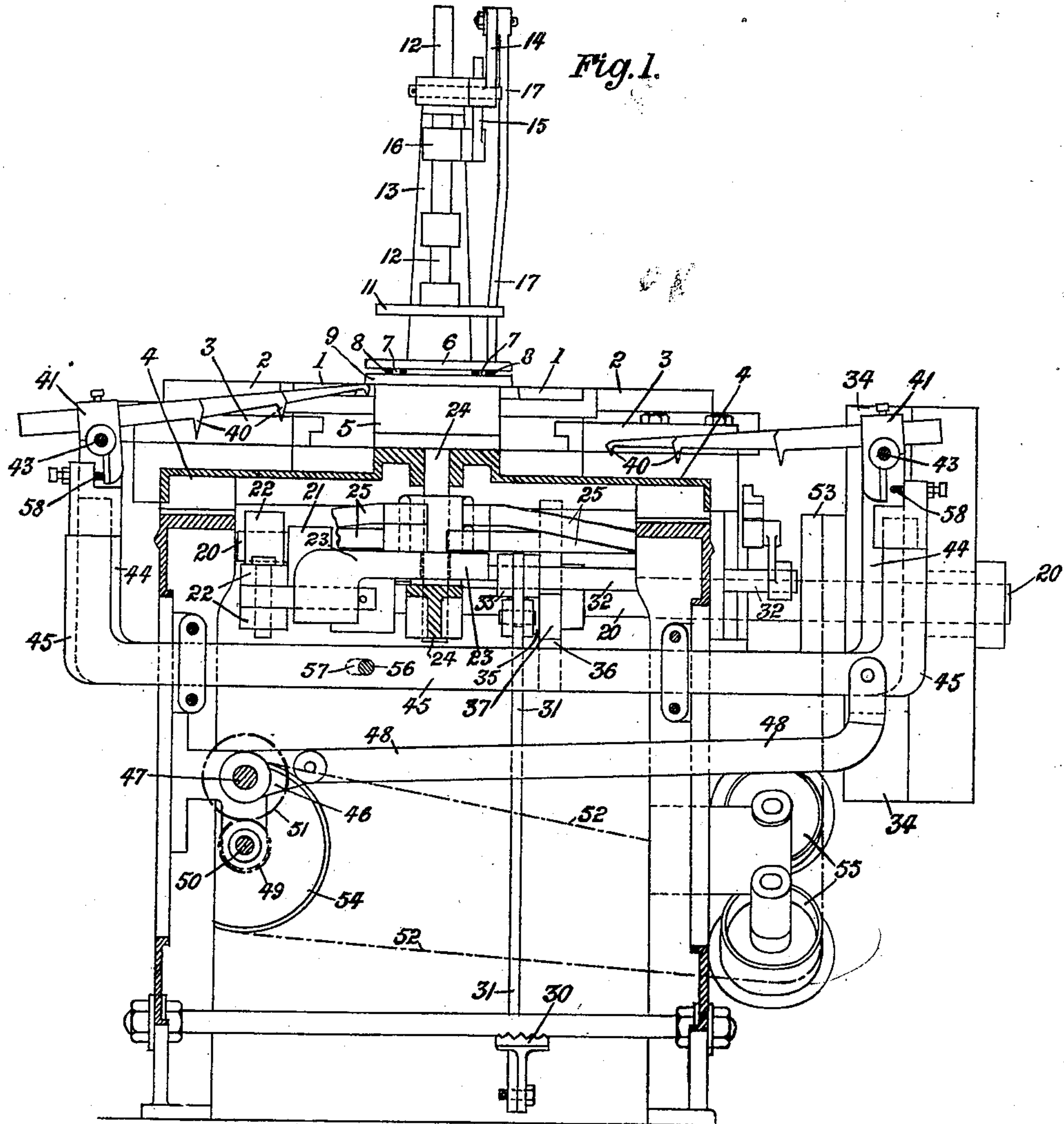


F. E. ADAMS.
MACHINE FOR TRIMMING THE EDGES OF METAL BOXES.
APPLICATION FILED AUG. 10, 1908.

925,070.

Patented June 15, 1909.

