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No. 789,768.

PATENTED MAY 16, 1905.

T. J. SULLIVAN.
RENOVATOR.

APPLICATION FILED JAN. 9, 1902.

3 SHEETS—SHEET 1.

Fig. 1.

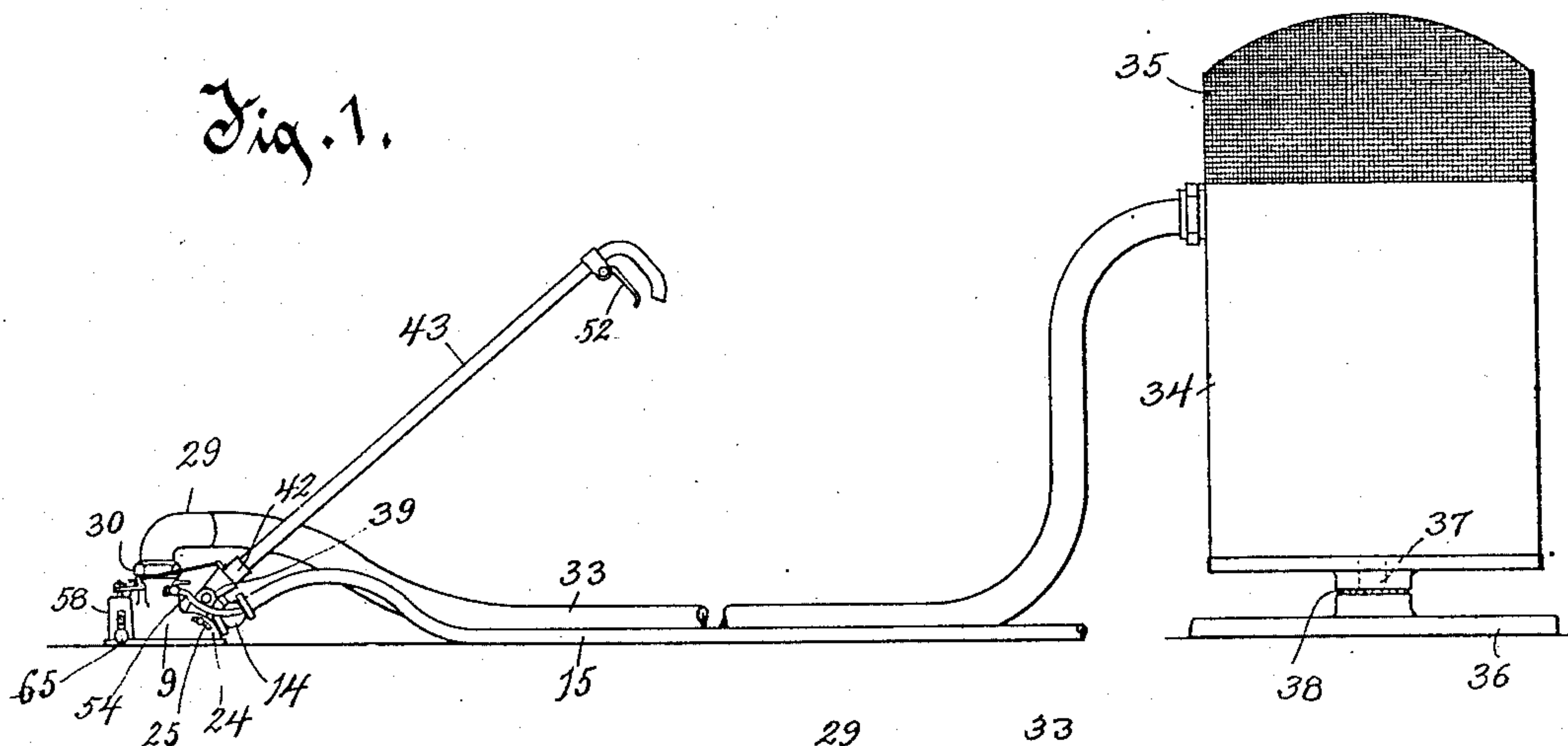


Fig. 2.

