

June 17, 1941.

F. R. HUNTER

2,245,859

DEVICE FOR CLEANING ELECTRICAL AND ASSOCIATED EQUIPMENT

Filed Dec. 15, 1939

2 Sheets-Sheet 1

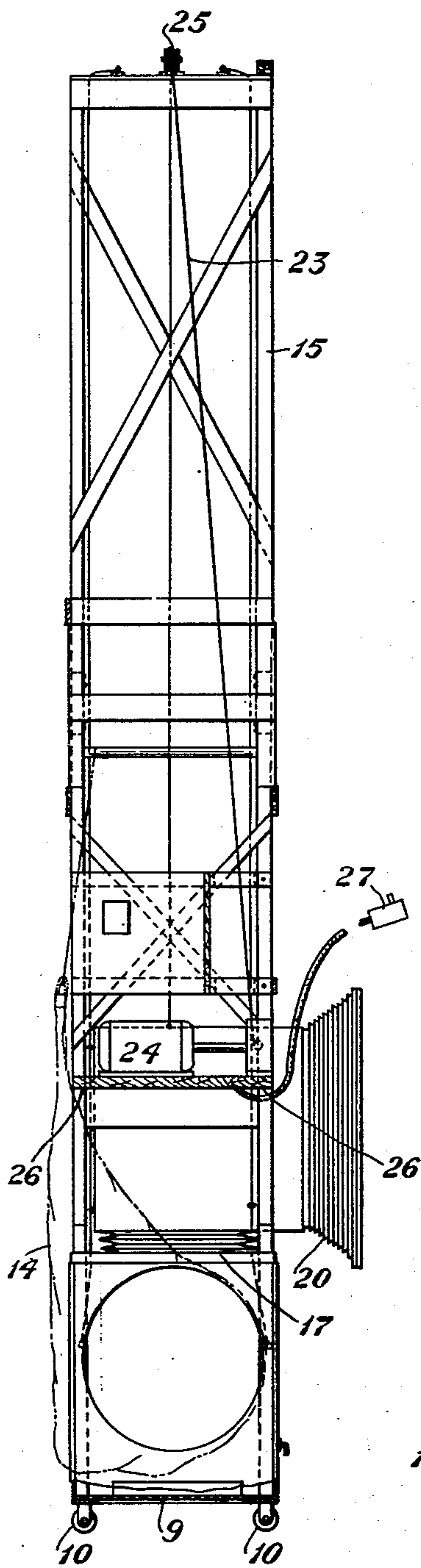


