of centering notches or recesses, a loose collar carried by the upper shaft and adjustable longitudinally thereof, a centering-pin carried by the collar and having a pointed end adapted to be received into any one of said centering notches or recesses, and an adjustable presser-foot forming a lower bearing or suppport for said centering-pin.

7. In a metal-cutting machine, the combination of the upper and lower disk-carrying shafts, cutting-disks carried thereby, an eccentric shaft having an operating-crank, pitmen connecting the upper shaft and eccentric shaft, a loose collar carried by the upper shaft, a centering-pin carried by said loose collar, and an adjustable presser-foot forming the lower bearing or support for said centering-pin.

8. In a metal-cutting machine, the combination of the frame, upper and lower disk-carrying shafts supported thereby, cutting-disks carried by said shafts, gearing connected to said shafts, a supporting-bed having an indicating-scale and provided with a series of centering notches or recesses, an eccentric shaft carried by the frame, a crank-arm for operating said eccentric shaft, pitmen connecting the eccentric shaft to said upper shaft, a collar carried by the upper shaft and adjustable longitudinally thereof, a centering-pin depending from said collar and having a lower pointed end adapted to pass through the metal to be cut, a presser-foot forming a

lower support for said centering-pin and adapted for contact with the surface of the metal, said presser-foot having an opening for the reception of the centering-pin and being bifurcated to permit the passage of the pointed end of said pin.

9. In a metal-cutting machine, the combination of the frame, upper and lower disk-carrying shafts, cutting-disks thereon, means for raising and lowering the upper shaft, a supporting-bed, a longitudinally-adjustable scale-plate carried by the supporting-bed and having centering notches or recesses, and a longitudinally-adjustable centering-pin carried by the upper shaft and movable vertical therewith, substantially as specified.

10. In a device of the class specified, a cutting-disk having a concaved periphery and concaved sides.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN H. DOUB.

Witnesses:
J. M. GOFF,
C. A. TRIPP.