4 SHEETS—SHEET 1.



WITNESSES

W. P. Burt
Chas. C. Carter

INVENTOR

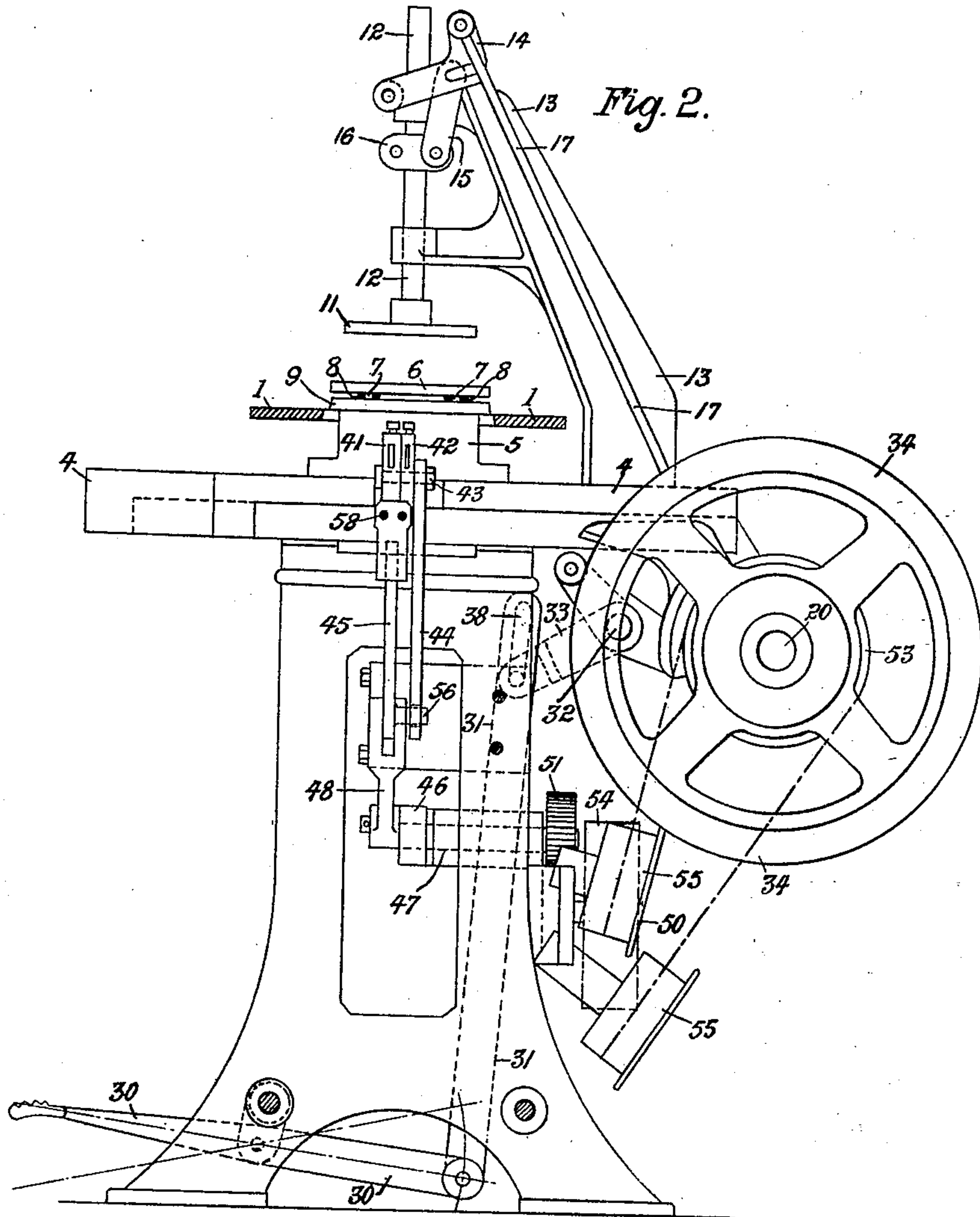
Frank Edward Adams
BY John Hallam White

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4 SHEETS—SHEET 2.



WITNESSES
W. P. Brink
Edw. Costo.