Fig. 1

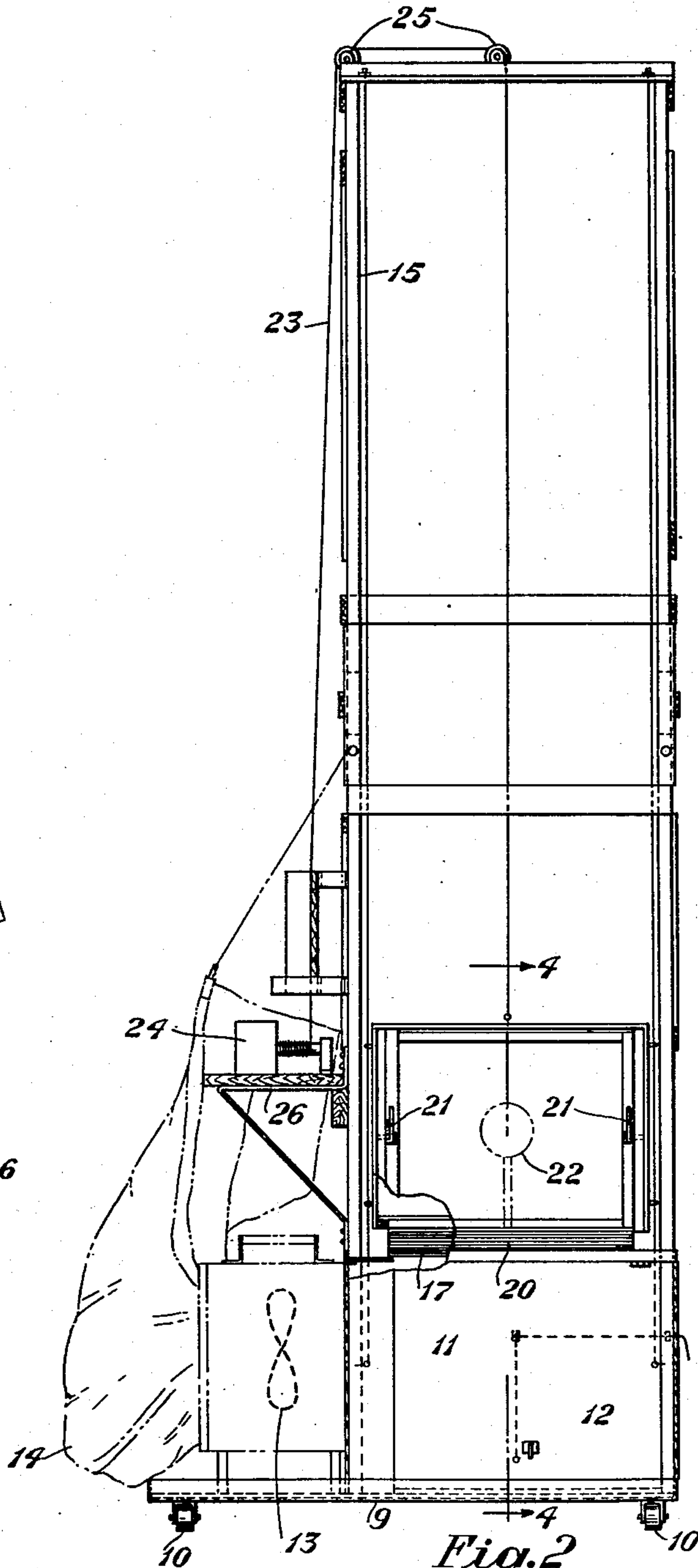


Fig. 2

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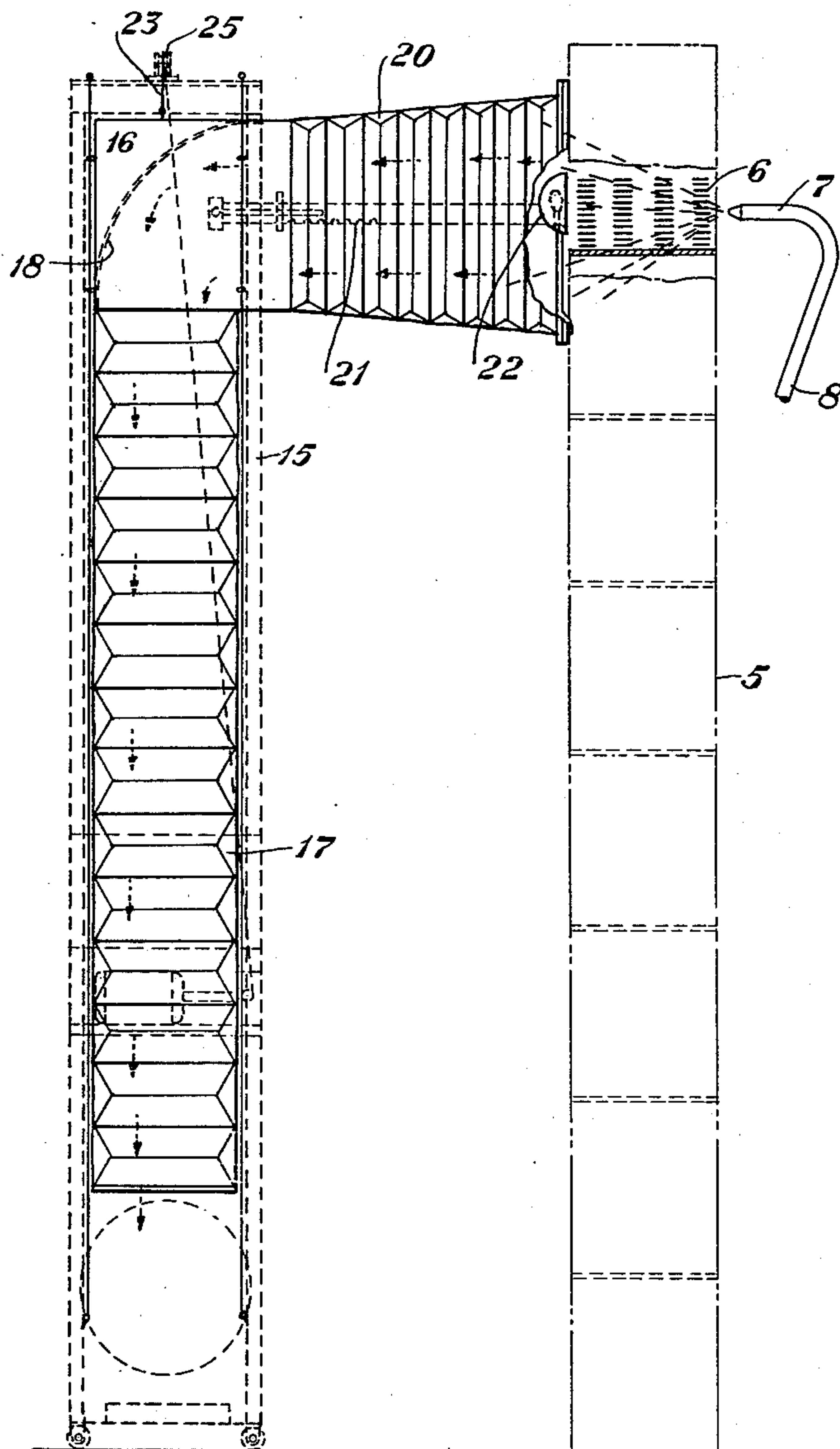