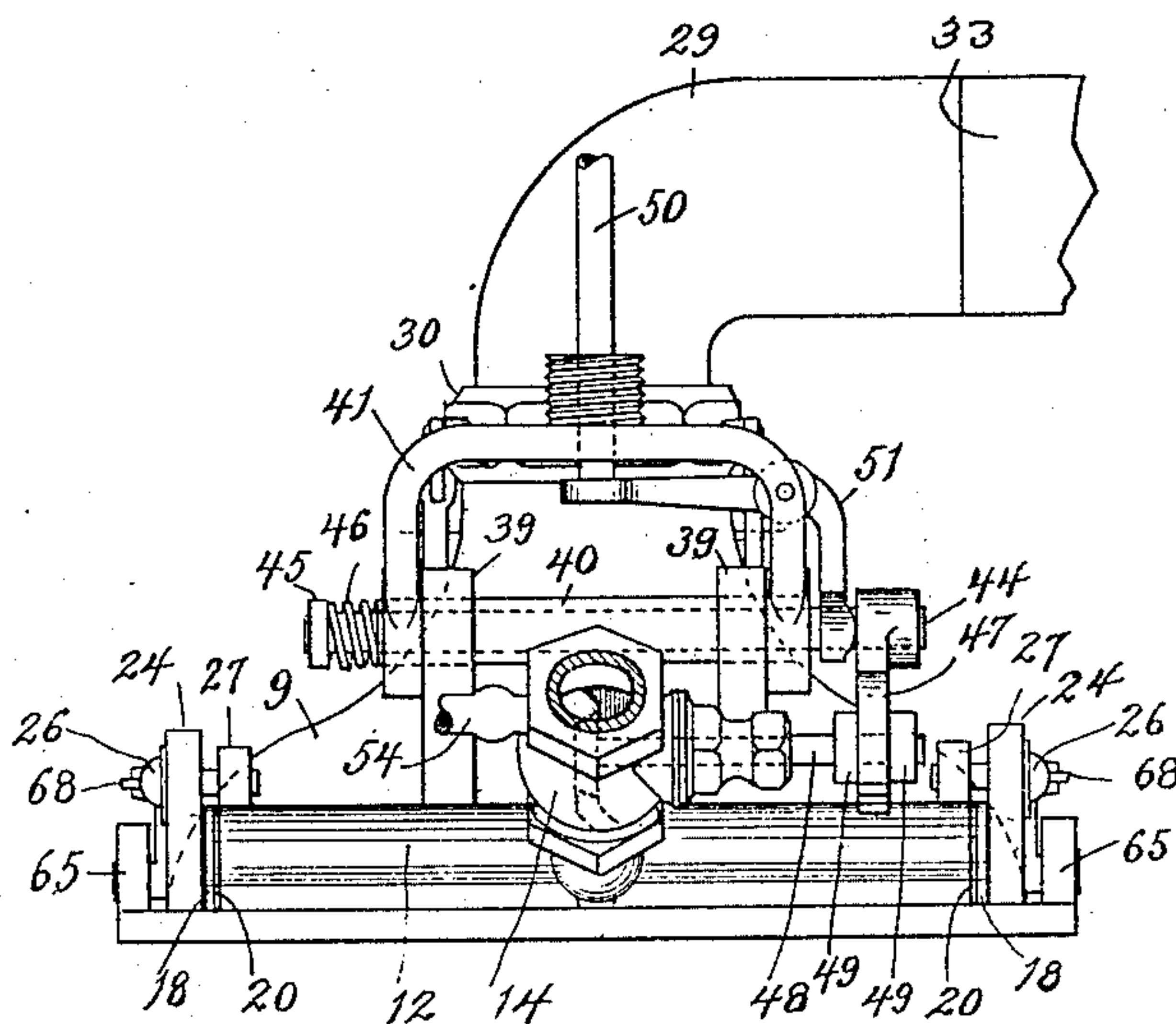


Fig. 6.

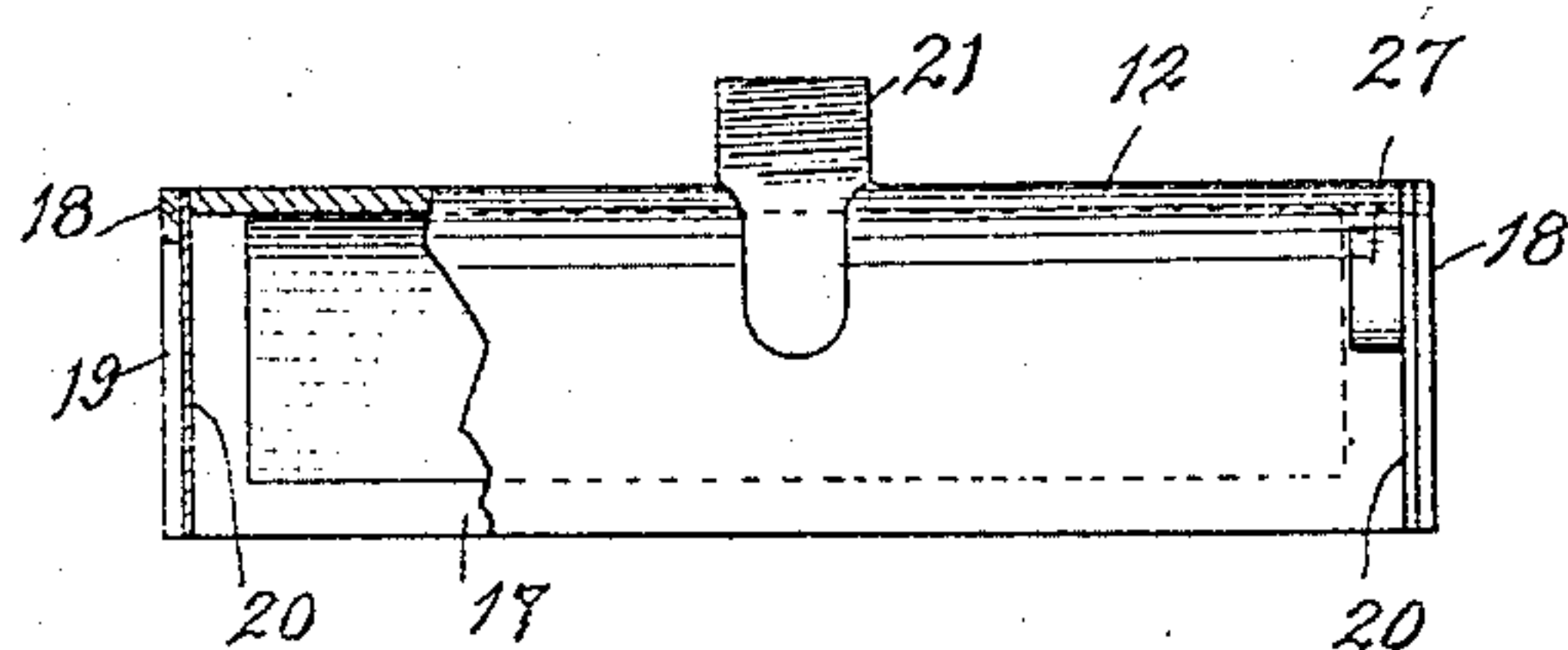


Fig. 7.

