

No. 837,060.

PATENTED NOV. 27, 1906.

C. O. HARLEY.
METAL PLANING MACHINE.
APPLICATION FILED FEB. 7, 1906.

Fig. 1.

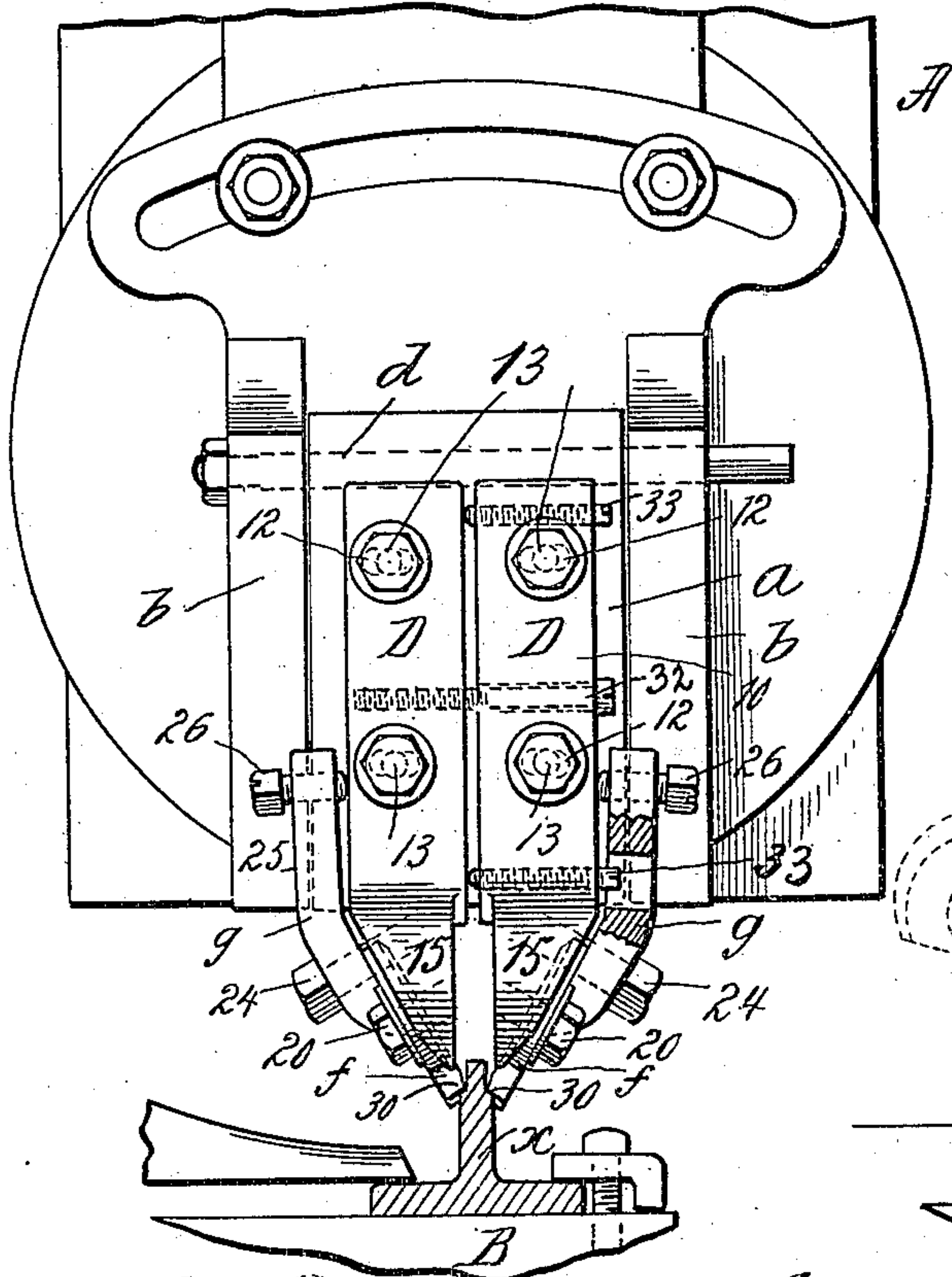


Fig. 2.