INVENTOR
Frank Edward Adams
BY Wm. Wallace White

ATTY

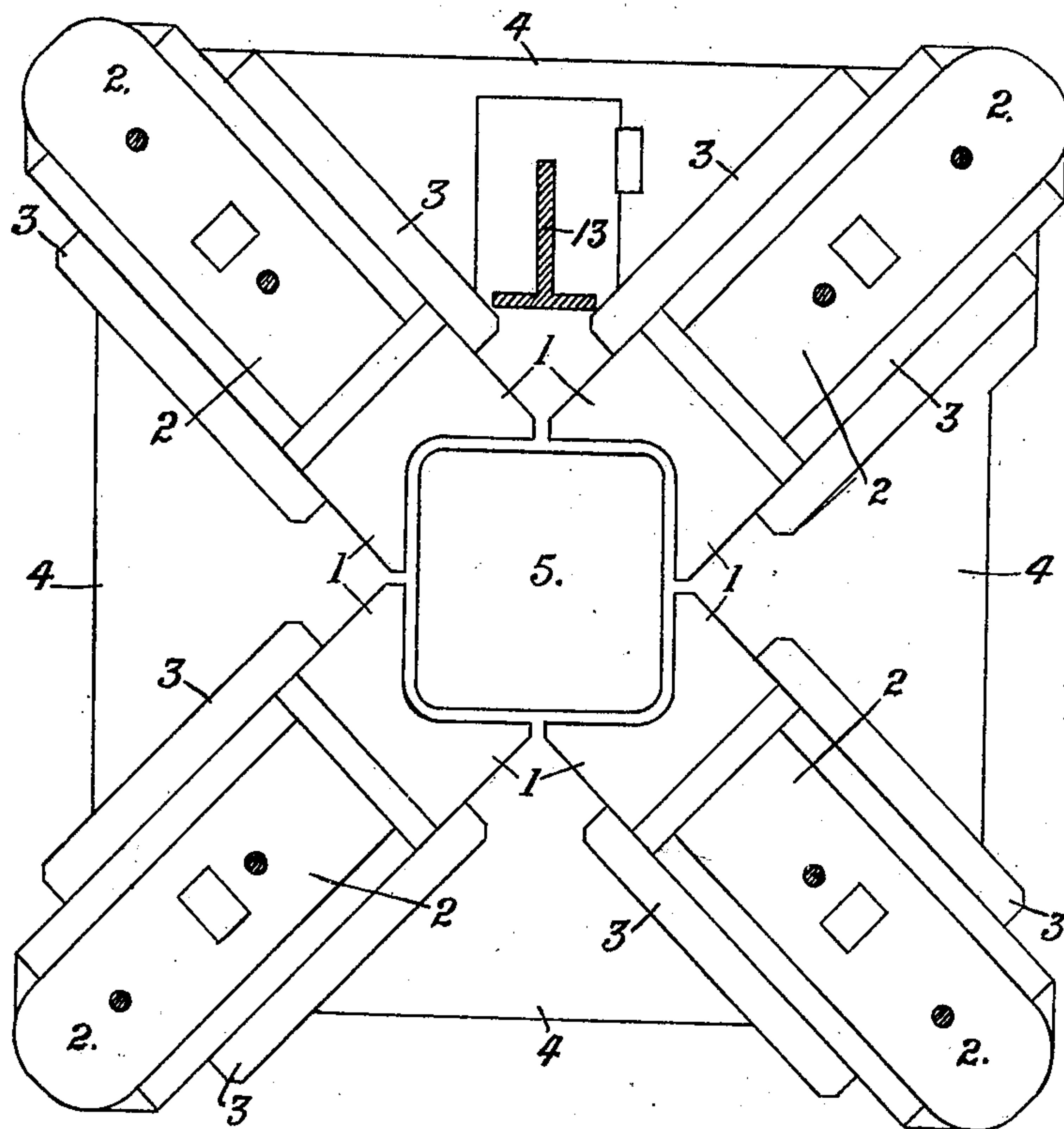
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4 SHEETS—SHEET 3.

Fig. 3.