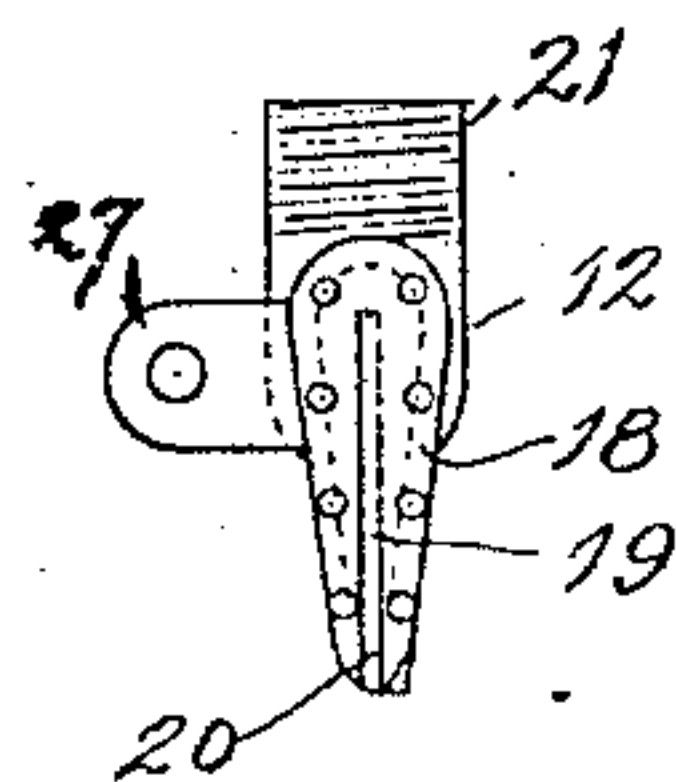
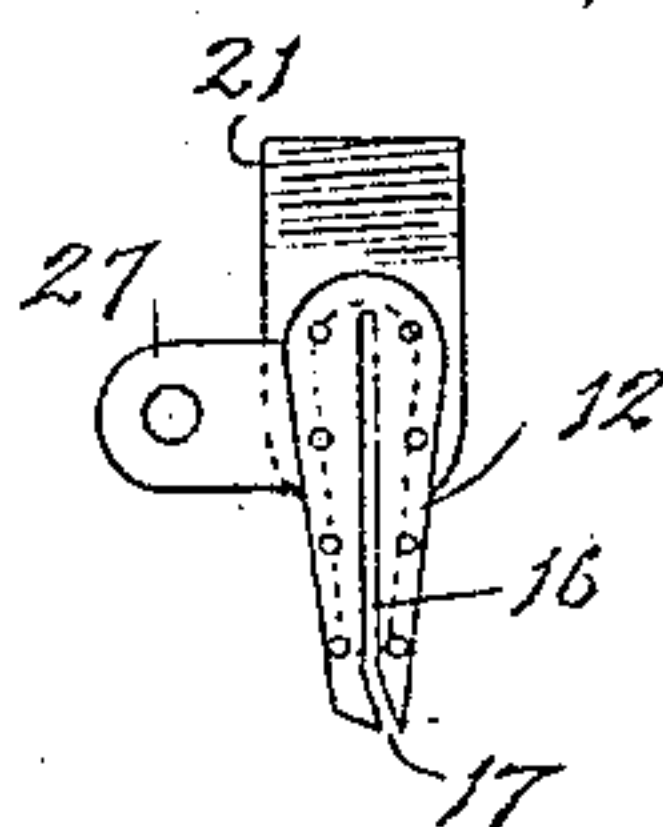


Fig. 8.



Witnesses.

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3 SHEETS—SHEET 2.

Fig. 3.

