

No. 709,967.

Patented Sept. 30, 1902.

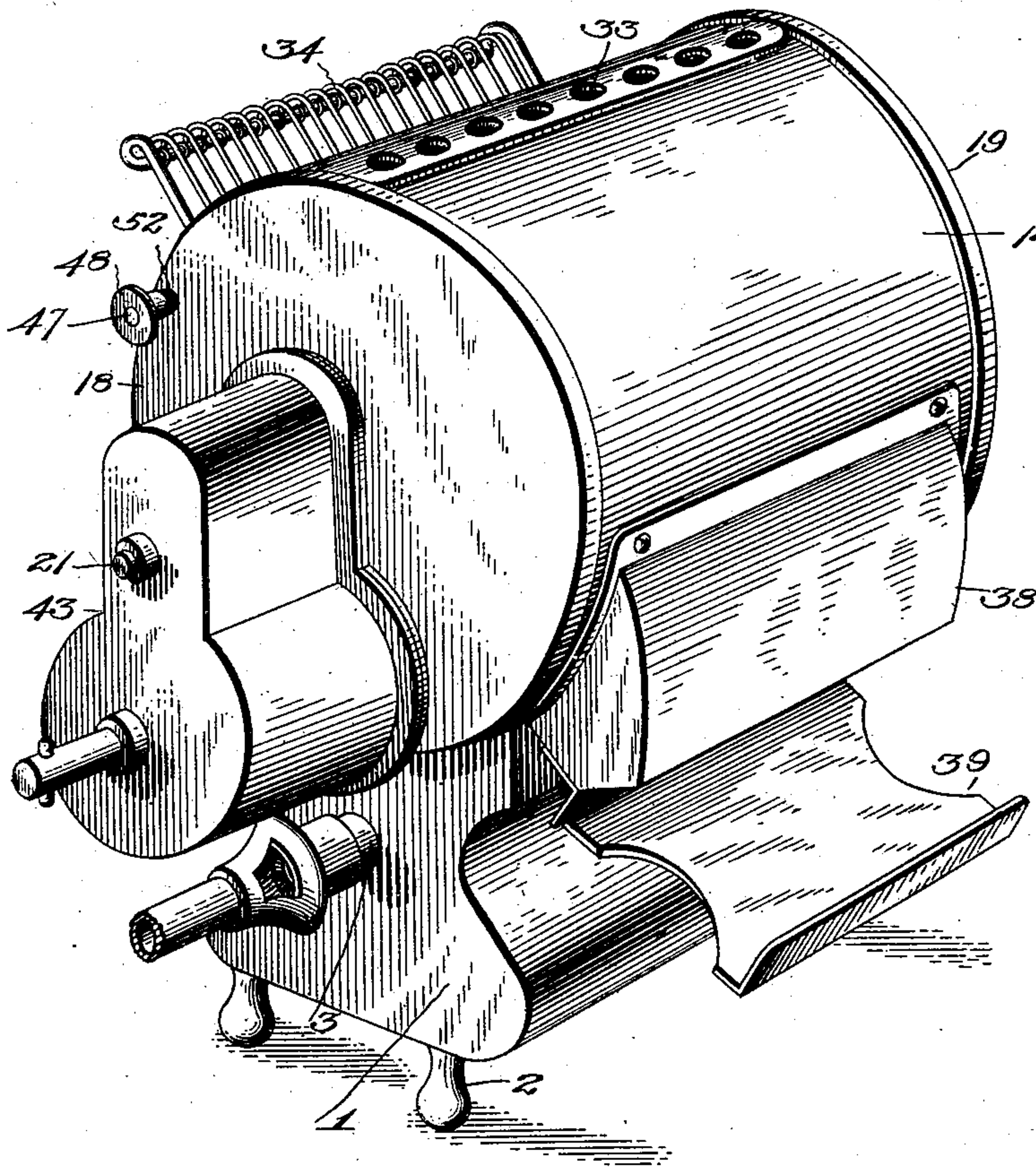
G. W. CURTISS.
CARBONIZING APPARATUS.

(Application filed Nov. 30, 1901.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.