WITNESSES

W. P. Burke
Edw. Coats.

INVENTOR

Frank Edward Adams
BY New Hallen White

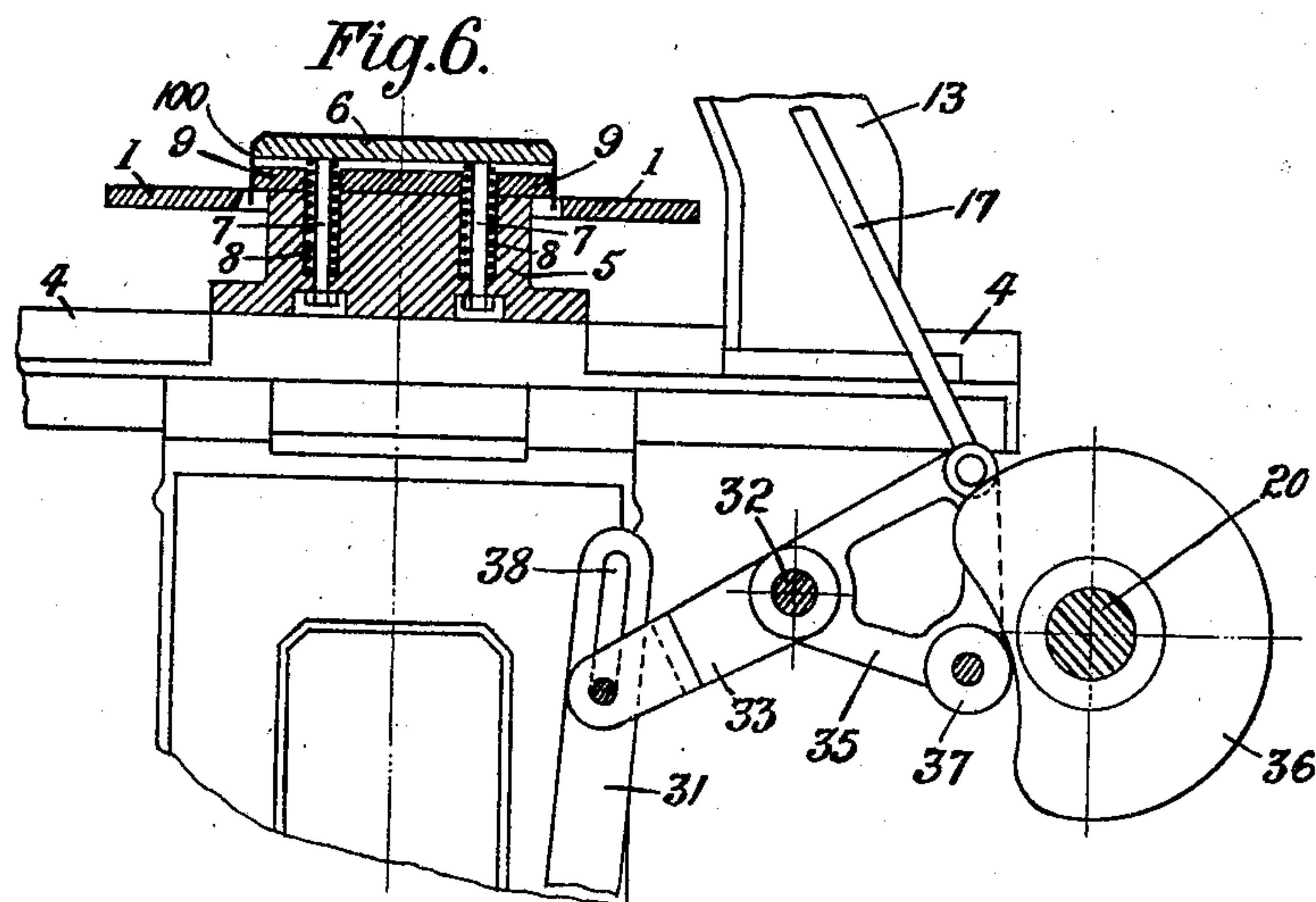