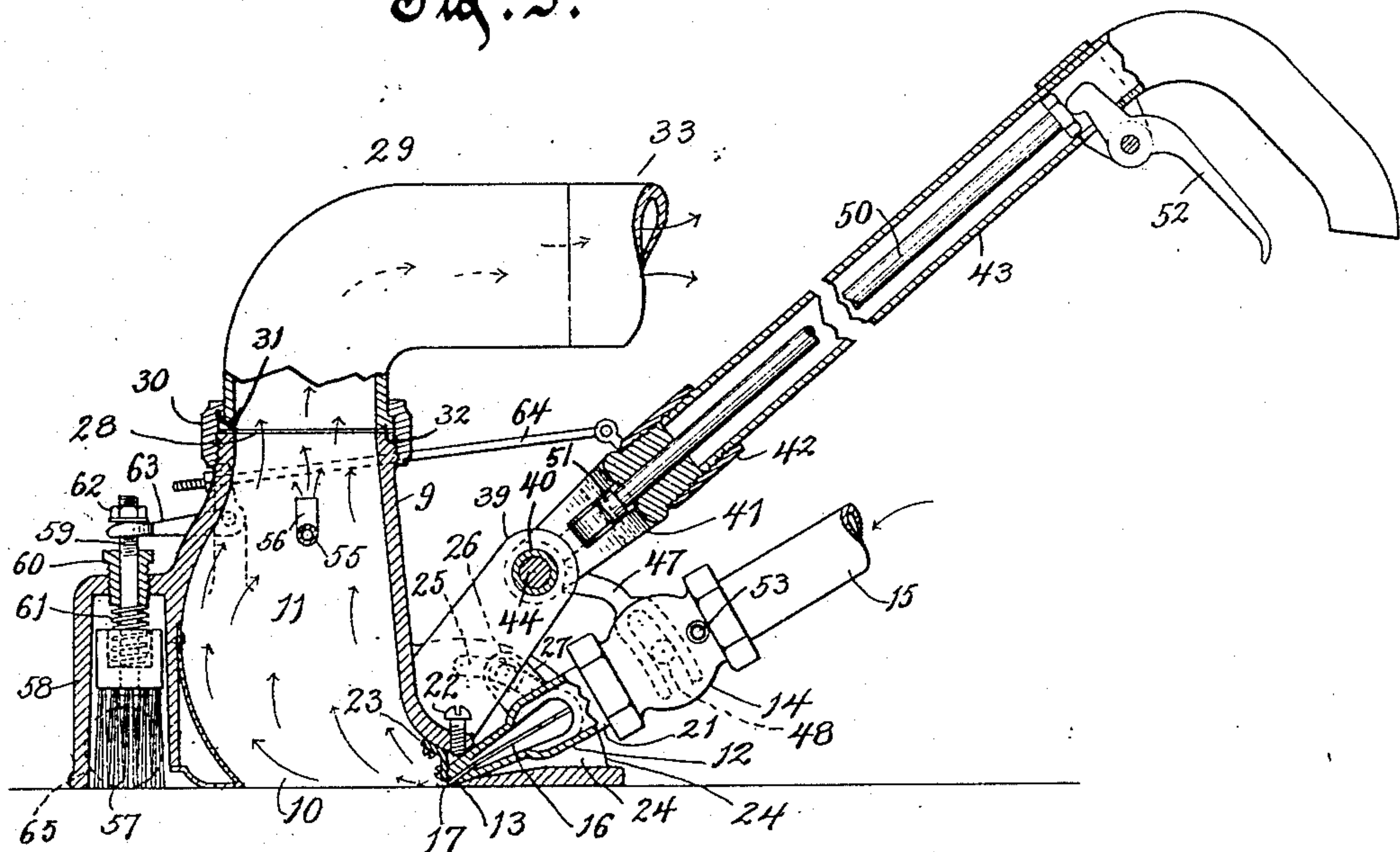


Fig. 4.

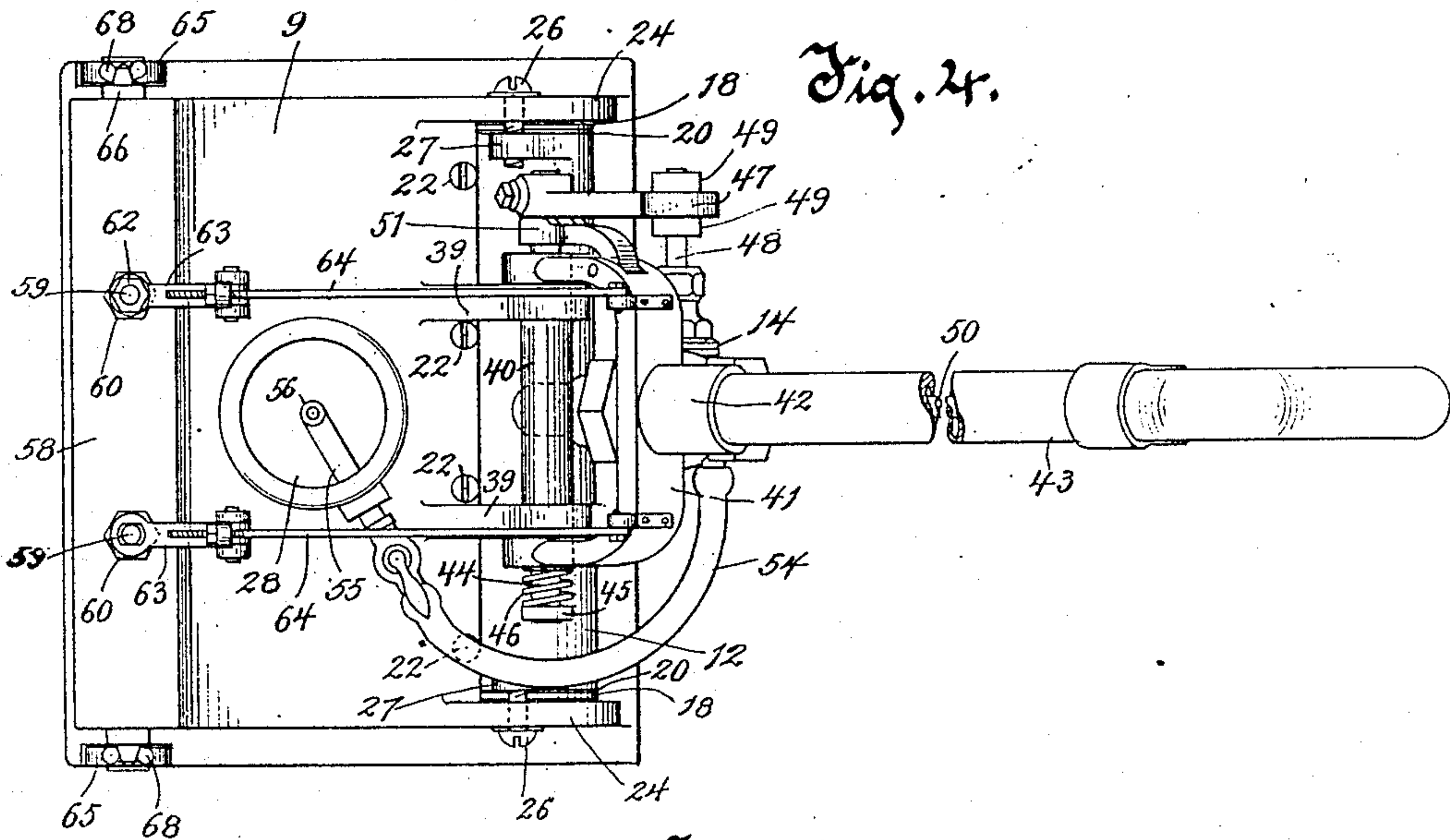
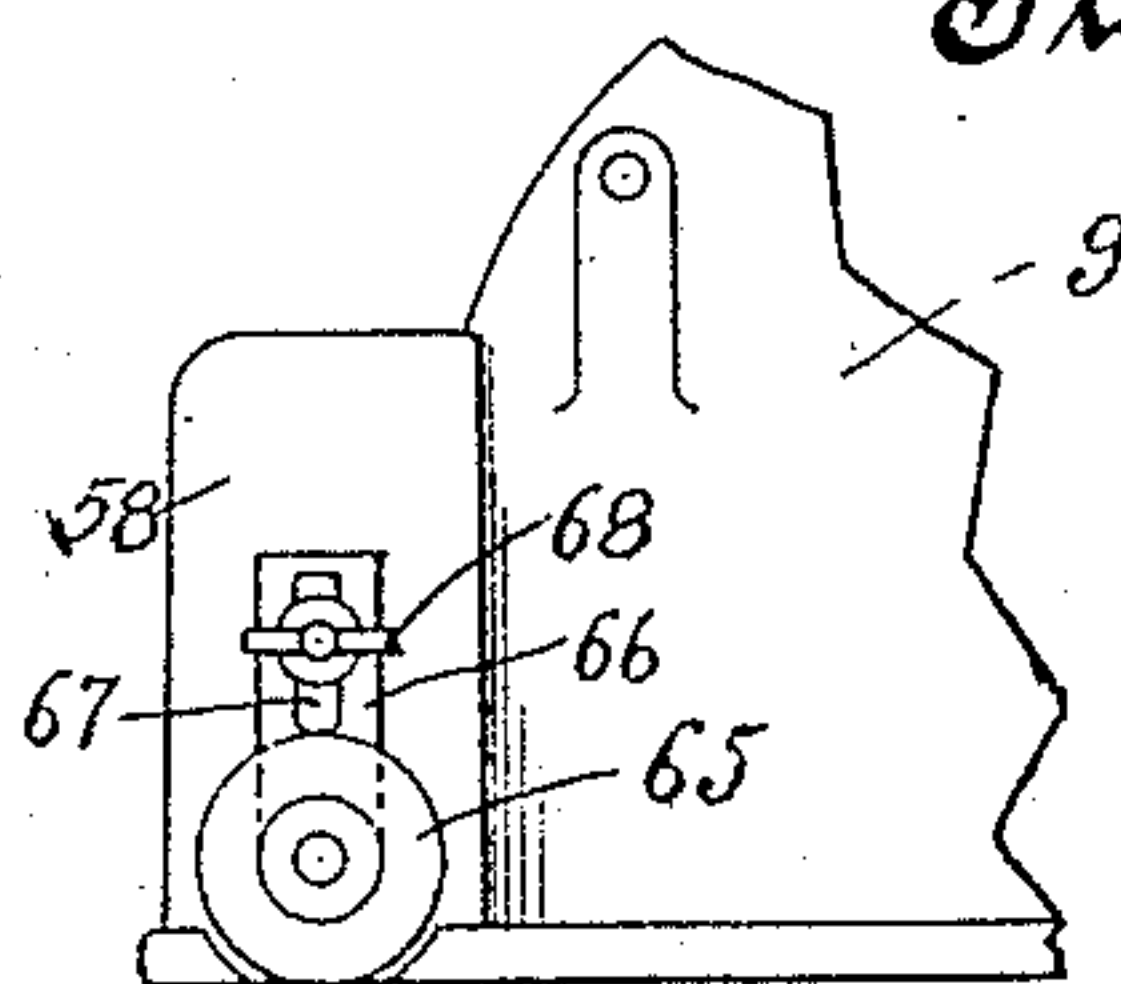