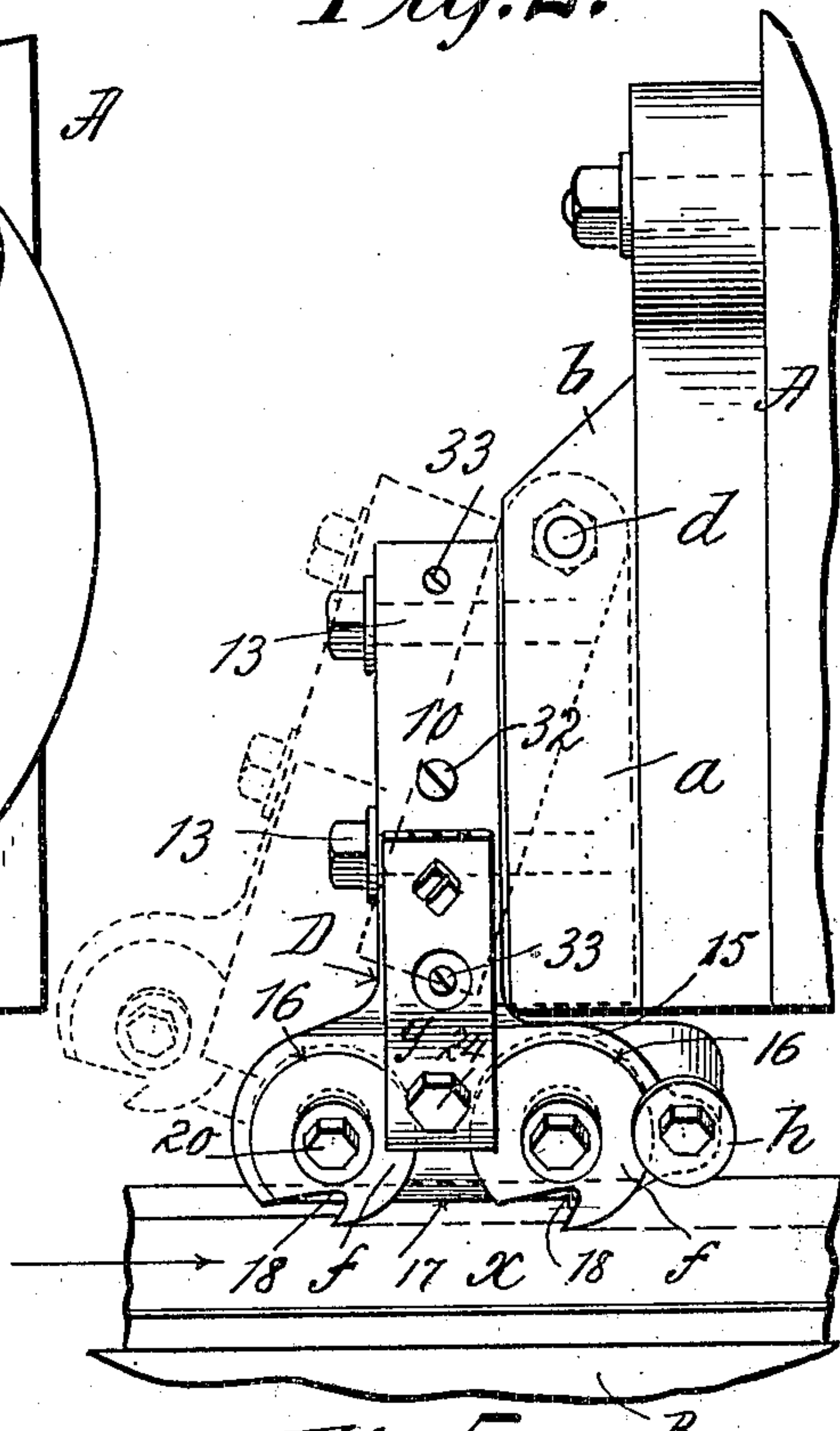


Fig. 3.

