

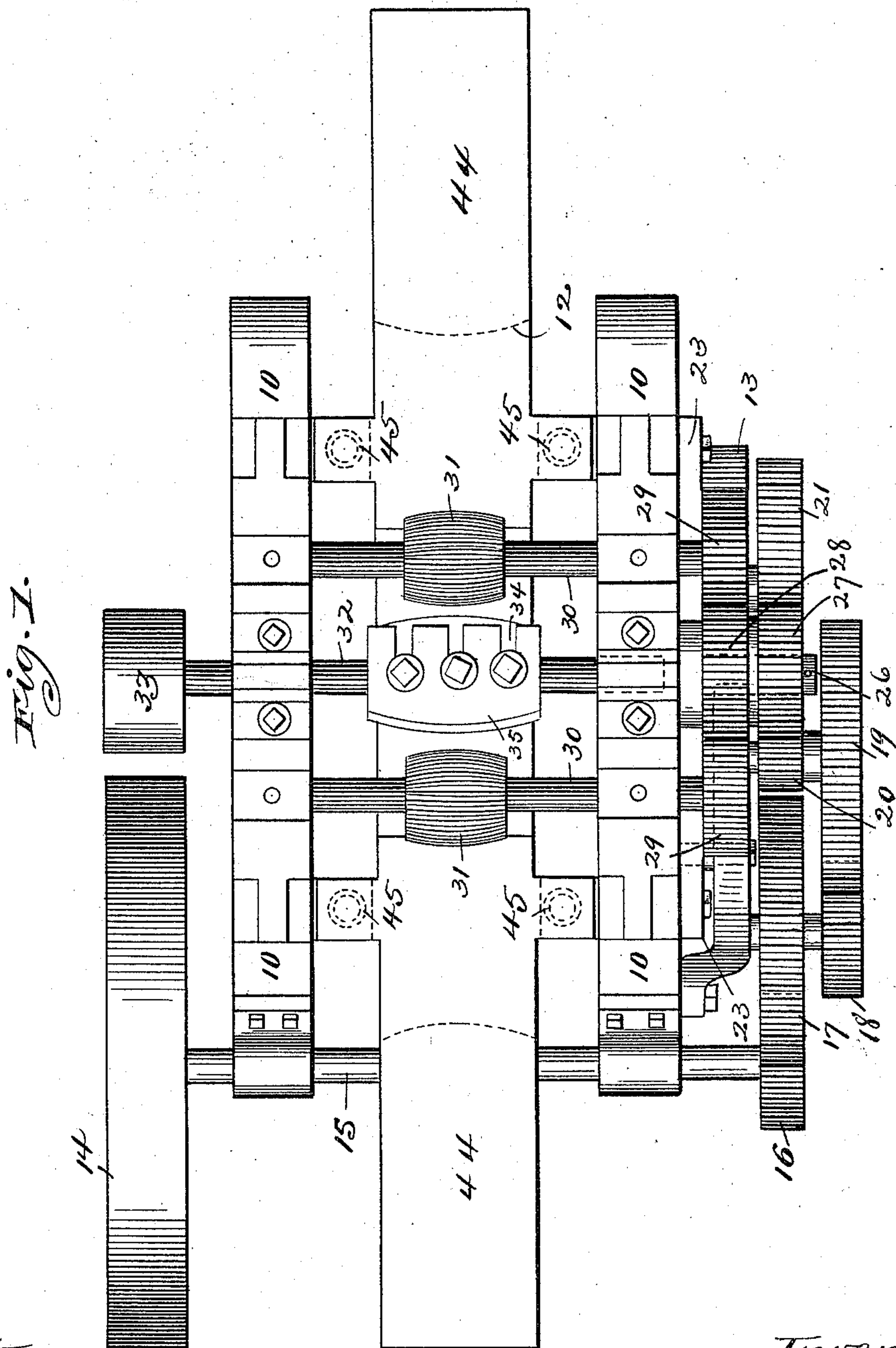
(No Model.)

4 Sheets—Sheet 1.

A. HIRSHHEIMER & C. M. MUELLER.
WOODWORKING MACHINE.

No. 533,220.

Patented Jan. 29, 1895.



Witnesses,

J. E. Mann,
J. B. Goodrum

Inventors,

Albert Hirschheimer
Charles M. Mueller
By *Offield Fowler & Hutchinson*
Attys.