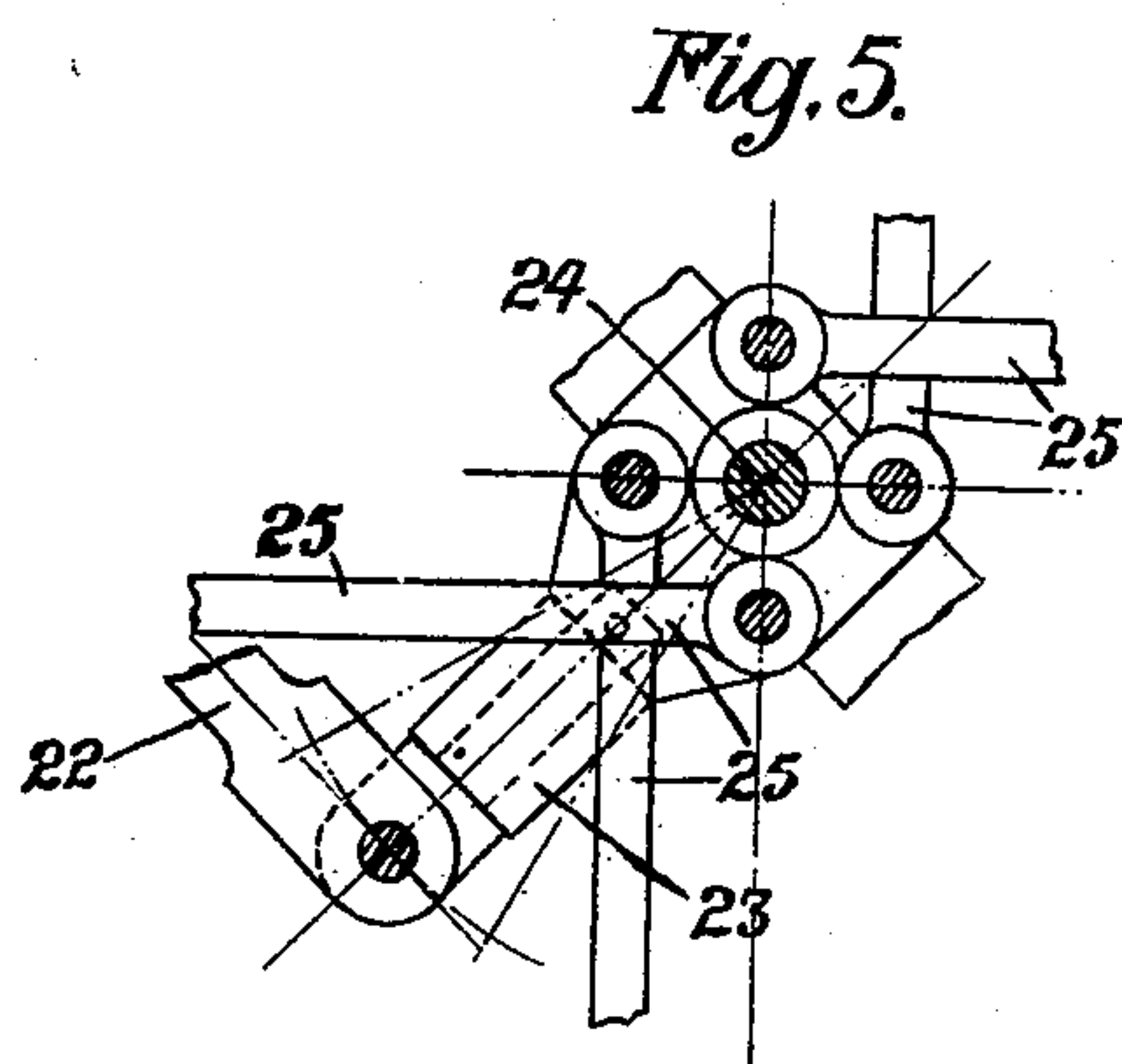
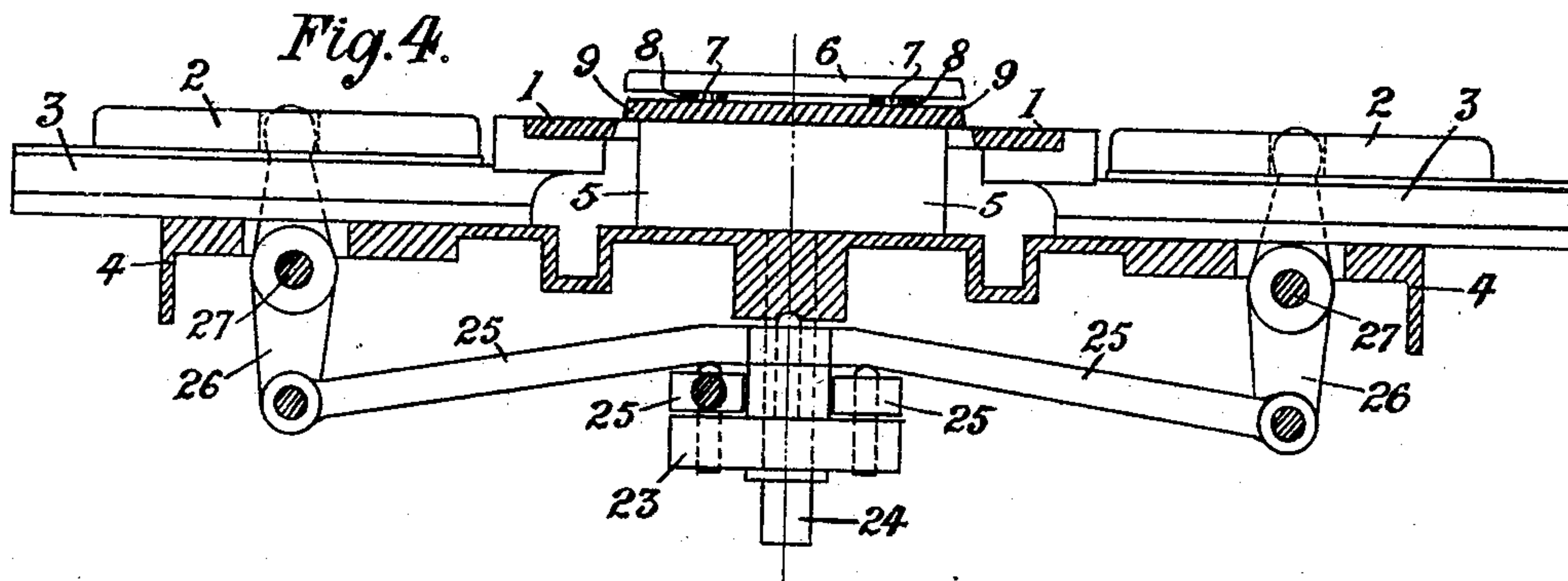
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4 SHEETS—SHEET 4.