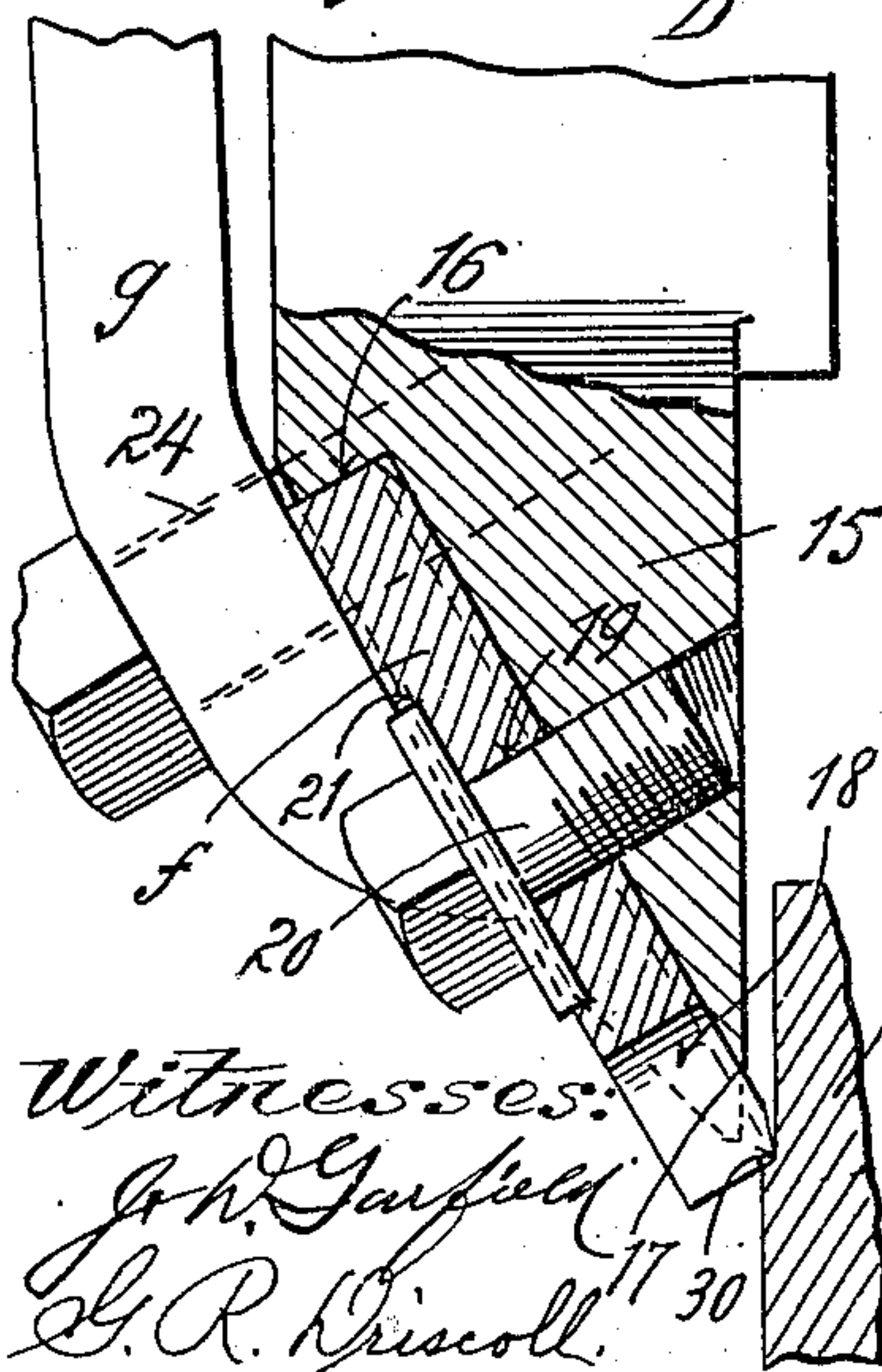


Fig. 4.