Fig. 5.



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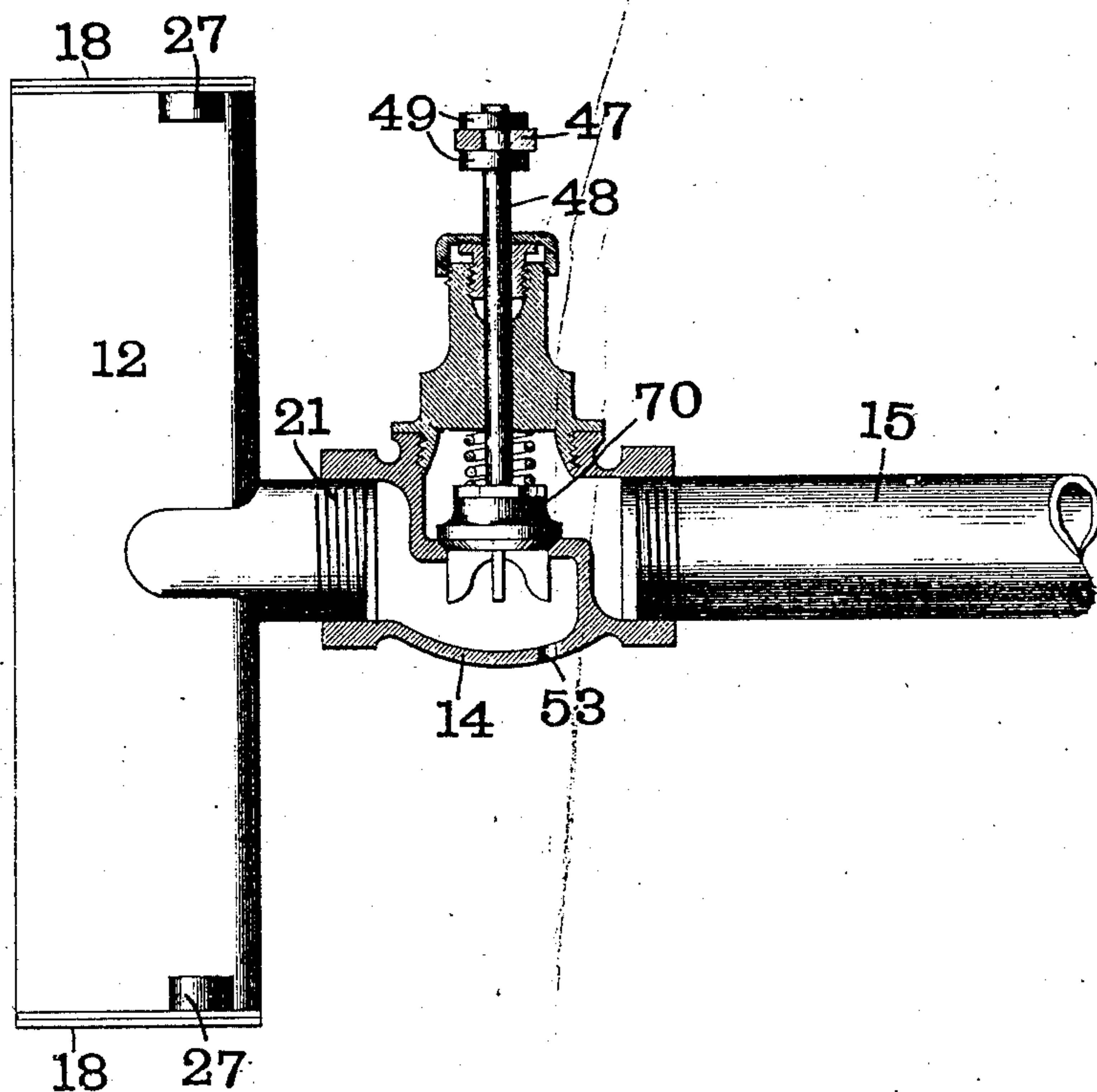
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3 SHEETS—SHEET 3.