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Witnesses

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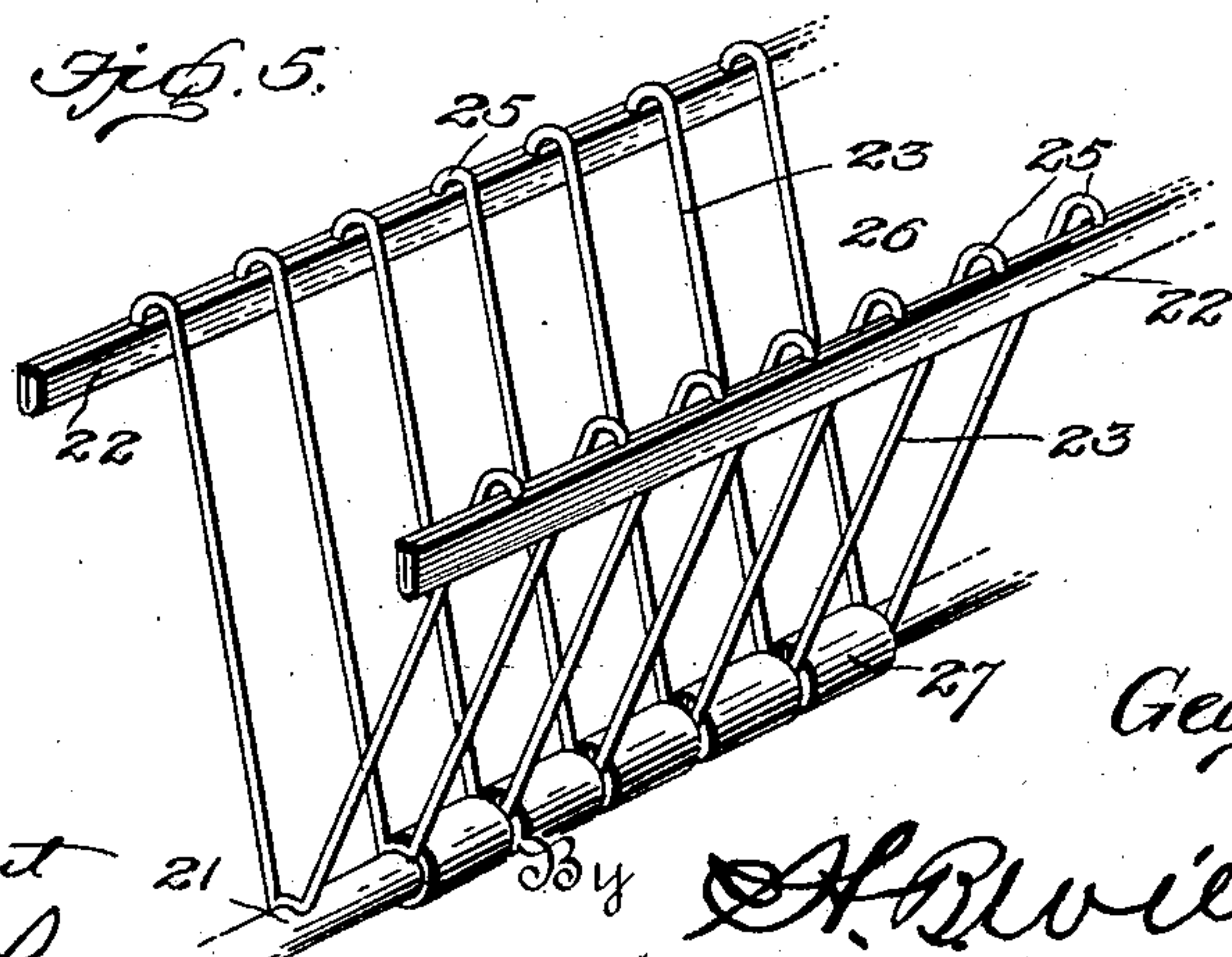
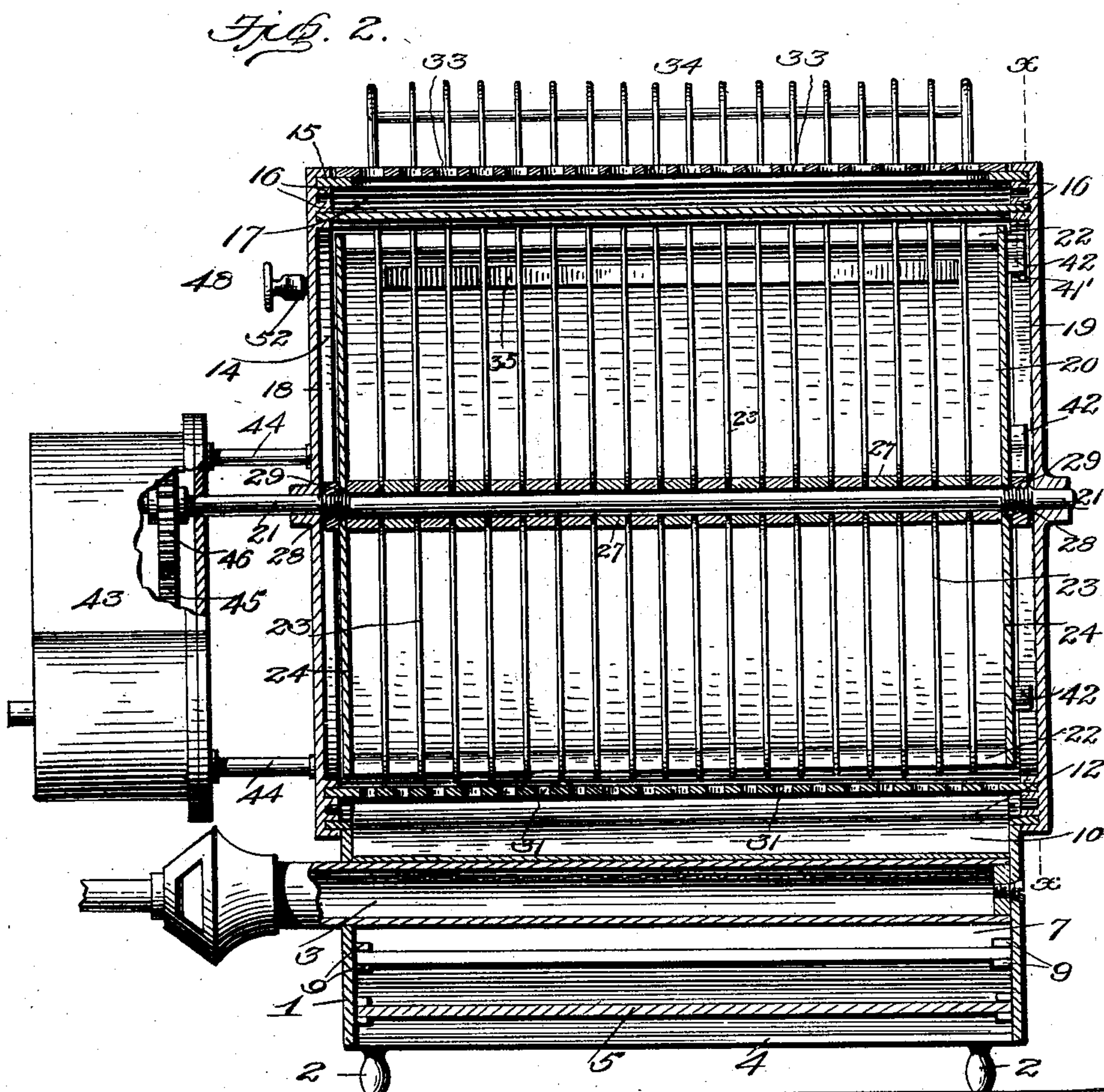
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Fig. 3.