WITNESSES

W. P. Burke
Eug. Costa

INVENTOR

Frank Edward Adams
BY N. H. Hallen White

ATTY.

UNITED STATES PATENT OFFICE.

FRANK EDWARD ADAMS, OF WALLASEY, ENGLAND.

MACHINE FOR TRIMMING THE EDGES OF METAL BOXES.

No. 925,070.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed August 10, 1908. Serial No. 447,865.

To all whom it may concern:

Be it known that I, FRANK EDWARD ADAMS, a subject of the King of England, residing at Laurel Cottage, Prospect Vale, Wallasey, in the county of Chester, Eng-
land, have invented new and useful Im-
provements in Machinery for Trimming the
Edges of Metal Boxes, of which the follow-
ing is a specification.

This invention has reference to machinery
for trimming the edges of the sides of metal
boxes or box lids, or parts, and it has for its
objects and effects to provide a machine
which is very efficient, and besides which is
capable of trimming a large number of
boxes or parts.

The improvements in machines for trim-
ming the edges of metal boxes, box lids, or
the like, according to this invention, com-
prise in conjunction with the trimming
mechanism, a means for removing the waste
or trimmings.

In the drawings which accompany the
specification, the trimming machine is of the
type which is adapted to trim the edges of
boxes, or box lids, or the like, which are of
rectangular or similar poly-sided form, and
in which the cutters are of a reciprocating
kind, and are adapted to overlap in their
cutting strokes; that is, the cutting scope
of two opposite cutters which operate in
conjunction with each other, is greater than
half of the perimeter of the article. Or, in
other words, each of the four cutters is ca-
pable of cutting more than one-fourth of
the sides of the tin or part, so that the whole
of the sides of the tin are of a certainty
properly cut, and moreover the opposite
couple of cutters are moved inward and
withdrawn, so as to operate upon and cut
the tin at the opposite sides at different
times.

While, however, the invention is mainly
described in connection with a machine for
cutting square or rectangular boxes or parts,
it is applicable to machines of the rotary
kind, and others used for trimming the
edges of round, oval, or like tins, or parts
thereof.

In the drawings, Figure 1 is a front eleva-
tion partly in section of a machine; and
Fig. 2 is a side elevation. Fig. 3 is a plan
of the machine, with the upper holding parts
removed, showing the table and cutters.
Fig. 4 is a diagonal section taken through
the table and cutters; and Fig. 5 is a plan

showing a detail of cutter slide actuating
means. Fig. 6 is a cross section taken across
the machine parallel with its sides.

Referring to the drawings, 1 are the cut-
ters, they being mounted on slides 2, work-
ing in guides 3 fixed on the rectangular
table 4. Upon the table, the slides and
guides are disposed in diagonal arrange-
ment, that is, across the angles.

5 is the block on the table 4, upon which
the tin or article to be trimmed is supported
and clamped; and 6 is a "pad" in the form
of a plate, carried from the block by pins 7,
and supported and pressed upward by
springs 8, surrounding the pins 7.

The part of the block which supports the
edges or sides of the tin to be operated upon
and trimmed, and in connection with which
the cutters 1 operate, is designated 9, and
forms a species of anvil with conical edges,
and it is slightly larger than the body 5 of
the block, to enable the cutters 1 to pass
under its lower edge, which constitutes the
cutting edge; and the pad 6, which supports
the bottom of the box or part, is of the same
size as this part 9, and it is maintained in
position in relation to the latter part—as
regards the vertical plane—by means of the
pins 7, which fit in and slide through holes
in the bottom of the block 5, and are guided
and held laterally thereby.

The strips of tin or other metal, as the
case may be, cut away from the box by the
action of the cutters, will be frequently in
the form of endless rings, which encircle the
cutter block 5, 9; and these are removed
from the machine automatically by recipro-
cating hooks 40. In the arrangement shown,
there are two sets of these hooks, one set at
each side of the cutter block 5. Each set in
the case shown, consists of three hooks in
advance of each other, two of which are
fixed in a carrier 41 in which they are ad-
justable, and fixed by set screws, and the
other in a carrier 42; these carriers being
mounted on a pin 43 fixed in the vertical
ends of an actuating reciprocating bar 44.
And this bar is reciprocated to and fro by
another bar 45, which is actuated from a
rotating crank 46, mounted on a spindle 47,
and a connecting rod 48; this spindle 47
being driven by a pinion 49 on the shaft 50,
and a spur wheel 51 on the shaft 47, which
it drives; the pinion 49 being rotated by a
belt 52 passed over a belt pulley 53 attached
to the fly wheel 34, and a belt pulley 54 con-

connected with the pinion 49, and also passing over guide pulleys 55.