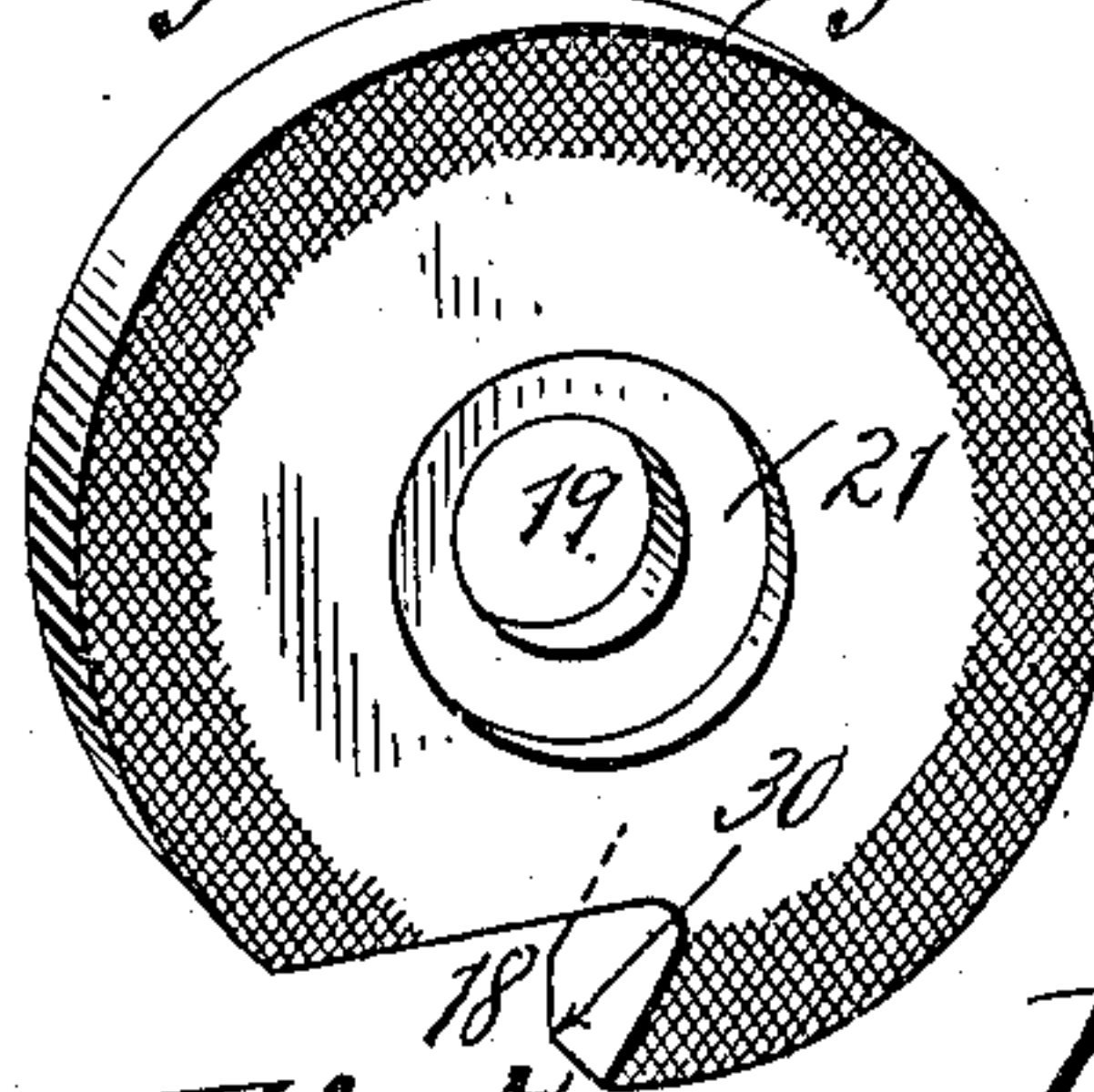


Fig. 5.