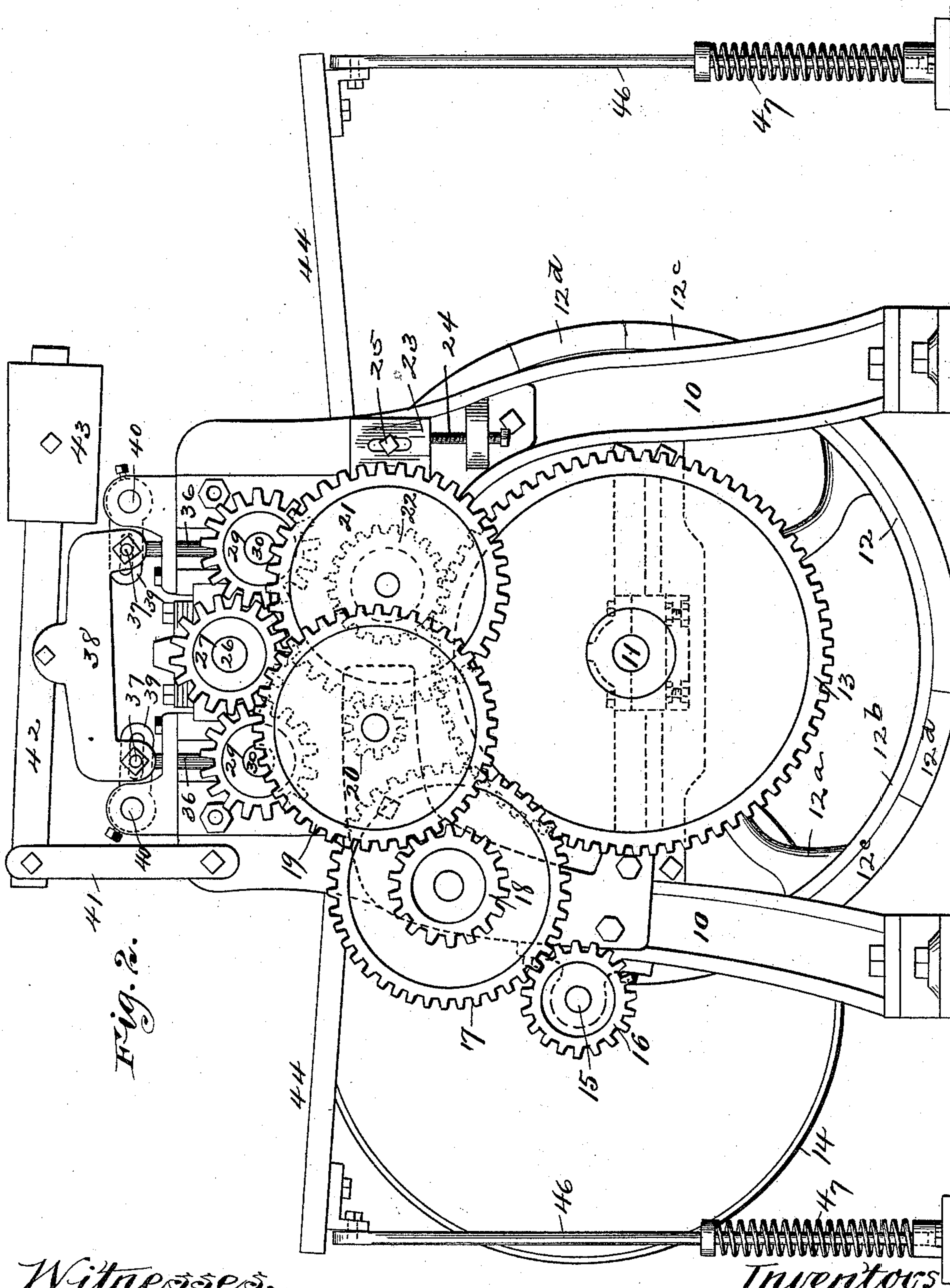
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Witnesses,
J. J. Mann.
F. B. Goodwin

Inventors,
Albert Hirschheimer
Charles M. Mueller
J. J. Offield, Fowler & Putnam
Attys.