Fig. 9.



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UNITED STATES PATENT OFFICE.

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LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

RENOVATOR.

SPECIFICATION forming part of Letters Patent No. 789,768, dated May 16, 1905.

Application filed January 9, 1902. Serial No. 88,984.

To all whom it may concern:

Be it known that I, THOMAS J. SULLIVAN, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented
5 a new and useful Improvement in Renovators, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention has relation to improvements
10 in renovators of that class wherein compressed air is utilized as the active agent in liberating the foreign particles, such as dust, from the carpet or other article to be cleaned or renovated.

15 The primary object of my invention is to provide a simple, cheap, compact, convenient, and enduring apparatus of the class referred to of such construction that the carpet or other article is thoroughly renovated and
20 cleaned.

A further object is the provision of an improved means for regulating the supply of compressed air to the device.

25 A further object is to provide an improved means for changing the inclination of the air-nozzle.

30 A further object is to provide an improved construction whereby an auxiliary suction is created in the chamber of the casing and the exhaust of the dust-laden air thereby facilitated.

35 A further object is the provision of an improved means for adjusting the size of the discharge-opening of the air-nozzle, and thereby by regulating the blast.

With the above and other incidental objects in view the invention consists of the devices and parts or their equivalents, as hereinafter set forth.

40 In the accompanying drawings, Figure 1 is a side elevation of the complete device. Fig. 2 is a rear elevation, parts broken away. Fig. 3 is a fragmentary side elevation with parts broken away and in section. Fig. 4 is
45 a plan view. Fig. 5 is a fragment of one side of the machine. Fig. 6 is a detail view of the nozzle, part broken away. Fig. 7 is an

end view of Fig. 6. Fig. 8 is a similar view with the end piece of the nozzle removed, and Fig. 9 is a sectional view showing a detail of
50 the valve mechanism.

Referring to the drawings, the numeral 9 indicates a casing which may be of any desirable construction, so long as it is provided with a bottom opening 10, so located that when
55 the device is in operative position the said opening will be immediately over the carpet or other article to be cleaned, and said casing also provided with an interior chamber 11, with which the opening 10 communicates. In
60 this class of devices air under compression is ejected into the chamber of the casing at the point where the opening of said chamber is located, so that said air is free to pass onto and into
65 the article to be cleaned and thence upwardly through the opening 10 into the chamber of the casing. Referring to the means for conducting the air, the numeral 12 indicates the nozzle, arranged, preferably, at an incline and having the
70 tip or discharge end thereof inserted through an opening 13 therefor in the lower end of the rear side of the casing and in position to discharge directly onto the carpet or other article
75 to be cleaned, as most clearly shown in Fig. 3. To the outer end of this nozzle is connected one end of a coupling 14, and to the opposite or
outer end of said coupling in turn is connected a long flexible tube 15, said tube leading
80 to and communicating with the source of compressed-air supply, which may be an air-pump, compressed-air tank, or other suitable supply for compressed air, located at any desirable
point, preferably outside of the building in which the cleaning operation is being per-
85 formed. It will be understood that in view of the fact that the tube is flexible the free turning of the casing is not interfered with.

The nozzle 12 is preferably of the peculiar form illustrated in the accompanying drawings and best shown in Figs. 3, 6, 7, and 8.
90 It comprises end portions and two side pieces, which latter are gradually bent toward each other in the direction of the discharge-opening of the nozzle, so as to provide a tapering

inner end of sufficiently reduced size to fit the opening 13. The nozzle is also slitted longitudinally, as indicated by the numeral 16, the said slit extending through the inner edge of the nozzle, so as to provide an elongated discharge-opening 17, extending longitudinally of said nozzle. The nozzle is also provided with end pieces 18 18, which are suitably shaped to conform to the shape of the ends of the nozzle and are provided with slits 19, registering with the slit 16. In order to provide against the air which is forced into the nozzle from escaping out of the slits 19 of the end pieces 18, I interpose between the inner sides of said end pieces and the ends proper of the nozzle leather pieces 20, which cover completely over the slits referred to, and hence prevent endwise leakage of the air. From the outer edge portion of the nozzle extends an exteriorly-threaded tubular nipple 21, communicating with the interior space of the nozzle formed by the longitudinal slit 16 thereof. The exterior threads of this nozzle form a convenient means for securing the coupling 14. The nozzle is preferably made of some flexible material, such as flexible metal, so that the sides thereof may be compressed or brought toward each other at the discharge-opening, whereby provision is made for regulating the size of said discharge-opening. In this class of devices it is very desirable that the size of the discharge-opening may be controlled by the operator, inasmuch as during the operation of renovating it frequently happens that the air should be discharged in either a very fine jet or stream or in a jet of a greater width or volume. By making the nozzle of flexible material and providing the slit 16 and slits 19 I am enabled to accomplish this result in a very simple manner, it only being necessary to provide in connection with said flexible nozzle one or more screws 22, which are turned through threaded openings in the outwardly-turned lower edge of the back piece of the casing, the lower ends of said screws impinging against the upper side of the nozzle near the inner edge of said upper side. It is obvious that by turning these screws downwardly the inner edge of the upper side piece of the nozzle may be brought in very close proximity to the inner edge of the lower side piece of said nozzle, and hence the discharge-opening thereby considerably reduced, or, on the other hand, if the screws are turned upwardly the inner edge of the upper side piece is permitted to move away from the inner edge of the lower side piece, and hence the discharge-opening is thereby enlarged. In order to prevent the air which is forced under considerable pressure into the carpet or other article and thence upwardly into the chamber of the casing from passing out of the joint between the lower edge of the rear side piece of the casing and the upper side of the nozzle, said joint is advisably made air-

tight by means of a flexible covering 23, of leather or other desirable material, secured to the inner side of said rear side piece of the casing and to the inner edge of the upper side piece of the nozzle.