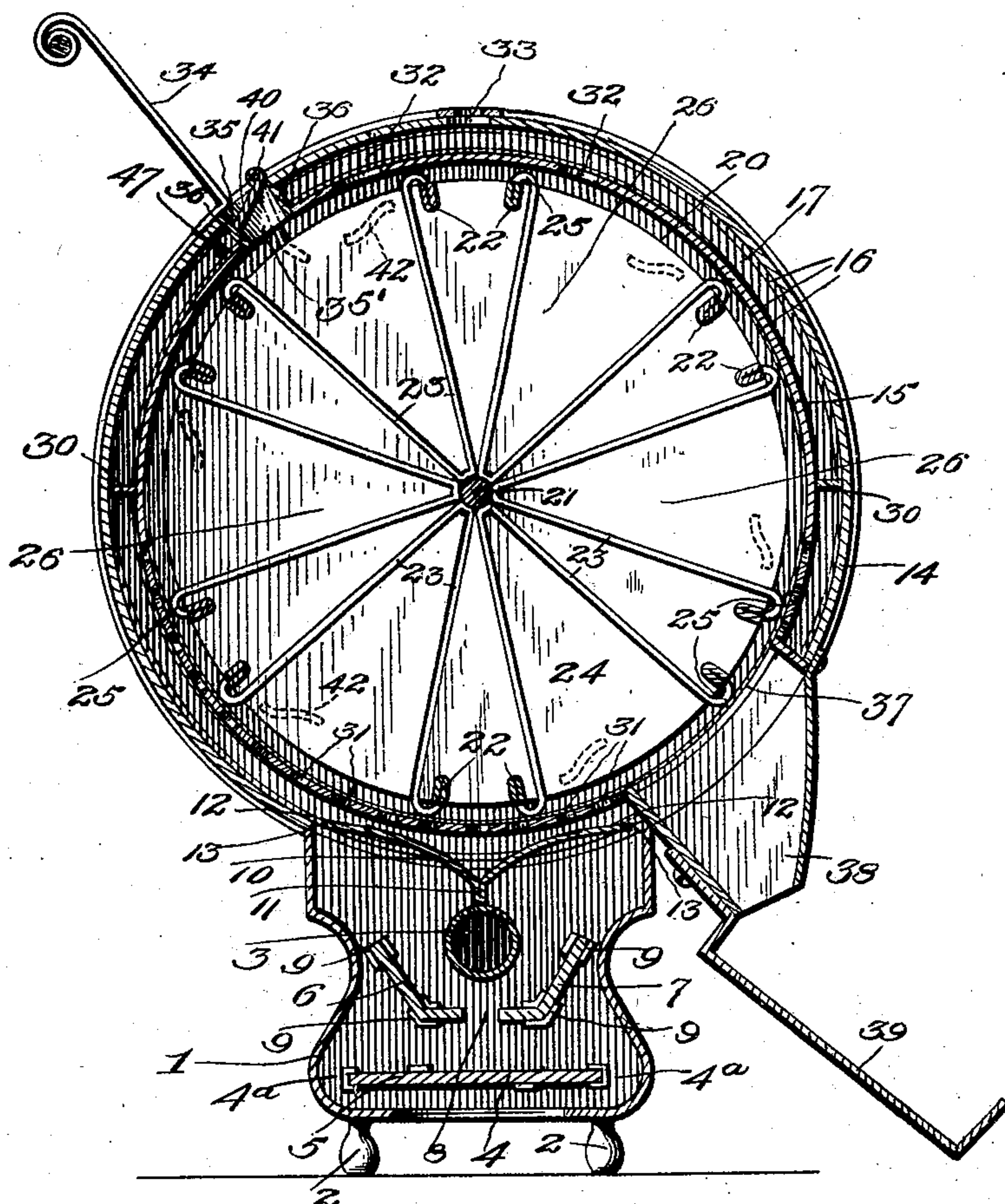
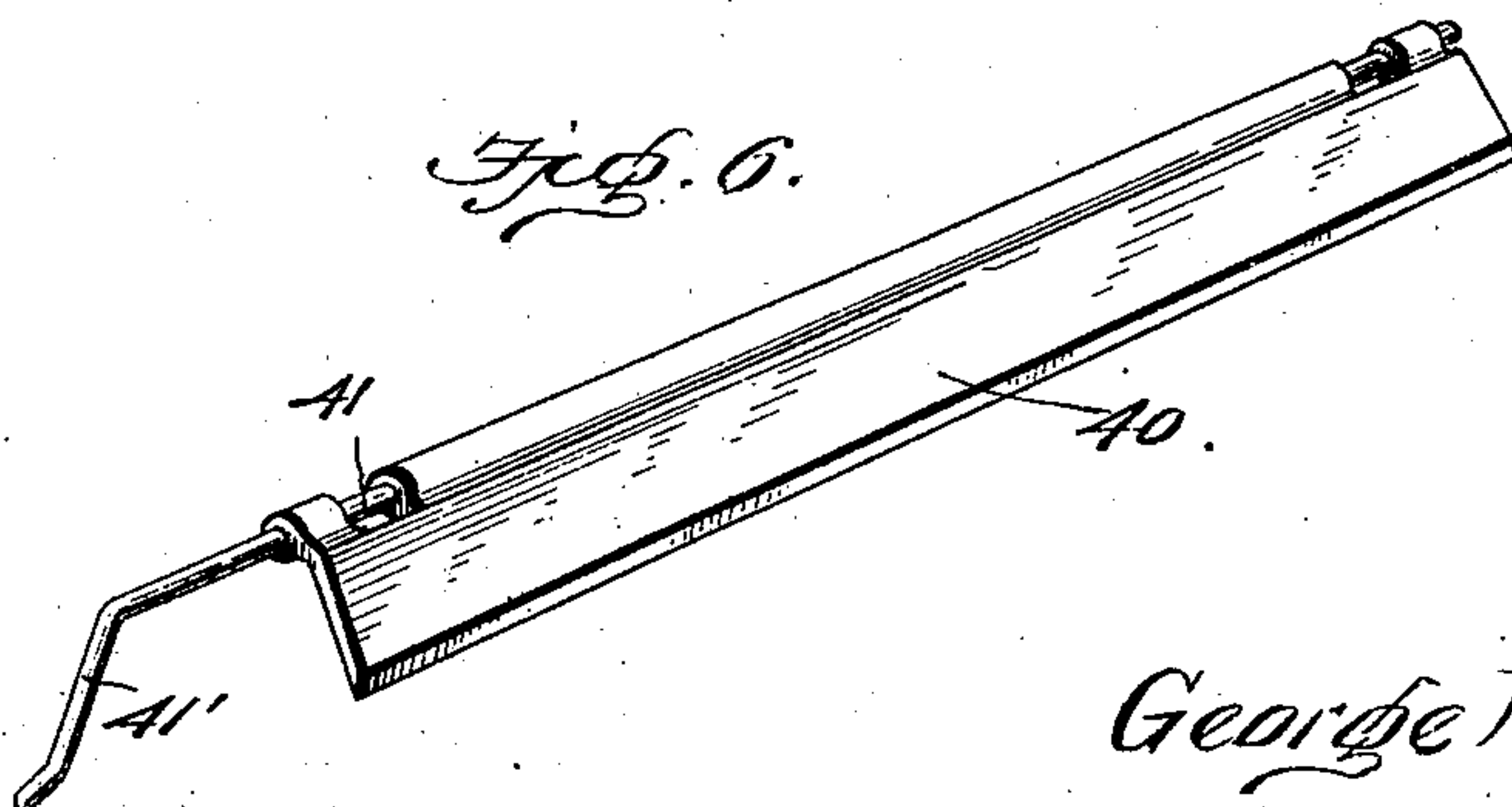