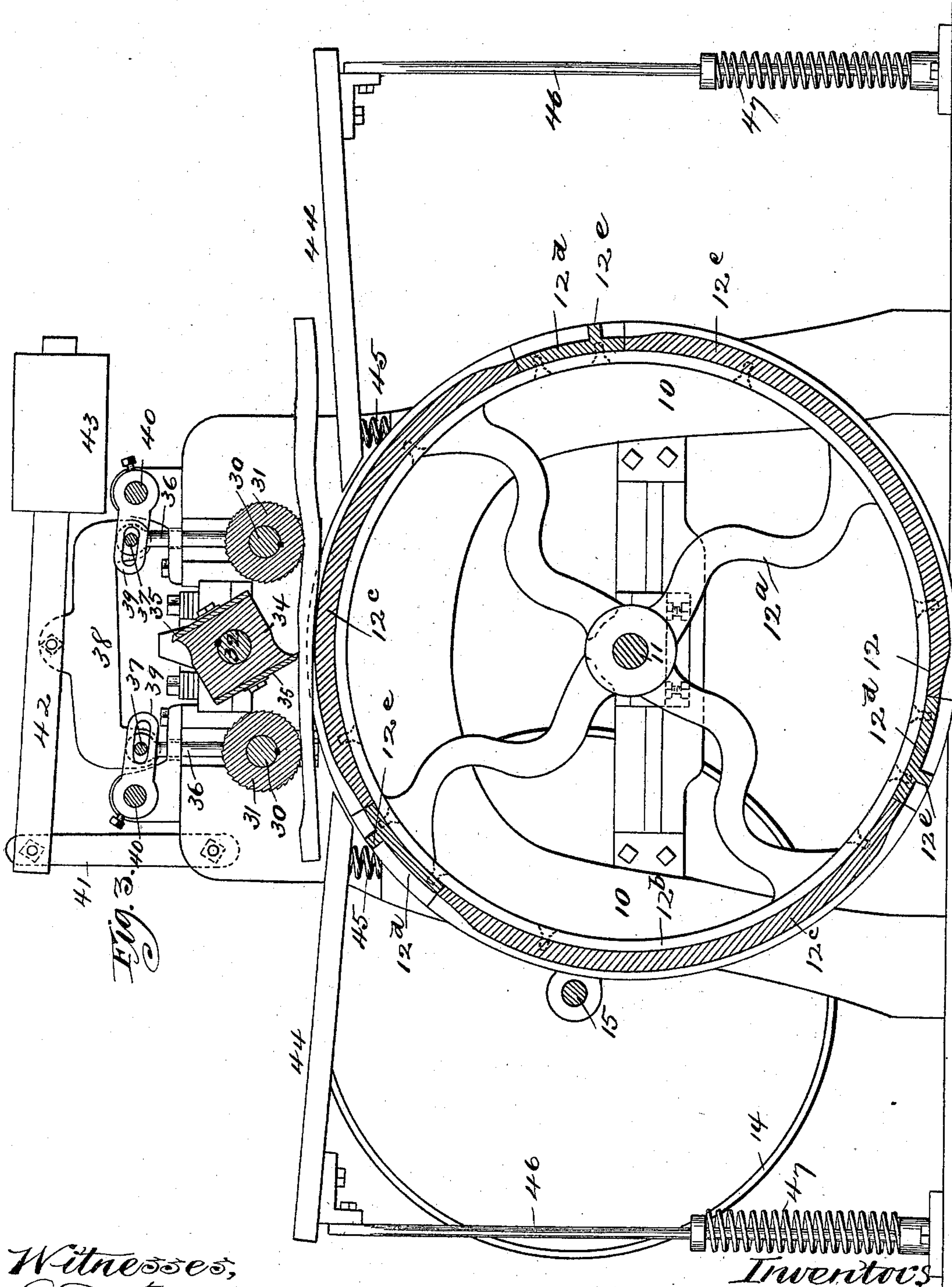
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Witnesses,
J. J. Mann
F. B. Goodrum

Inventors,
Albert Hirschheimer
Charles M. Mueller
By J. P. Offield, Fowler & Luthien, Attys.

(No Model.)

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Fig. 4.