In devices of this character it is desirable that the air-nozzle should be arranged at an angle, so as to project the air-blast at an angle onto or into and through the carpet. It is also desirable that means should be provided for readily changing the inclination of the nozzle in order to suit the requirements of the particular work. To provide for this, I form or provide the rear side piece of the casing at opposite ends with rearwardly-extending flanges 24 24, each flange being provided with a segmental slot 25. A screw 26 passes through each segmental slot and enters a lug 27 from the end of the nozzle. It is obvious that by loosening these screws the angle of the nozzle may be changed and the said nozzle held firmly at its adjusted inclination by again tightening said screws. By reason of the fact that the covering 23 is of flexible material said covering does not in any manner interfere with this adjustment.

The top of the casing is provided with an opening 28, and to the edge of this opening is connected an elbow-pipe 29, preferably having a swivel connection with the edge of the opening, so as to permit the casing to be turned to any position. This swivel connection may be provided by means of a nut 30, engaging a threaded extension from the casing, said nut provided at its upper end with a shoulder 31, engaging over a shoulder 32 at the lower end of the elbow-pipe. Connected to the outer end of this elbow-pipe is a flexible tube 33. This flexible tube leads to and communicates with the interior of a receptacle 34, which is adapted to receive therein the dust laden and charged air, and which air so charged would, if means were not provided to guard against it, again settle down upon the goods undergoing the cleaning operation. A reticulated upper portion or hood 35 is provided for the receptacle, said hood provided with a series of fine meshes which permit the air freed from the particles of dust or other matter to escape, but yet permitting said dust, &c., to lodge and settle in the bottom of the receptacle. In order to provide for the free movement of the renovator, the receptacle is advisably revolvably mounted above a base-piece 36 on a pivot 37, antifriction-balls 38 being preferably interposed between a depending hub from the receptacle and an upwardly-extending hub from the base.

Extending outwardly and at an upward incline from the rear side piece of the casing are arms 39 39, which form bearings for a tubular rocking sleeve 40. The ends of a yoke 41 are secured so as to rock with this sleeve, and this yoke at a central point is provided with a

socket 42, with which socket the inner end of the handle 43 has a threaded engagement. A shaft 44 is longitudinally movable in the sleeve 40, and the ends of said shaft project beyond the ends of the sleeve. On one end of the shaft is a nut 45, and between this nut and one end of the yoke the shaft is encircled by a coiled spring 46. The opposite end of the shaft carries a valve-operating arm 47, the outer end of said arm being bifurcated and the furcate parts straddling a valve-stem 48, collars 49 49 being mounted fast on the valve-stem and impinging against opposite sides of the valve-operating arm 47. The valve-stem extends into the coupling 14, and this end is provided with a valve 70, which when the valve-stem is actuated longitudinally in one direction is adapted to close the passage in the coupling 14 and when actuated in the opposite direction is adapted to open said passage. This is accomplished by the longitudinal movement of the shaft 44. When said shaft is moved in one direction—say to the right of Fig. 2—the coiled spring 46 is compressed and at the same time the valve-stem 48 is pulled outwardly. When pressure in this direction against the shaft 44 is removed, the coiled spring 46 expands, and consequently moves the shaft 44 in the opposite direction and causes the valve-stem through the arm 47 to be moved inwardly. The movement of the shaft 44 may be accomplished in any desirable manner; but I prefer to accomplish the same through the medium of mechanism which is directly under the control of the operator, and for this purpose I make the handle 43 tubular and arrange movably in the bore thereof a rod 50. The inner end of this rod is adapted to bear against the end of one arm of a pivoted bell-crank lever 51, and the opposite arm of said bell-crank lever is in engagement with the shaft 44. It is obvious that when the rod 50 is moved downwardly the bell-crank lever is turned in a direction to cause the shaft 44 to move to the right of Fig. 2. When force is no longer applied to the rod 50, the expansion of the coiled spring 46 not only causes the shaft 44 to return to its normal position, but at the same time also restores the bell-crank lever and the rod 50 to their normal position. For the purpose of causing a down movement of the rod 50 I provide a medially-pivoted lever 52, which is pivoted to lugs projecting from the handle, and its short arm is extended through an opening in the handle in position to act upon the rod 50, while its outer arm is in convenient position to be readily manipulated by the operator grasping the curved outer end of the handle.

I have found it desirable to provide for the maximum suction in the chamber of the casing 9, and for this purpose I provide the coupling 14, in which the valve of the valve-stem 48 works, with a small opening 53, and to this opening is connected one end of a flexible tube

54, the opposite end of said tube being connected to a valve-controlled metallic pipe 55, said pipe extending through the casing 9 and into the chamber 11 for a short distance and provided within the chamber with an upwardly-extending discharge-nozzle 56. It is obvious that from this construction when the valve of pipe 55 is open an auxiliary current of the compressed air is free to pass through the tube 54, thence into the metallic pipe 55, and finally discharged upwardly in the chamber 11, whereby the suction in said chamber is considerably augmented.