Fig. 6.



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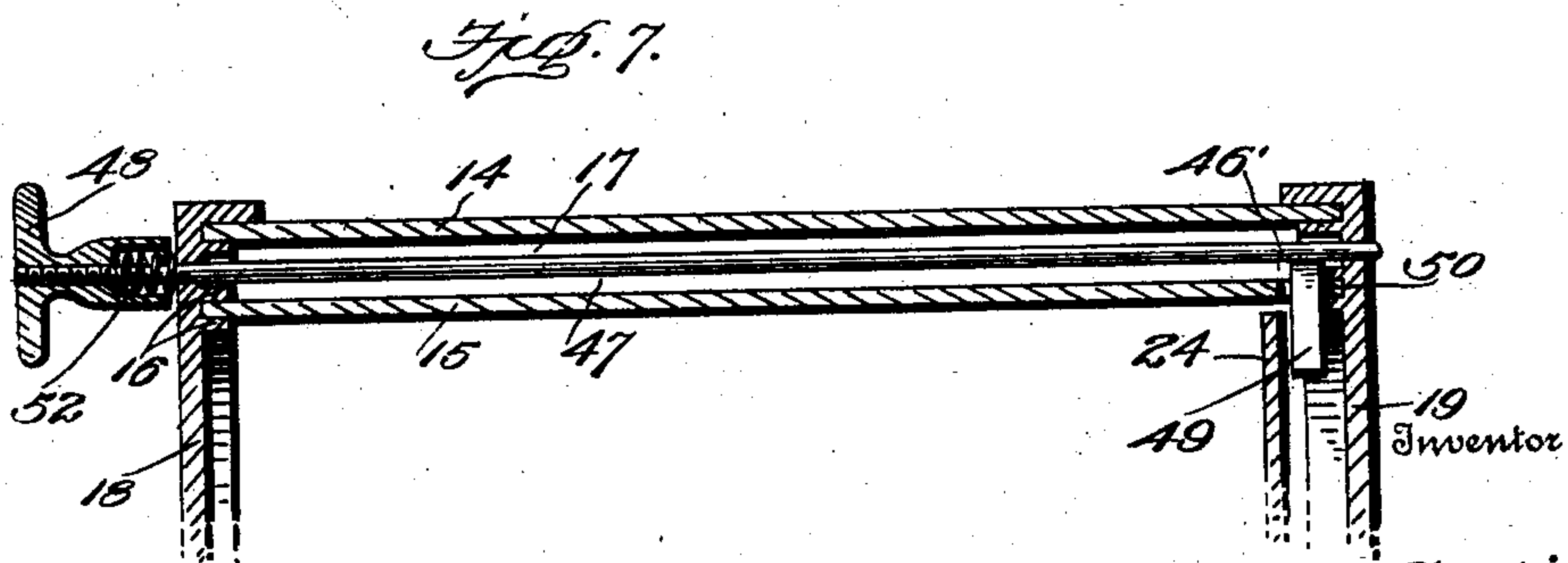
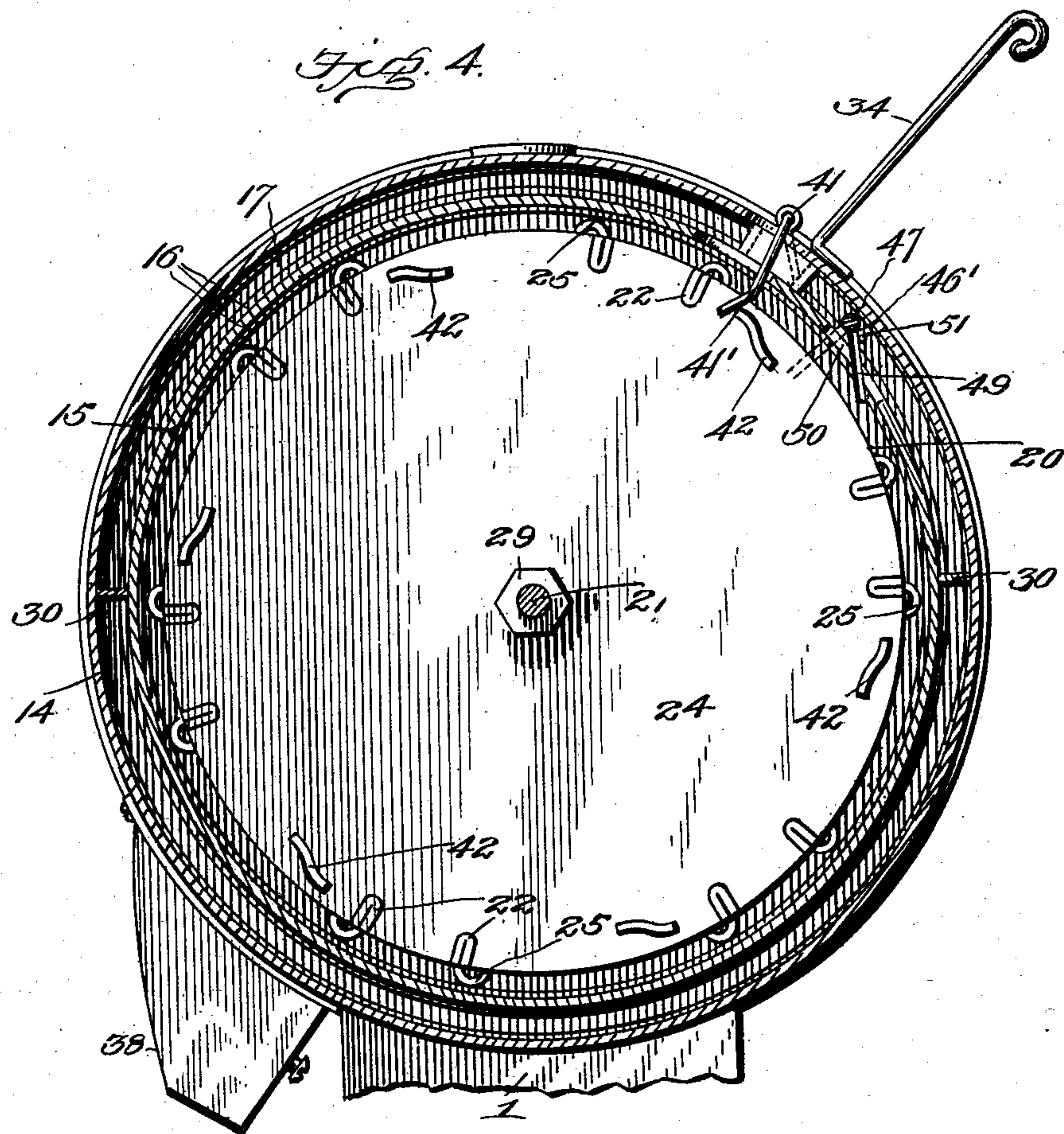
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

GEORGE W. CURTISS, OF PEORIA, ILLINOIS, ASSIGNOR TO MORROW PROTECTIVE PROCESS COMPANY, A CORPORATION OF ILLINOIS.

CARBONIZING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 709,967, dated September 30, 1902.

Application filed November 30, 1901. Serial No. 84,274. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. CURTISS, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Carbonizing Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to carbonizing apparatus.

The apparatus is especially designed for use in a process wherein the lines to be carbonized are written or printed upon paper or some other suitable material by a colored ink, the carbonization being accomplished by subjecting the paper carrying such lines of written or printed matter to the action of artificial heat until such lines become carbonized and are rendered permanent and ineradicable.

The object of the present invention is to provide a heating apparatus by means of which the operation of carbonizing the written or printed matter may be quickly, conveniently, and efficiently carried out; and a further object of the invention is to provide a heating apparatus of this character by means of which a large amount of written or printed matter may be carbonized within a minimum period of time.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in certain novel features of construction and combination and arrangement of parts, which will be hereinafter more fully described, defined in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the apparatus. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a central vertical transverse section. Fig. 4 is a vertical transverse section on line *xx* of Fig. 2 looking in the direction of the arrow. Fig. 5 is a fragmentary view showing the construction of one of the pockets of the rotary wheel. Fig. 6 is a detail view of the gate. Fig. 7 is a fragmentary sectional view illustrating the stop mechanism.