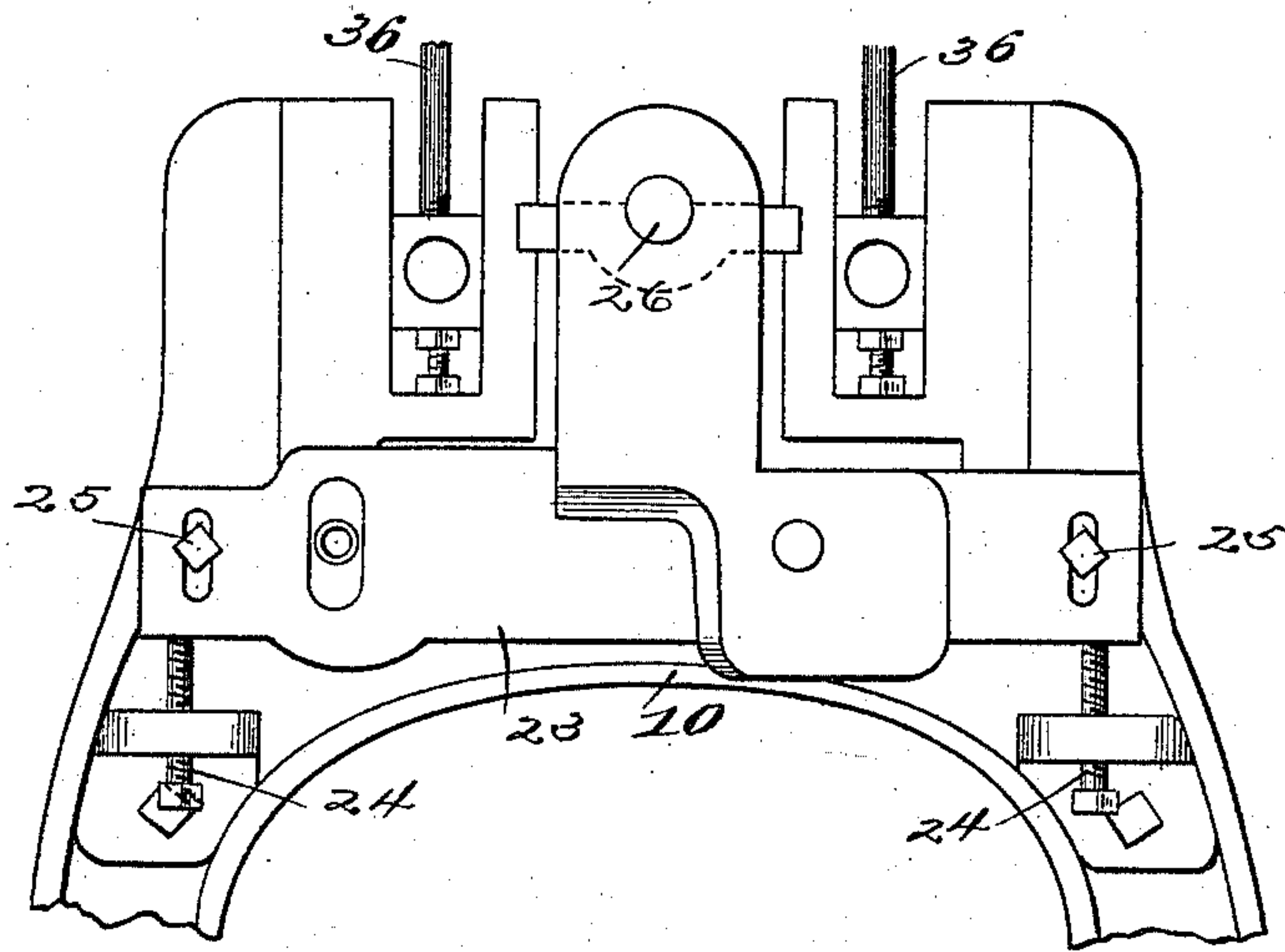


Fig. 5.