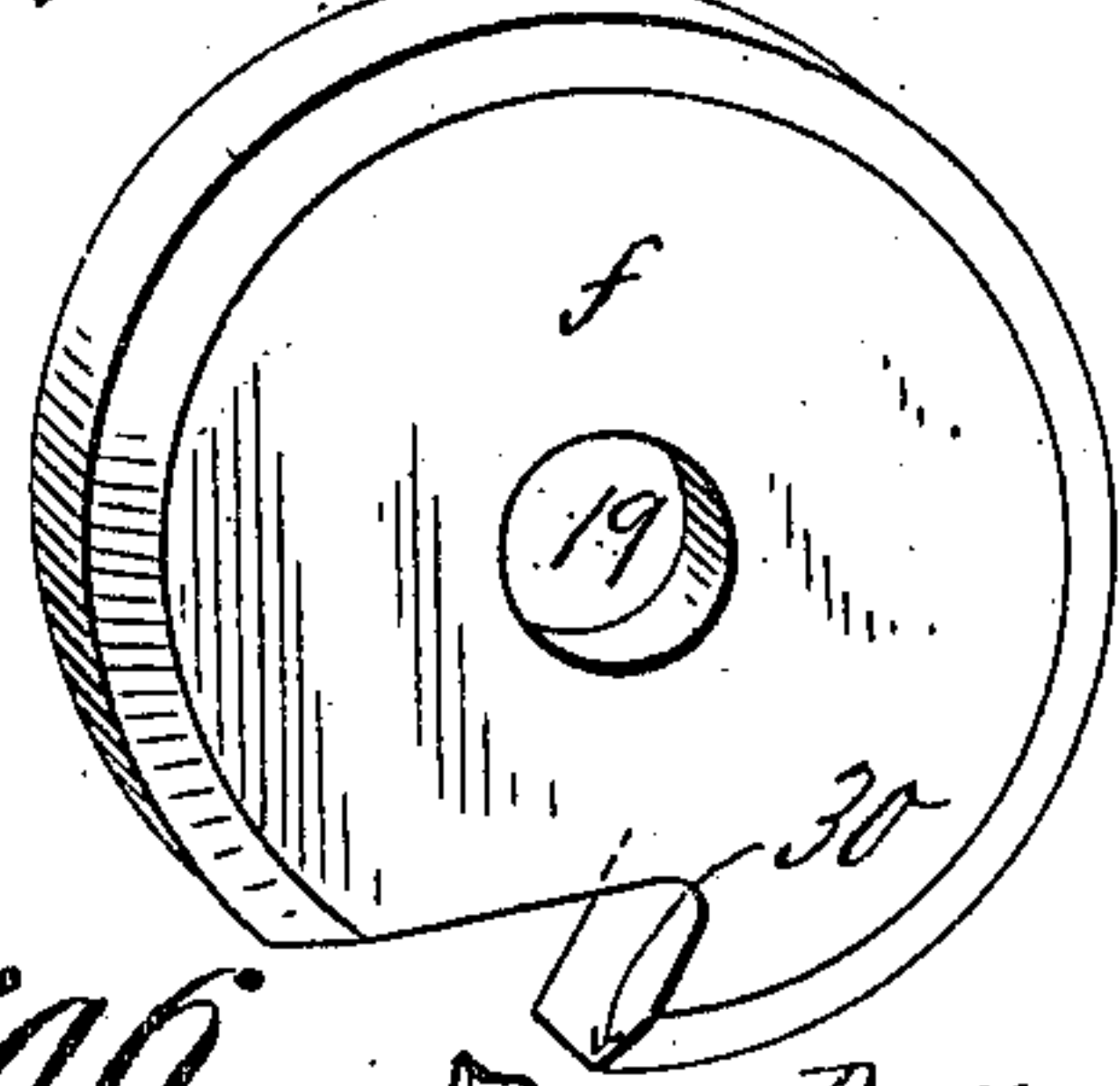
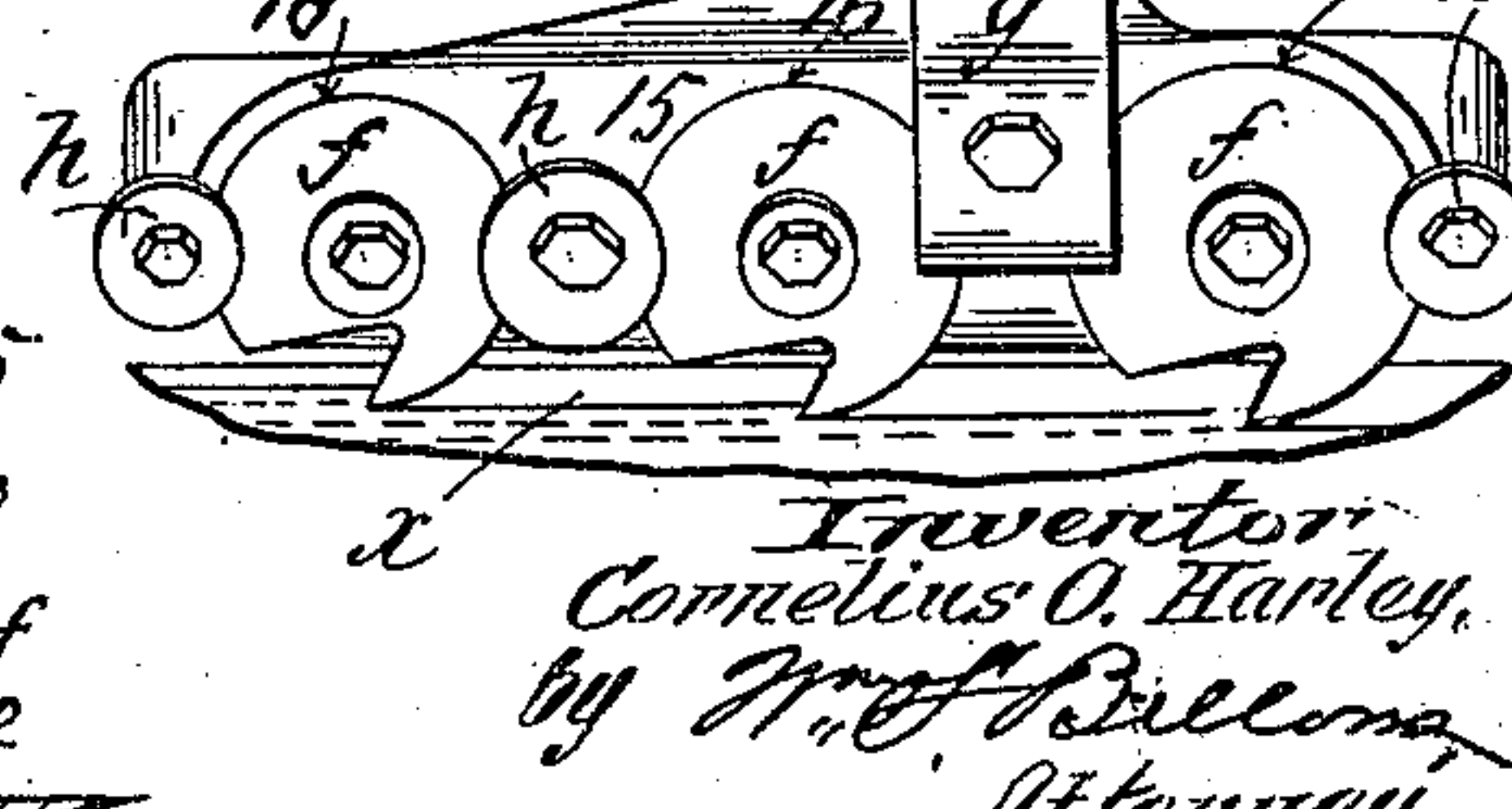


Fig. 6.