Referring now more particularly to the

drawings, the numeral 1 represents a suitable chambered base, which is supported upon feet 2 and in which is arranged a heating device 3, which may be in the form of a gas burner, as shown, an electric heater, or any other preferred type of heating means. The bottom of this base is open, as shown at 4, for the inlet of air, and arranged above said opening is an asbestos shield 5, which is designed to protect the counter or desk on which the apparatus may rest from the heat from the burner 3. This shield is of less width than the base, so as to leave spaces or passages 4^a on opposite sides thereof for the entrance of air to support combustion. Between the shield 5 and the burner is a trough-shaped shield formed of two parts or sections 6 and 7, of asbestos, which protect the sides of the base from the heat of the burner 3. The lower edges of said sections 6 and 7 are spaced apart to form a central air-passage 8, through which the air enters the upper portion of the chamber and passes to opposite sides of the burner, by which it is heated. The shields are retained in position by holding-lugs 9, from which they may be readily disconnected for removal whenever desired. Above the burner is arranged a flame-spreader and heat-diffuser 10, which consists of a sheet-metal plate folded centrally to form a divider 11, from which extend upwardly and laterally curved wings 12, which are spaced apart from the wall of the heating-chamber to provide passages 13 for the upward flow of the heated air to a cylindrical inclosing casing 14, supported upon the said base 1. The wings 12 deflect the flames and heated air laterally, so as to diffuse the heat and cause the passage of an equal supply of hot air to the casing 14 through each of the passages 13. The casing 14 incloses a cylindrical drum 15, which is held concentric therewith by interconnecting pieces 16, forming a space or chamber 17 between the two for the reception of the hot air from the base or heating-chamber 1. These two cylinders are closed at their ends by the heads 18 and 19, which are common to both cylinders. A rotary wheel or carrier 20 is arranged within the drum and comprises a longitudinal shaft 21, journaled in said heads, a series of periph-

eral strips or slats 22, the radial spokes or arms 23, and the end disks 24. The arms 23 are formed of V-shaped rods or wires, which are slightly flattened at the vertex portion to bear
 5 upon the shaft and are provided with hooks 25 at their free ends to fit within seats in the outer edges of the pair of cooperating slats 22. The rods or wires are arranged in longitudinal rows, each row forming, with the co-
 10 operating slats, a V-shaped tray or pocket 26. The pockets are closed at their ends by the disks 24, to which the slats or strips 22 are fixed. Each of said slats or strips preferably consists of a strip of sheet metal folded to em-
 15 brace the hooked ends of the arms, the folded edges of the strip forming between them the receiving-space or seat for the said hooked ends of the arms. The arms are clamped and held spaced the proper distance apart by col-
 20 lars 27, which surround the shaft 21, and said shaft is formed with threaded portions 28 to receive clamping-nuts 29, which bear against the heads 24 and force the collars inward to clamp the arms in place. The wheel con-
 25 structed as thus described forms a series of V-shaped trays in the form of pockets to receive the checks, tickets, or papers carrying the lines of writing to be carbonized, which trays are connected to a common shaft or ac-
 30 tuating device, by which they are adapted to be turned or rotated in unison.

The lower half or portion of the space or chamber 17 is separated from the upper half or portion thereof by partitions 30, and the
 35 drum 15 is in communication with the lower portion of said chamber through the medium of ports 31 and with the upper portion of said chamber through the medium of similar ports 32, by which the hot air from the heater is
 40 supplied to the drum to carbonize the lines of writing on the checks, tickets, or papers contained in the trays 26 and then exhausts to the atmosphere. As will be readily under-
 45 stood by reference to Fig. 3, the hot air entering the lower half of the chamber 17 from the heater first passes into the drum or inner casing 15 and circulates therein through the open or foraminous trays 26 and then passes out through the ports 32 into the upper half of
 50 said chamber 17 and exhausts to the atmosphere through exhaust-ports 33, formed or provided in the top of the casing 14.

Secured to the upper surface of the casing is an inclined shelf 34, and formed in the cas-
 55 ing is a feed-aperture 35, which is separated from the chamber 17 by partitions 36 and registers with an aperture 35', formed in the drum 15. The shelf 34 serves as a support for the checks, tickets, or papers to be fed
 60 into the trays 26 and guides the same to the feed-aperture 35, whence they fall into the trays as the latter in rotating pass by and beneath said aperture. A discharge-aperture 37 is formed in the drum 15 at a point dia-
 65 metrically opposite the feed-aperture and registers with a discharge-chute 38, attached to the casing 14, which chute conducts the

checks, tickets, or papers on which the lines of writing have been carbonized to a suitable tray or receptacle 39. The feed-aperture is
 70 normally closed by a tilting gate or valve 40, which is automatically opened as each tray 26 comes in line therewith to allow the check, ticket, or paper resting on the shelf 34 to feed or drop by gravity into said tray. This gate
 75 is carried by a rock-shaft 41, journaled in the casing 14 and having at one end an inclined arm 41', which is adapted to be engaged by cams 42, fixed to one of the heads 24. These
 80 cams, which correspond in number to the trays 26, are so constructed and arranged as to open the valve as each tray comes in line with the feed-aperture and to maintain the valve open a sufficient length of time to per-
 85 mit the ticket, check, or paper to pass through the aperture and into the tray before the valve closes. It is preferable to have the cams properly shaped to cause the valve to open quickly and to close gradually or slowly, as
 90 the quick opening of the valve allows the object to be treated to fall immediately and uniformly or at the proper angle into the tray or pocket, while the gradual or slow closing of the valve affords sufficient time for the object
 95 to feed into the tray below before another tray comes into receiving position and obviates all liability of said object being caught by the valve on its closing movement. As
 100 the valve opens instantly under the action of a cam, it will be readily understood that the object to be treated will pass at once through the feed-aperture into the registering tray or pocket without tilting or canting and will
 105 thus be prevented from hanging in the feed-opening or between the blades or wires of the tray. Hence reliability in the proper feed and discharge of the checks or objects under treatment is insured.