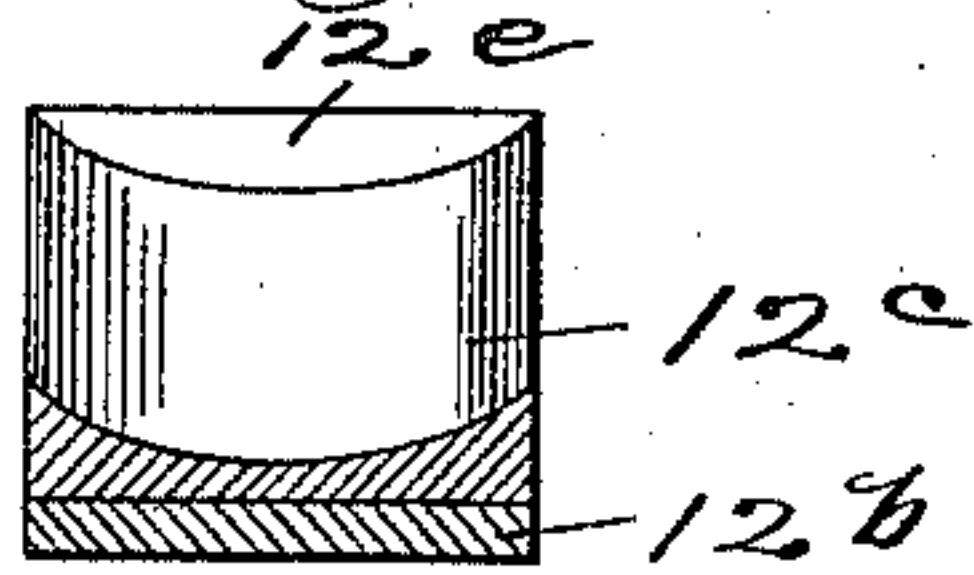


Fig. 6.

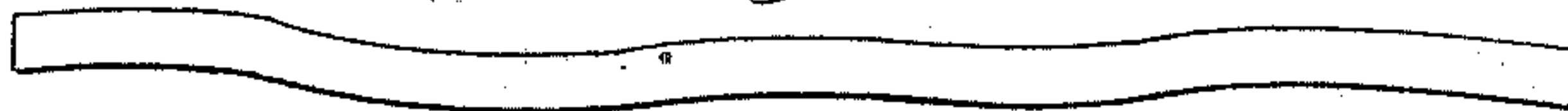


Fig. 7.

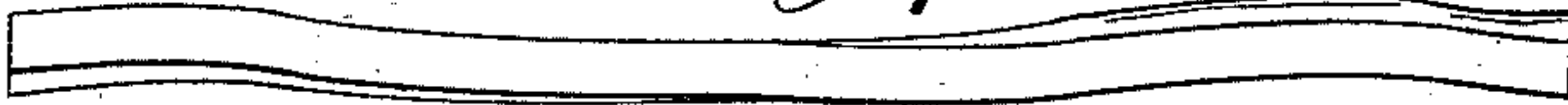


Fig. 8.



Fig. 9.



Witnesses,
J. J. Mann
J. B. Goodwin

Inventors
Albert Hirschheimer
Charles M. Mueller
By *Offield, Fowler & Luthie* Attys.

UNITED STATES PATENT OFFICE.

ALBERT HIRSHHEIMER AND CHARLES M. MUELLER, OF LA CROSSE,
WISCONSIN.

WOODWORKING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 533,220, dated January 29, 1895.

Application filed November 20, 1893. Serial No. 491,483. (No model.)

To all whom it may concern:

Be it known that we, ALBERT HIRSHHEIMER and CHARLES M. MUELLER, of La Crosse, Wisconsin, have invented certain new and useful
5 Improvements in Woodworking-Machines, of which the following is a specification.

The subject matter of this invention is a wood working machine which is particularly adapted for dressing, shaping or planing lumber; and the object of the invention is to construct a machine which is capable of planing,
10 dressing or shaping the material to any desired or uniform thickness without reference to the original shape of the blank. For example, the machine is particularly adapted for dressing stock in the manufacture of barrel staves, the blanks usually being produced by riving or splitting the log, but owing to the character of the grain the blank is some-
15 times crooked, of irregular thickness and frequently warped or twisted both transversely and longitudinally.

The machine of our invention is capable of working blanks of this character to a uniform
25 thickness. It is this capability of the machine for reducing irregular blanks to a desired thickness that constitutes the chief feature of our improvement; and while the machine is applicable to other uses than the
30 manufacture of staves, we have described our invention as embodied in a stave machine.