The bar 45 is connected up with the bar 44 by a stud 56 fixed in the bar 45, but working in and engaging the ends of a short slot 57, in 44; and, hence, in action, the bar 45 will move a short distance before moving the bar 44. The effect of this is that when the hooks 40 are moved toward the block 5, they will first be tilted upward about the pin 43 by the studs 58 carried in the upper ends of the bar 45, such studs acting upon the parts of the carriers 41, 42, which lie below the pin 43; and then when they have been moved to the inner position at the beginning of the return movement of the bar 45, the studs 58 will leave the hook carriers, and so they will fall; after which, when the bar 44 is moved, they will be moved bodily outward from the block 5. The two positions of these hooks are shown in Fig. 1.

In falling, the innermost hook penetrates the entangled pieces of the metal cut away by the cutters 1, that is, the trimmings round the block 5, and take hold of them, and drag them away from the block, thereby breaking them, and dragging them away, and the other hooks move them off the table. These hooks are operated continuously in the manner described, and they are therefore reciprocated much more frequently than the cutters 1, and hence the machine is kept clear of the debris, which otherwise is liable to choke it.

The tin is pressed onto, and held on the block 5, by means of a vertically reciprocating presser or holding plate 11, supported on a vertical shaft 12, carried by the bracket 13 from the table 4; the shaft 12 being raised and lowered by a lever 14 carried on and from the upper end of the bracket 13, and connected to the shaft by a coupling link 15, adjustably connected at one end in the lever 14, and at the other to a boss or clamp 16 on the shaft. The lever 14 is vibrated up and down by the connecting rod 17 operated from the mechanism or gearing hereinafter described.

The pad 6, and the article to be trimmed, are pressed down by the presser plate 11 to the regulated or required amount, and the springs 7—which are kept under compression—are further compressed; and then, afterward, when the tin, or other article is relieved, it is pressed up by the springs 7, and so is lifted clear of the cutting edge of the block part or head 9, thereby enabling the tin to be easily taken away.

The motion of the slides and the cutters 1, that is, their movement in opposite pairs or couples, inward and outward, so as to operate upon and cut the tin on opposite sides, at different times, is conveniently effected from the main horizontal driving

shaft 20, through a crank 21, a connecting rod 22, and a horizontal wrist plate 23, mounted on the spindle 24, a part of the wrist plate extending outward at one side, and being connected to the end of the connecting rod 22.

The connection of the wrist plate 23 with the several cutter slides 2, is by connecting rods or bars 25; the inner ends of each opposite pair of which are disposed above one another, as shown more clearly in Figs. 4 and 5, so that the points of their connection with the plate 23 are at about right angles to the direction of movement of the cutter slides, which they operate.

The outer ends of the rods 25 are connected to the lower arms of the levers 26, fulcrumed at 27 to the table 4, the upper ends of which project up into an opening in an adjustable part on the top of the slides 2. Thus by the rotation of the shaft 20, the wrist plate 23 is simply vibrated about its axis, with the result that a pair of the opposite slides with their cutters, are moved inward, while the other pair are moved outward, and vice versa.

When the tin—marked 100 in the drawing—is placed on the block 5, 9, manually, the presser plate or holder 11 is brought onto it by means of a treadle 30, which, when pressed down by the foot, moves up a rod 31, which actuates a rocking shaft 32 through an arm 33 mounted on it, and actuated by the upper end of the rod 31; and the rocking of this shaft 32 is adapted to throw into action, a clutch mechanism of any known suitable kind (such as are used in sheet metal working machines which are started manually, and stopped automatically after each actuation) working in connection with the driven fly wheel 34, whereby the wheel 34 will be caused to be connected up with the said shaft, and drive it, and be automatically freed from it at the right moment near the end of the operation. At the same time, by the upward movement of this arm 33, and oscillation of the shaft 32, the presser plate 11 is moved down by the downward movement of a triangular lever or arm 35 fixed on the shaft 32, through the connecting rod 17 and mechanism above described, and the tin is pressed down and clamped or held on the cutter block 5, 9.

When the presser plate 11, and clutch have been put in action by the treadle 30 and lever 31, the plate 11 is kept in its active position, to which it has been moved during the trimming operation—which then follows—by the cam 36 fixed on the shaft 20; this cam being so formed as to act upon the bowl 37 on the lever 35, and keep it and the presser 11 down, for the greater portion of a revolution of the shaft 20. Thus the operator can release the treadle 30 immediately after the presser or holder 11, and the

clutch, are brought into action, and it returns to the position in which it will be ready for acting upon the next tin or box placed in the machine, by the rod 31 having a slot 38 in its upper end, allowing it to fall, while the arm 33 is kept up by the cam 36.