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METAL-PLANING MACHINE.

No. 837,060.

Specification of Letters Patent.

Patented Nov. 27, 1906.

Application filed February 7, 1906. Serial No. 299,905.

To all whom it may concern:

Be it known that I, CORNELIUS O. HARLEY, a citizen of the United States of America, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Metal-Planing Machines, of which the following is a full, clear, and exact description.

10 This invention relates to improvements in planing-machines for metal, and is particularly applicable on a planing-machine of the general description set forth in Letters Patent of the United States granted to me and another, dated December 19, 1905, No. 807,740.

20 The particular object of this invention is to provide equipments for the planing-machine whereby several tools or cutters may simultaneously operate to make cuts one in advance of the other and operable at the same time on one or more surfaces of a piece to be planed at each forward pass or run of the piece carried on the reciprocatory carriage relatively to the tools, to the end of greatly multiplying the capacity of the planing-machine and so that the planing of different pieces of work may be performed in only a fraction of the time usually heretofore required.

30 Another object of the invention is to provide new tool-holders and equipments for the planing-machine and means for mounting the same on the feed-head, whereby the holder is adapted for the reception of planing tools or cutters which are equally well adapted on each passage of the work for making planing cuts on a vertical or a horizontal face of the work to be finished.

40 The invention consists in the constructions of parts and the combination and arrangement of parts, all substantially as hereinafter fully described, and set forth in the claims.

45 In the accompanying drawings, Figure 1 is a front elevation of a tool-carrying feed-head of a planing-machine and a portion of the work-carriage, showing a piece of work clamped thereon, it being understood that said head, as usual, is capable of vertical and also cross feeding movements. Fig. 2 is a side elevation of the same. Fig. 3 is a view in elevation and partial section of parts especially comprising a holder and one of the tools shown in Fig. 1, but on a somewhat larger scale. Fig. 4 is a front perspective

view of one of the disk-shaped planing tools or cutters. Fig. 5 is a rear perspective view of the same. Fig. 6 is a front view somewhat similar to the tool-carrying portion on Fig. 2, but showing an increased number of disk tools. Fig. 7 is a view similar to Fig. 3 and illustrating capabilities for holding tools for horizontal surface planing, as well as planing on a vertical surface.

Similar characters of reference indicate 65 corresponding parts in all of the views.

In the drawings, A represents the tool feed-head of a planing-machine, the same being understood as having its location above the reciprocatory carriage of the planing-machine, a portion of which carriage is represented at B, and it is common to provide more than one of the tool-carrying feed-heads A for planing-machines.

75 The means for imparting the feed movements vertically and horizontally to the feed-head will not be here illustrated or described, as the same involves no novelty.

The feed-head comprises a plate or block *a*, located between separated cheeks *b b* of the head and hung thereto on the pivot-bolt *d*, such part being backed up against and resisted by the face of the head as the carriage and work run forwardly; but the said plate or block *a* is free to swing as represented in the dotted lines, Fig. 2, when the carriage has its reverse movement, so the returning piece of work—such, for instance, as represented at *x*—on the carriage may pass freely by the cutting-points of the planing-tools *f* without 90 injuring the latter.

Two tool-holders D are shown as carried by each feed-head A, the same being mounted on the aforementioned pivotally-hung block or plate *a*, and each tool-holder is 95 equipped with means for the reception and confinement thereon or therein of a plurality of the disk cutters or planing-tools *f*, and one of the tool-holders will now be fully described.

100 The tool-holder comprises a vertical shank 10, having horizontal slots 12 12, Fig. 1, through the same from front to rear, and through which slots the confining-bolts 13, having the enlarged heads, pass to engagements into the block or plate *a*. The shank 105 at its extremity which depends below the head to a position suitably adjacent the carriage B has a portion 15, which is widened in a horizontal line parallel with the length of the carriage, and the outer face of this 110

lower widened portion is beveled, as particularly shown in Figs. 1 and 3.

The holder is made with a plurality of substantially circular sockets 16, which are side-
5 wise open at the lower edge 17 of the beveled widened portion 15 of the holder.