In this embodiment of our invention we employ, in addition to the supporting frame and yielding pressure devices, which may be of
35 ordinary construction, a novel construction of bed, the preferred form of which is circular and mounted so as to be capable of rotation and presenting only a small supporting surface beneath the material which is being
40 operated upon. The cutter head is mounted parallel to the bed and is also rotatable, while combined pressure and feed rolls are disposed on either side of the cutter head and rotate in unison with the bed. The stock is fed to
45 the cutter over a supplemental bed or table, which is preferably yielding both vertically and laterally, and the blank is received after passing under the cutter upon a similar bed or table on the delivery side of the machine.

50 In the operation of this machine the stock or blank is rigidly supported only immedi-

ately below the cutter and the feed or pressure rolls are capable of automatic adjustment so as to permit the stock or blank to tip from end to end and also to roll from side to side. 55

In the accompanying drawings, Figure 1 is a plan view with the pressure devices omitted. Fig. 2 is a side elevation of the machine complete. Fig. 3 is a central longitudinal section. Fig. 4 is a detail of the upper part
60 of the frame work, showing certain adjustable parts. Fig. 5 is a detail showing a cross section of the bed; and Figs. 6 to 9 inclusive show variations in the stock.

In the drawings, 10 is a supporting frame
65 work on which the principal shafts of the machine are mounted. On the cross bars of this frame are mounted adjustable bearings for the bed shaft 11 on which is mounted the bed 12 and its driving gear 13. Motion is
70 imparted to said gear from the large driving pulley 14 on shaft 15 through pinion 16, the gear 17, pinion 18 on the same shaft with 17, gear 19, pinion 20 on the same shaft as 19,
75 gear 21, and pinion 22 on the same shaft as 21, the latter pinion meshing into the gear 13. The gears 13, 21 and 22 are capable of a vertical adjustment, the gear 13 being mounted in a sliding box and the gears 21, 22 being
80 mounted upon an adjustable frame 23, which is shown in Fig. 4, and which is capable of adjustment through the set bolts 24, the frame being slotted and sliding upon bolts or studs
25. Upon the same frame is a bearing for stud 26 which carries gears 27, 28, the former
85 receiving motion from the gear 21 and the latter imparting motion to the gears 29 mounted on the feed roll shafts 30, the feed rolls being marked 31.

32 represents the cutter head shaft which
90 is driven from the pulley 33.

34 is the cutter head on which are removably secured the knives 35. But two knives are shown but any number desired may be employed.

95 The feed roll shafts 30 are mounted at each end in sliding boxes which are capable of automatic vertical movement to compensate for irregularities in the stock which is passing beneath the feed rolls. The mechanism
100 for exerting pressure upon these feed rolls may be varied, but that shown comprises the

rods 36 which are loosely connected to the bolts 37, the latter extending transversely of the machine and passing through apertures in the arms of the yoke 38. The rods 37 also
5 pass through slots in the arms 39, said arms being secured on rock shafts 40 which are mounted on the frame.

41 represents links pivotally connected to the frame and also pivotally connected to
10 weighted levers 42, said levers being pivotally connected with yokes 38. The weights 43 can be shifted so as to vary the pressure upon the feed rolls. With the construction above described a yielding pressure is exerted by the
15 feed rolls 31 upon the stock.

It will be understood that the yokes, rock arms and weighted levers are duplicated, one at each side of the machine so as to permit the ends of the feed roll shafts to move inde-
20 pendently.

Arranged upon each side of the main frame are the supplemental bed pieces or tables 44, which are mounted at their inner ends upon springs 45 so as to adapt them to yield verti-
25 cally. The outer ends of the tables are supported upon standards 46 which are seated upon springs 47. This gives the supplemental tables 44 the capacity of both vertical and lateral movement. The function of these ta-
30 bles is to support the stock as it is presented to and received from the cutters.

In Figs. 6, 7, 8 and 9 of the drawings is shown some of the variations in which stave stock is presented. The variations are due
35 mainly to the grain of the wood. As the stock is usually produced by splitting or riving, the split will follow the grain and produce the stock presenting irregularities which are outlined in these figures. In Fig. 6 is shown
40 a blank or piece of stock presenting one peculiarity of form, said peculiarity consisting in an irregularity of the blank longitudinally. Figs. 7 and 8 show a stave blank having longitudinal irregularities and also a trans-
45 verse twist. Fig. 9 shows a stave produced from one of the blanks shown in the preceding figures as it would appear after passing through the machine.