The shaft 21, carrying the rotary trays 26, is driven from a spring or other suitable mo-
 110 tor 43, connected by insulated supports 44 upon the exterior of the casing to the head 18. This motor is shown conventionally in Figs. 1 and 2 and is represented as having a drive gear-wheel 45 to mesh with a pinion 46
 115 on the shaft 21, by which said shaft is driven to rotate the trays 26. A stop device 46' is provided for arresting the motion of the rotary wheel or carrier and comprises a finger or lug 49, carried by a rod or shaft 47, jour-
 120 naled in the heads 18 19 and having one end extending exteriorly of the casing and threaded to receive a thumb-nut 48, by which it is adapted to be turned to project the stop-lug
 125 49 through an aperture 50 in the drum into and out of the path of the cams 42 on the wheel. A pin 51, fixed to the head 19, limits the movement of the lug in one direction—
 130 *i. e.*, in the direction of retraction—and a spring 52 is seated in a socket in the nut 48 and is adapted to bear upon the head 18 to hold the stop device in adjusted position. This spring causes sufficient resistance to the movement of the rod 47 to prevent casual

projection of the lug, as well as to prevent retraction of the lug when projected to engage a cam 42 by the contact of the cam therewith, thereby preventing the cam from moving past the lug and allowing the pocket next in order to pass beneath the feed-aperture to move out of proper register with said aperture.

In the operation of the apparatus, the heater having been preliminarily started and the motor set in action to rotate the wheel when the temperature rises to a predetermined point, the checks, tickets, or papers carrying the written or printed matter to be carbonized are one by one rested on the shelf and fed into the V-shaped trays or pockets 26, this operation being automatically effected by the cams 42 contacting with the arm 41 of the rock-shaft 41, by which the gate is swung open to allow the check or paper to drop through the feed-aperture 35 into the pocket 26 therebelow. As the checks or papers are carried by the rotation of the tray, which turns in the direction of the arrow, Fig. 3, the lines of writing thereon are subjected to the action of the hot air circulating in the drum 15, and are thereby carbonized and rendered permanent and ineradicable. Upon the coming of each tray into register with the discharge-chute 38 the check or paper therein discharges through said chute onto the tray 39. By keeping the apparatus in constant use a large amount of written or printed matter may thus be carbonized within a minimum period of time. When it is desired to stop the wheel, the lug 45 is projected by turning the nut or finger-piece 48 to rock the shaft 47, whereby the lug is brought into position to engage one of the cams 42 to stop the wheel, with one of the trays or pockets in register with the feed-aperture. To start the wheel again, the lug is retracted and the motor set in operation, as will be readily understood. The hot air from the base or heating-chamber 1 passes upwardly into the lower portion of the chamber 17, to the opposite sides of which it is equally directed by the wings 12 of the spreader 10, and thence flows through the ports 31 into the drum 15 and circulates through said drum and through the foraminous pockets 26, thereby causing the rapid heating and carbonization of the written or printed matter contained in said pockets. After circulating in the drum the heated air discharges into the upper portion of the chamber 17 and thence to the atmosphere through the ports 32. The writing on the papers or materials to be treated is done by a suitable chemical writing fluid, which is adapted to sink into the fiber of the paper and when subjected to artificial heat to become carbonized, thus rendering the writing permanent and ineradicable.

The arms or spokes 20, forming the body portion of each tray or pocket, are preferably composed, as shown, of wire or strips of metal of such size as to form thin metallic

rests or supports for the paper placed thereon, relatively thin material being used in order to secure the quick and even heating of said supports and even carbonization of the material.

From the foregoing description, taken in connection with the accompanying drawings, the construction, mode of operation, and advantages of my invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion, and details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A portable apparatus for carbonizing ink on paper comprising a heating-chamber provided with feed and discharge apertures, a tray within the chamber and movable to register with said apertures, a gate or valve closing the feed-aperture, means for moving the tray, and means carried by the tray for opening said gate or valve as the tray moves into register with the feed-aperture, substantially as set forth.

2. A portable apparatus for carbonizing ink on paper comprising a heating-chamber provided with feed and discharge apertures, a tray within the chamber and movable to register with said apertures, a gate or valve closing the feed-aperture, means for moving the tray, and a cam carried by the tray for opening said gate or valve as the tray moves into register with the feed-aperture, substantially as set forth.

3. A portable apparatus for carbonizing ink on paper comprising a heating-chamber provided with feed and discharge apertures, a tray within the chamber and movable to register with said apertures, a gate or valve closing the feed-aperture, means for moving the tray, and a cam carried by the tray for opening said gate or valve as the tray moves into register with the feed-aperture, said cam being so constructed as to effect the quick opening and gradual closing of the valve, substantially as set forth.

4. A portable apparatus for carbonizing ink on paper comprising a heating-chamber provided with feed and discharge apertures, a rotary tray within the chamber and movable to come in register with said apertures, a gate or valve closing the feed-aperture, means for rotating the tray, a rock-shaft carrying the valve and provided with an arm, and a cam upon the tray for engaging said arm to rock the shaft and open the valve as the tray moves into register with the feed-aperture, substantially as set forth.