When the shaft 20 has made nearly a complete revolution, and the cutters have been actuated as above described, and the edges of the box or article trimmed, the larger diameter portion of the cam 36 will have left the bowl 37, and so the arm lever 35 can rise, and with it the presser plate 11 can be raised off the box; this return action being effected by a spring or weight, as may be desired. And upon the complete actuation of the machine, the clutch connected with the belt fly wheel 34 and shaft 20, will be thrown out of action in the well known way, and the shaft will be free, and will be stopped as usual, and will remain stationary until the trimmed box has been removed, and a fresh one placed upon the block. After this, when a new tin is placed on, by operating the treadle, the action is repeated, the clutch for operating—*i. e.*, starting and stopping—the machine being again thrown in.

In cases where the tins are fed automatically by any known suitable form of feeding means onto the block 5, 9, the presser or holder 11 may, in such cases, be also freed in the manner described, and made self-acting, both in its relieving or upward movement, as well as in its downward movement. In some cases, the main shaft (20) can be run continuously, in which case a device is employed to time the clamping of the tin; while if this shaft be provided with a clutch mechanism as referred to, in the manner of a power press, the machine will be stopped at definite points of the stroke; the clutch being made to stop the machine by the treadle after the tin has been clamped; while, subsequently, the clutch is taken off, and the tin clamp is relieved automatically as referred to.

What is claimed is:—

1. In a machine for trimming the edges of boxes, box lids and tins, the combination of a plurality of cutters angularly disposed relatively to each other, and capable of being moved into the active and cutting part of the path traversed by the adjacent cutters, means for removing from the machine the portions trimmed from the articles, means for holding in position the article to be trimmed, and means for operating the trimming and waste removing mechanism and the holding means.

2. In a machine for trimming the edges of boxes, box lids and tins, the combination of a plurality of cutters angularly disposed relatively to each other, and capable of being reciprocated alternately into the paths traversed by the adjacent cutters, a reciprocated trimming waste removal mechanism, means

for holding in place the article to be trimmed, and means for operating in a predetermined order, the trimming and waste removal mechanism and the holding means.

3. In a machine for trimming the edges of boxes, box lids and tins, the combination of a plurality of cutters angularly disposed relatively to each other, and capable of moving into the path traversed by adjacent cutters, a plurality of reciprocated hooks which engage with and remove the portions trimmed from the articles operated upon, means for operating the cutters intermittently and the reciprocated hooks continuously, a spring pressed block for supporting the article to be trimmed, and a reciprocated means for holding the article on the said block.

4. In a machine for trimming the edges of sheet metal boxes, parts of boxes, and the like, a cutter adapted to operate upon the edge of the box or part, and to trim same; and a reciprocating trimming removal means operating in conjunction with the part which receives same, consisting of a plurality of reciprocating hooks adapted to be moved inward and lifted, and to fall onto and engage said trimmings, and then to be moved away and break, and drag same away; substantially as described.

5. In a machine for trimming the edges of sheet metal boxes, parts of boxes, and the like, an intermittently operating trimming cutter; and a constantly reciprocating waste or trimming removing mechanism; substantially as described.

6. In a machine for trimming the edges of sheet metal boxes, parts of boxes, and the like, the combination of trimming mechanism, means for intermittently reciprocating said mechanism having cutters adapted to extend into the shearing area of the adjacent cutters; reciprocating waste removing mechanism; means for constantly operating said mechanism and mechanism adapted to hold the work in position, and to start the machine; substantially as described.

7. A machine for trimming the edges of sheet metal boxes, parts of boxes, and the like, comprising in combination reciprocating trimming cutters, so adapted that the points on the box or article reached by the outer ends or extremities of the respective sets of cutters, overlap; a continuously operating waste removing mechanism; and a treadle mechanism connected with the cutter mechanism adapted to bring same into action when operated; substantially as described.

8. In a machine for trimming the edges of sheet metal boxes, parts of boxes, and the like, two pairs of cutters 1, arranged at right angles to each other, adapted to be moved in opposite directions; a wrist plate 23, and connecting rods 25 connecting said wrist plate with the said respective pairs of cut-

ters, the two points of connection to the said wrist plate, of the rods connected with each pair of cutters being 180 degrees from each other, and the two sets of connections to the
5 said wrist plate being at right angles to each other; as herein set forth.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

FRANK EDWARD ADAMS.

Witnesses:

SOMERVILLE GOODALL,
RICHARD H. JENKINS.