As the machine above described is adapted
50 particularly for dressing staves, we have shown a peculiar construction of bed. The bed, which is marked 12, consists of an iron spider 12^a with an iron rim 12^b to which are applied the segments 12^c and the segments
55 12^d. The segments 12^c are preferably of iron or steel and removably secured to the rim and they have their ends beveled or cut away on the upper surface. The segments 12^b are thinner than the bodies of the segments 12^c
60 and have the stops or shoulders 12^e against which the end of the stave may abut as it is presented to the machine. The cutter shown is adapted for use in dressing one face of the stave to a concave form, this face constituting
65 the inner face of the stave when it is made up in the barrel.

In the manufacture of staves the middle

portion of the blank is cut away more than its ends, and for this reason the depression is produced in the segments 12^c and 12^b. By
70 reference to Fig. 3 of the drawings it will be seen that the knife is operative only in a line drawn through the cutter shaft 30 and the bed shaft 11, and therefore any variation in the bed can be made to produce a correspond-
75 ing variation in the cutting. When the end of the blank is presented to the knife the cutter will simply dress the end of the stave. Over the inclined part of the segment the cutter will bevel the stave back to the point
80 where the depression of the segment 12^c commences. Thereafter the cutter will work deeper into the material cutting it to a uniform depth until the opposite end of the stave is approached when the cut will gradually de-
85 crease and finally the rear end of the stave will be dressed as it passes out. Now if there be any longitudinal curvature or irregularity, such as shown in the blank of Fig. 6 of the drawings, the cut will be uniform throughout,
90 notwithstanding such irregularity, and this is due to the fact that the stave is rigidly supported only at a point immediately below the knife. Obviously a bed having a plane sur-
95 face of a length approximately that of the stave would prevent the stock from accommodating itself to this irregularity, and the result would be that the stave produced would vary in thickness. In other words, those portions
100 of the stave which were elevated or out of line would be cut off; but with the form of bed which we have described the stave is held un-
yielding only at that point immediately below the knife while its ends may tip as it passes under the knife and the stock is cut to uniform
105 or any desired thickness, determined by the contour of the bed segment. In the passage of the material under the knife these irregularities of the blank longitudinally are compensated for by the yielding of the pressure
110 rolls vertically, but if the stock in addition to being irregular lengthwise is also twisted, the same capability of adjustment is present in the machine to meet this exigency. The feed rolls are capable of vertical movement
115 and also of tipping or tilting laterally while exerting a constant pressure on the stock and the latter being held by the bed immediately below the knife will turn or tip laterally be-
120 neath the knife so as to accommodate itself to the surface of the bed and any twist will not have the effect of producing a stave thicker at one edge than the other. In other words, its transverse diameter at any point
125 will be uniform.

It will be observed that the bearing sur-
faces of the feed and pressure rolls are nor-
mally in the plane of the cutting edges when the latter are in action, and also in a plane
130 parallel to the bed or supporting surface, and that the stock is not twisted or straightened by any pressure exerted thereon, but on the contrary the parts of the machine which feed it and hold it upon the bed are self-adjustable

so as to permit the blank to tilt or tip, thereby presenting its surface to be cut uniformly. The material which this machine is particularly intended to work upon is quite rigid and unyielding and a machine capable of straightening it would have to be made very heavy and would be expensive while great power would be required to run it.

The character of the work which this machine is intended to do makes it important that the bed should be vertically unyielding in order that the material shall be rigidly supported opposite the cutters, while the feed rolls are adjustably or yieldingly mounted to permit the blank to tip or turn, corresponding to the irregularities in contour which the blank presents.

The machine as shown is organized for dressing the stave so as to produce a concave surface which will be the inner side of the stave when made up in the barrel. For this purpose we prefer to make the bed segments concave or hollow, as shown in the detail Fig. 5, while the knives and feed rolls are convex on their faces, but in dressing the other side of the staves the reverse of this construction would be employed, and for this purpose we make the bed segments and the knives removable. The contour of the work will depend mainly or solely upon the form of the knife which is used.

The gearing is so arranged that the feed rolls have the same rate of speed at their peripheries as the periphery of the bed so that the material is fed forward by the conjoint action of the feed rolls and bed and without any slipping on either.