Practical tests have demonstrated that in devices of this character more effective work is accomplished if previous to the action of the blast on the carpet or other article to be cleansed the nap of the carpet or other article is raised, so that the air can thereby more freely enter into the material. To accomplish this, I provide at the front of the casing a brush 57, said brush being arranged within a box-like projection 58, extending from the front side of the casing. By this arrangement as the renovator is pushed over the surface of the article to be cleaned it is obvious that the brush will be thereby caused to first raise the nap of the article before the blast action takes place. I only desire that the brush should be brought into operative position when the brush is pushed away from the operator and that when pulled toward the operator it is then raised out of operative position. To provide for this, I have extending upwardly from the brush-back one or more stems 59. In the accompanying drawings I have shown two of said stems. These stems pass movably through bushings 60, said bushings having threaded engagement with the openings in the top of the box-like projection 58. The stems are encircled by coiled springs 61, said springs being disposed between the lower ends of the bushings and the upper side of the brush-back, their lower ends preferably extending into a recess in said brush-back. By turning the bushings the tension of the springs may be regulated. The upper ends of the stems are threaded, and nuts 62 are turned thereon. The lower arms of pivoted bell-crank levers 63 are adapted to engage beneath these nuts. The upper arms of these bell-crank levers are adjustably connected to rods 64 64, the outer ends of said rods being pivotally connected to the handle. From this construction it will be evident that when the renovator is pulled toward the operator and the handle turned downwardly on its pivot the brush will be raised, in view of the fact that a pull is exerted on the rods 64. The nap of the carpet is not, therefore, on this movement loosened or raised. On the reverse outward movement of the renovator, however, and on the turning upwardly of the handle the brush is permitted to lower and the nap of the carpet is loosened or raised,

and any crust of dirt which may be on the surface of the carpet is also thereby loosened. The coiled springs 61 when the handle is turned downwardly and the brush thereby raised are necessarily compressed; but when the handle is turned upwardly these springs expand and assist in returning the brush to its lowered position and maintain said brush yieldingly in its lowered position until said brush is again raised. I prefer to mount in the end pieces of the box-like projection 58 rollers 65 65. These rollers, as will be most clearly seen from Fig. 5, are adjustably mounted, so as to be adjusted downwardly in contact with the surface traveled over, or adjusted upwardly out of contact with such surface. This is accomplished by extending the bearings 66 of the axis of the rollers upwardly and providing each bearing with an elongated slot 67. Through each slot is adapted to turn a winged screw 68, the inner end of each screw turning into the end of the box-like projection. It will be seen from this construction that the rollers may be readily raised or lowered and securely held in their adjusted position.

In the operation of my device it will be assumed that the flexible tube 15 is connected to a suitable source of compressed-air supply. The casing is then placed in proper position over the carpet or other article to be cleaned. The casing is then reciprocated by the operator grasping the handle and the valve 14 is opened by the operator, so as to permit a blast of air to pass out of the discharge-opening 17 of the nozzle onto and into and through the article. This air dislodges dust and carries it upwardly through the opening 10 and into the chamber 11 and thence through the elbow-pipe 29 and tube 33 into the dust-receptacle 34; the dust settling in the bottom of said receptacle and the air freed from the dust particles passing upwardly through the reticulated hood 35, as hereinbefore explained. If necessary during the operation of the device the valve in the pipe 55 may be opened, so as to create an upward suction in the chamber 11, and thereby assist the passage of the dust-laden air through said chamber and into the pipes 29 and 33.

It is to be noted that by the provision of the swivel connection between the elbow 29 and the exit-opening of the casing and also by reason of the swiveling of the dust-receptacle 34 the casing is free to be moved at will in different directions. Also by reason of employing a large receptacle 34 the necessity of frequent removal of accumulated dust is avoided.

What I claim as my invention is—

1. In a renovator, the combination of a casing having an inner chamber and a bottom opening communicating with said chamber, a nozzle connected with the casing and adapted to discharge compressed air onto the article

to be cleaned, the said compressed air thence passing upwardly through the bottom opening of the casing and into the chamber of said casing, a pipe leading from the compressed-air supply to the nozzle, a valve in said pipe for regulating the supply of compressed air to the nozzle, said valve provided with an outwardly-extending stem, a handle separate from and unconnected with the nozzle, a rod extending longitudinally of the handle, means for moving said rod, a bell-crank lever having one arm in position to be acted upon by the rod, and having its other arm adapted to act on the stem of the valve so as to move said stem and its valve in one direction, and means for moving the valve-stem and its valve in the opposite direction.

2. In a renovator, the combination of a casing having an inner chamber, and a bottom opening communicating with said chamber, a nozzle connected with the casing, and adapted to discharge compressed air onto the article to be cleaned, the said compressed air thence passing upwardly through the bottom opening of the casing and into the chamber of said casing, a pipe leading from a compressed-air supply to the nozzle, a valve in said pipe for regulating the supply of compressed air to the nozzle, said valve provided with an outwardly-extending stem, a tubular handle separate from and unconnected with the nozzle, a rod extending longitudinally in the bore of the handle, a lever pivoted at a medial point to the handle, and having one arm thereof exterior of the handle, and its other arm extending into the bore of the handle, in position, when the lever is turned, to act upon the end of the rod and thereby move said rod longitudinally, a bell-crank lever having one arm in position to be acted upon by the rod, and having its other arm adapted to act on the stem of the valve so as to move said stem and its valve in one direction, and means for moving the valve-stem and its valve in the opposite direction.

3. In a renovator, the combination of a casing having an inner chamber and a bottom opening communicating with said chamber, a compressed-air nozzle connected with the casing and adapted to discharge compressed air onto the article to be cleaned, the said compressed air thence passing upwardly through the bottom opening of the casing and into the inner chamber of the casing, means for supplying compressed air to the nozzle, and means for adjusting the inclination of the nozzle.

4. In a renovator, the combination of a casing having an inner chamber and a bottom opening communicating with said chamber, a flange extending from the casing and provided with a segmental slot, a compressed-air nozzle connected with the casing and adapted to discharge compressed air onto the article to be cleaned, the said compressed air thence passing upwardly through the bottom open-

ing of the casing and into the inner chamber
of said casing, means for supplying com-
pressed air to the nozzle, and a screw passing
through the segmental slot of the flange and
5 engaging the nozzle, said screw when loosened
permitting the degree of inclination of the
nozzle to be regulated.

In testimony whereof I affix my signature in
presence of two witnesses.

THOMAS J. SULLIVAN.

Witnesses:

ANNA V. FAUST,
A. L. MORSELL.

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