The disk-shaped cutters *f* are made with angular recesses 18 in their edge portions, one side of each recess extending to the disk
10 defining the cutting portion of the tool, and said disks are arranged in said holder-sockets so that the cutting-points of the tools are positioned for one to further intersect or extend
15 across the cutting plane than another. This may be done, for instance, as shown in Figs. 2 and 6, by having the sockets made with their centers all in the same horizontal line, but of different diameters for cutting tool-
20 disks of different diameters, so that the cutting-points of one of the tools is farther extended beyond the edge of the holder than another.

The tool-disks are preferably made of diameters corresponding to those of the sock-
25 ets in the holder therefor, so as to closely fit therein, and the clamping-bolts 20 confine with reasonable stability the tool-disks in the holder-sockets, the shanks of said bolts passing through the central holes 19 in the cut-
30 ters and with screw-thread engagements into the widened bar portion of the holder beyond the bases of the sockets, and the enlarged heads of the bolts directly or through the medium of washers bind on the front
35 faces of the tool-disks. The bolt-disks preferably have countersunk seats 21, Figs. 3 and 4, in which the bolt enlargements are set.

In addition to the confining bolts clamps are mounted on and form parts of each tool-
40 holder and have confining-bearings against the faces of the disk at points laterally removed from the bearings of the head enlargements of the clamping-bolts.

One clamp for each holder is represented
45 at *g* and the other at *h*, and the clamp *g* consists of a lever of an obtuse angular shape, having a bolt 24 passing loosely through the member thereof which is oblique to the substantially vertical member 25, the shank of
50 said bolt-screw engaging into the widened bar portion 15 of the holder and constituting a fulcrum on which the clamp may have a slight, although sufficient, rocking movement.

55 Another bolt 26 screws through the upper portion of the clamp *g* and against the face of the tool-holder, and by properly turning the bolt 26 a prying action is exerted, so as to swing the clamp and place its lower and in-
60 clined member in a clamping confinement against the faces of two of the disk tools *f f*, it being perceived on reference to Figs. 2 and 6 that the central vertical line of the clamp *g* is so located as to cross the widened part of

the holder midway between two of the sock- 65 ets and that the width of the clamp is so wide as to materially overlap on two of the tool-disks.

As seen in Fig. 2, each tool-disk is centrally clamped and also clamped at their ap- 70 proached edges, and the additional clamp *h* is applied on the holder, so as to clamp the right-hand tool-disk also at its marginal portion opposite that bound by the clamp *g*, and a like additional clamp may be applied at the 75 left-hand marginal portion of the left-hand disk, although in practice generally the central bolts and the lever-clamp *g* between and in common to two of the disks are adequate, it being always appreciated, however, that 80 there can never be too great rigidity in the holding of the tool in the socket therefor.

By the making of the tool-disk sockets within the oblique face of the holder the tools are carried in a plane oblique to the median 85 vertical plane of the machine, as well also as to the horizontal top of the bed and carriage, and the manner of presentation of the cutting edge 30 of each tool-disk to the work is clearly seen in Figs. 1 and 3, and the excess of the 90 distension of one of the cutting-points beyond the other for both tools to simultaneously make their cuts during one and the same pass of the work is shown in Fig. 2, an extension of this idea of means being further- 95 more shown in Fig. 6, wherein three tool-disks are clamped in the single holder having respective sockets therefor.

The present improvements were primarily devised for the planing of rails of T shape, as 100 shown in Fig. 1 at *x*, and it becomes entirely practical and unusually desirable to utilize the equipments for planing both sides of the upstanding middle portion of the rail at the same time, and hence two of the tool-holders 105 D D are bolted onto the front face of the plate or block *a* of the feed-head side by side, and in order that the tools carried by both of the holders may be maintained to a nicety in proper relations means for adjusting the one 110 holder bodily relatively to the other and for confining the holders in adjustment are provided, the same, as shown, consisting of a screw 32, which passes loosely transversely through one of the tool-holder shanks and 115 with a thread engagement into the other, and set-screws 33 33, which thread through one of the tool-holder shanks and have endwise bearing against the vertical edge of the other tool-holder shank. 120

When making the adjustment, either or both sets of the bolts 13 are loosened, the screws 33 33 are in some cases withdrawn, and the screw 32 is operated to spread or draw together the shanks of the holders. 125 The screws 33 33 are then set up to their bearings, and the bolts 13 13 are tightened against the faces of the holder-shanks.

The face of the tool-disks may be roughened, as shown in Fig. 4, for increasing the certainty of engagement of the clamps *g* and *h* thereagainst.