We do not limit our invention to the precise details of construction and arrangement of parts which we have above particularly described. We prefer in all cases to use a movable bed but it is obvious that feed devices might be employed to move the stock beneath the knife and a stationary rest or bed employed. It is also obvious that the bed shown is not the only form of movable bed that might be employed. For example, a bed made up of a number of segments connected together by a chain or other flexible connecting medium and carried over sprocket wheels might be utilized. A small roller might be used but we prefer the large circular bed shown. The particular form of bed shown is well adapted to the making of staves. The segments furnish stops for the ends of the staves. The cut away portion of the segments provide depressions into which the ends of the stave may yield so that the ends are dressed to a uniform thickness and the beveled portions provide for the bevel or taper of the stave; and the concavity of the surface of these segments provide suitable seats for the stave stock.

The purpose of the tables is mainly to furnish bearings for one end of the blank or stock as the opposite end passes under the knife and before it reaches the second roll. The

tables are preferably downwardly inclined toward the bed, their inner ends being below the plane of the bed and their upper ends slightly above such plane. As the blank passes under the knife the table will support its rear end, thus permitting its forward or advancing end to pass easily beneath the second feed roll. As the blank passes out from beneath the first feed roll it will strike the inclined table on the delivery side of the machine and be supported thereby. These tables therefore furnish supports for the ends of the staves so that the feed rolls may press the stock firmly down upon the bed until both feed rolls are engaged with the stock so that at all times the stock or blank is pressed down upon the bed, and yet owing to the manner of mounting the feed rolls this pressure is sufficiently yielding to permit the rolling or tipping of the blank so that the surface which is under the operation of the knife is held parallel with the bed and uniformity of cut secured. Instead of the tables small rolls may be employed and yieldingly mounted.

It will be understood that by changing the segments thinner or thicker staves may be cut; that both sides of the stave may be operated upon, and that longer or shorter staves may be made by using a greater or less number of segments. By adjusting the bed vertically and correspondingly adjusting the gearing staves of different thicknesses may be operated upon.

We claim—

1. In a machine of the class described, the combination with a revoluble cutter, of a bed which is adapted to rigidly support the material at a single point opposite the cutter and feed and pressure rolls yieldingly mounted in the plane of the cutter and on opposite sides of the cutter and bed support, substantially as described.

2. In a machine of the class described, the combination with a revoluble cutter, of a circular traveling bed adapted to rigidly support the material at a single point opposite the cutter, rotatable feed and pressure rolls yieldingly mounted on opposite sides of the cutter head in the plane of the cutters and co-operating with the bed to feed the material beneath the cutter, substantially as described.

3. In a machine of the class described, the combination with a revolving cutter, of a revolving bed carrier whose center of support is in or near the plane of the axis of the cutter, and combined feed and pressure rolls yieldingly mounted upon opposite sides of the cutter and in the plane thereof and adapted to co-operate with the bed carrier whereby to pass the material beneath the cutter, substantially as described.

4. In a machine of the class described, the combination with a revoluble cutter, of a bed adapted to rigidly support the material at a single point opposite the cutter, pressure and feed rolls arranged upon opposite sides of the cutter and lower bearings arranged on oppo-

site sides of the bed support, substantially as described.

5 In a machine of the class described, the combination with a revoluble cutter, of a revolving bed adapted to rigidly support the material at a single point opposite the cutter, feed rolls rotatably mounted on opposite sides of the cutter and tables to support the material as it enters and leaves the machine, 10 said tables being yieldingly mounted whereby they may move both laterally and vertically, substantially as described.

6. In a machine of the class described, the combination with a revoluble cutter, of a revolving bed of circular form having upon its periphery segments whose contour conforms reversely to the contour desired to be produced in the material, and means for feeding

the blank beneath the cutter, substantially as described. 20

7. In a machine of the class described, the combination with a revoluble cutter head, of pressure and feed rolls yieldingly mounted upon opposite sides of said cutter head, a traveling bed of circular form, a plurality of 25 removable segments secured to said bed and adapted to furnish seats for the material and other segments interposed between said seat segments and having stops thereon for the material, substantially as described.

ALBERT HIRSHHEIMER.
CHARLES M. MUELLER.

Witnesses:

C. C. LINTHICUM,
N. M. BOND.