5. A portable apparatus for carbonizing ink on paper comprising a heating-chamber provided with feed and discharge apertures, a rotary tray within the chamber and movable

to come in register with said apertures, a gate or valve closing the feed-aperture, means for rotating the tray, a rock-shaft carrying the valve and provided with an arm, a cam upon the tray for engaging said arm to rock the shaft and open the valve, and a stop device for engaging said cam to arrest the motion of the tray, substantially as set forth.

6. In an apparatus for carbonizing ink on paper, the combination of a heating-chamber provided with feed and discharge apertures, a rotary tray within the chamber and movable to come in register with said apertures, a gate or valve closing the feed-aperture, means for rotating the tray, a stop-lug projectable into the path of the tray to arrest the motion thereof, a rock-shaft carrying said lug, and means for maintaining the rock-shaft and lug in adjusted position, substantially as set forth.

7. In an apparatus for carbonizing ink on paper, the combination of a heating-chamber provided with feed and discharge apertures, means for heating said chamber, a tray movable within the chamber to register with said apertures, means for moving the tray, a gate or valve closing the feed-aperture, a rock-shaft carrying said valve, a cam upon the tray for actuating said rock-shaft, a lug projectable into the path of the cam to arrest the motion of the tray, a rock-shaft for actuating said lug, and means for maintaining the lug in adjusted position, substantially as set forth.

8. In a device for carbonizing ink on paper, the combination of a heating-chamber provided with feed and discharge apertures, means for heating said chamber, a shaft, end pieces upon the shaft, slats connected to the end pieces, a series of V-shaped arms connected to the slats and forming a tray or pocket for the reception of the paper carrying the lines of writing to be carbonized, means for clamping the vertex portions of the arms to the shaft, and means for rotating said shaft, substantially as set forth.

9. In a device for carbonizing ink on paper, the combination of a heating-chamber provided with feed and discharge apertures, means for heating said chamber, a shaft, end pieces upon the shaft, slats connected to the end pieces, a series of V-shaped arms connected to the slats and forming a tray or pocket for the reception of the paper carrying the lines of writing to be carbonized, collars on the shaft between the arms, means for forcing the collars toward each other to clamp the vertex portions of the arms to the shaft, and means for rotating said shaft, substantially as set forth.

10. A portable apparatus for carbonizing ink on paper comprising a supporting-base having a heater arranged therein, a casing mounted upon the base and having inlet and discharge apertures, a drum arranged within the base, heads closing the ends of the cylinder, a wheel rotatably supported by the heads

and provided with pockets to receive the papers carrying the lines of writing to be carbonized, and means for operating the wheel, substantially as specified.

11. A portable apparatus for carbonizing ink on paper comprising a heating-chamber provided with feed and discharge apertures, means for heating said chamber, a rotary wheel mounted within the chamber and provided with a series of trays or pockets for receiving the papers carrying the lines of writing to be carbonized from said feed-aperture and moving the same through the heated chamber to the discharge-aperture, a gate or valve closing the feed-aperture, cams upon the wheel for automatically opening said valve as each tray or pocket moves into receiving position, and means for operating said wheel, substantially as set forth.

12. A portable apparatus for carbonizing ink on paper comprising a heating-chamber provided with feed and discharge apertures, means for heating said chamber, a rotary wheel mounted within the chamber and provided with a series of trays or pockets for receiving the papers carrying the lines of writing to be carbonized from said feed-aperture and moving the same through the heated chamber to the discharge-aperture, a gate or valve closing the feed-aperture, means for opening the valve as each tray or pocket moves into receiving position, means for engaging the wheel to arrest the motion thereof, and means for operating said wheel, substantially as set forth.

13. In a device for carbonizing ink on paper, the combination of a heating-chamber provided with feed and discharge apertures, a shaft arranged therein, disks mounted upon the shaft, slats connected to said disks, rows of metallic V-shaped arms having their vertex portions bearing on the shaft and their free ends connected to the slats, forming a series of trays or pockets, collars about the shaft between the arms, fastening devices for forcing said collars toward each other to clamp the arms to the shaft, and means for rotating the shaft, substantially as set forth.

14. A portable apparatus for carbonizing ink on paper comprising a base having a heating device arranged therein, a casing supported by and in communication with the base, a drum arranged within the casing and in communication therewith, said casing and drum being provided with hot-air inlets and outlets and feed and discharge apertures for the papers carrying the lines of writing to be carbonized, a wheel arranged within the drum and provided with a series of trays or pockets, and means for rotating said wheel, substantially as set forth.

15. In an apparatus for carbonizing ink on paper, the combination, with a casing provided with vent-openings, of a drum therein and spaced therefrom, the space suitably partitioned to form inlet and outlet spaces for heated air, said spaces being in communica-

tion with the casing and the casing and drum provided with feed and discharge apertures, means for supplying heated air to the inlet-space, a tray movable within the drum to register with said apertures, and means for moving the tray, substantially as set forth.

16. In an apparatus for carbonizing ink on paper, the combination, with a casing provided with vent-openings, of a drum therein and spaced therefrom, the space suitably partitioned to form inlet and outlet spaces for heated air, said spaces being in communication with the casing and the casing and drum provided with feed and discharge apertures, means for supplying heated air to the inlet-

space, a rotary wheel mounted within the drum and provided with a series of trays or pockets for receiving the papers carrying the lines of writing to be carbonized from said feed-aperture and moving the same through the drum to the discharge-aperture, and means for operating said wheel, substantially as set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE W. CURTISS.

Witnesses:

E. F. CAVERLY,
BENJ. G. COWL.