5 It will be apparent by comparison of Figs. 2, 3, and 7 that with a holder having sockets obliquely positioned for a plurality of plate or disk tools the planing of horizontal surfaces may be as well performed as the planing
10 of vertical surfaces, with no change other than the positioning of the disk tools with the cutting-points distended laterally relatively to their face planes, (as seen by full and dotted line indications at *f* and *f*², Fig. 7,) instead of
15 positioning the disk tools with their cutting-points distended one radially more than another, as indicated in the other views. The positioning of one of the disks in a plane face-wise offset from that of the other may be ac-
20 complished by letting one disk tool set fully against the base of its socket, while by a shim 38 the other tool-disk in the same holder is held in a relatively slightly outward position; but of course for horizontal surface planing
25 the intermittent cross-feed of the machine would be employed instead of the vertical feed required between the passes of the work undergoing vertical surface planing. The disk cutters may be reground repeatedly on
30 tangential or radial lines until much of their outer portions are used up.

I claim—

1. A tool-holder comprising a bar portion, a plurality of disk-shaped cutters of varying
35 diameter having angular recesses in their edge portions, one side of each recess, extending to the disk periphery, defining the cutting portion of the tool, said disks being arranged on said holder with the cutting-
40 point of one extended farther beyond the edge of the holder than that of another, clamping-bolts, the shanks of which pass through the cutter-disks with thread engage-
45 ments into the bar, and which by their heads bind on the front faces of the disks, and clamps mounted on the holder and having confining-bearings against the faces of the disks laterally of the points of bearing of the heads of said clamping-bolts.

50 2. A tool-holder comprising a bar portion having within its face a plurality of substantially circular sockets the sides of which open at one edge of the bar, a plurality of disk-shaped cutters having angular recesses in
55 their edge portions, one side of each recess, extending to the disk periphery, defining the cutting portion of the tool, and said disks being arranged in said holder-sockets so that the cutting-point of one disk will intersect the
60 cutting plane of another disk, clamping-bolts, the shanks of which pass through the cutter-disks with thread engagements into the bar, and which by their heads bind on the front faces of the disks, and clamps mounted

on the holder, and having confining-bearings 65 against the faces of the disks laterally from the bearings of the said clamping-bolts.

3. A tool-holder having within its front side a substantially circular socket a side of which however is open at the edge of the 70 holder, a disk cutter, in said socket, having an angular edgewise recess, one side of which defines the cutting portion of the tool, a clamping-bolt passing centrally through the cutter-disk, screw engaging the holder be- 75 yond the base of the socket and having a head enlargement bearing on the front face of the disk, and a clamp consisting of a lever intermediately fulcrumed on the holder and having a screw engaging through one extrem- 80 ity thereof and in bearing against the side of the holder, and operable to force the lever to bind, at its opposite extremity, against the face of the cutter-disk.

4. A tool-holder having within its front 85 side a plurality of substantially circular sockets having different diameters the sides of which are open at one edge of the holder, disk cutters of different diametrical sizes in said sockets each having an angular edge- 90 wise recess one side of which defines the cutting portion of the disk tool, and means for immovably confining the disk cutters in said sockets with their cutting-points in unequal distention beyond the side of the holder at 95 which said sockets open.

5. A tool-holder comprising a bar portion having within its face a plurality of substan- 100 tially circular sockets of varying diameter, each having the side thereof open at one edge of the bar, a plurality of disk-shaped cutters of different diameters and having angular re- 105 cesses in their edge portions, one side of each recess, extending to the disk periphery, defining the cutting portion of the tool, and said disks being arranged in said holder-sockets so that the cutting edge of one disk will intersect the cutting plane of another disk, and said disks having their outer sur- 110 faces roughened, clamping-bolts, the shanks of which pass through the cutter-disks with thread engagements into the bar, and which by their heads bind on the front faces of the disks, and clamps mounted on the holder, and having confining-bearings against the 115 roughened surfaces of the disks laterally from the bearings of the said clamping-bolts.

6. A tool-holder comprising a shank and an angularly-widened portion having its face beveled and the said beveled face provided 120 with a plurality of substantially circular sockets which open at the lower edge portion of the widened portion of the holder, a plurality of disk-shaped cutters having angular recesses in their edges, and arranged in said 125 holder-sockets for positioning the cutting-points of one beyond another, clamping-bolts, having the shanks thereof passing

through the cutter-disks with thread engage-
ments into the bar, and the said bolts hav-
ing the heads thereof binding against the
front faces of the disks, and a clamp mounted
5 on the holder and having confining-bearings
against the faces of two of the disks at the ad-
jacent portions thereof.

Signed by me at Springfield, Massachu-
setts, in presence of two subscribing wit-
nesses.

CORNELIUS O. HARLEY.

Witnesses:

WM. S. BELLows,
G. R. DRISCOLL.