Fig. 3

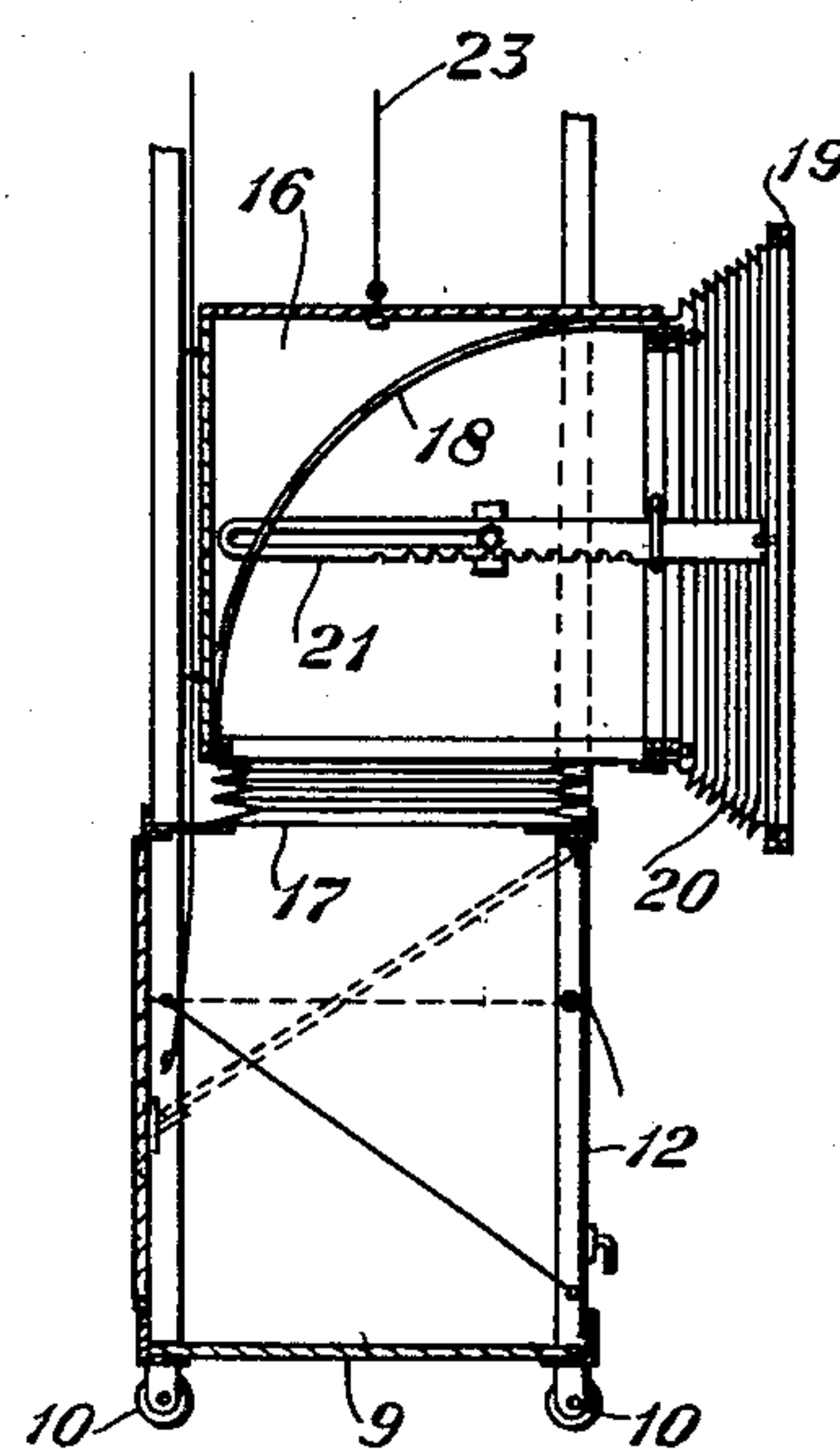


Fig. 4

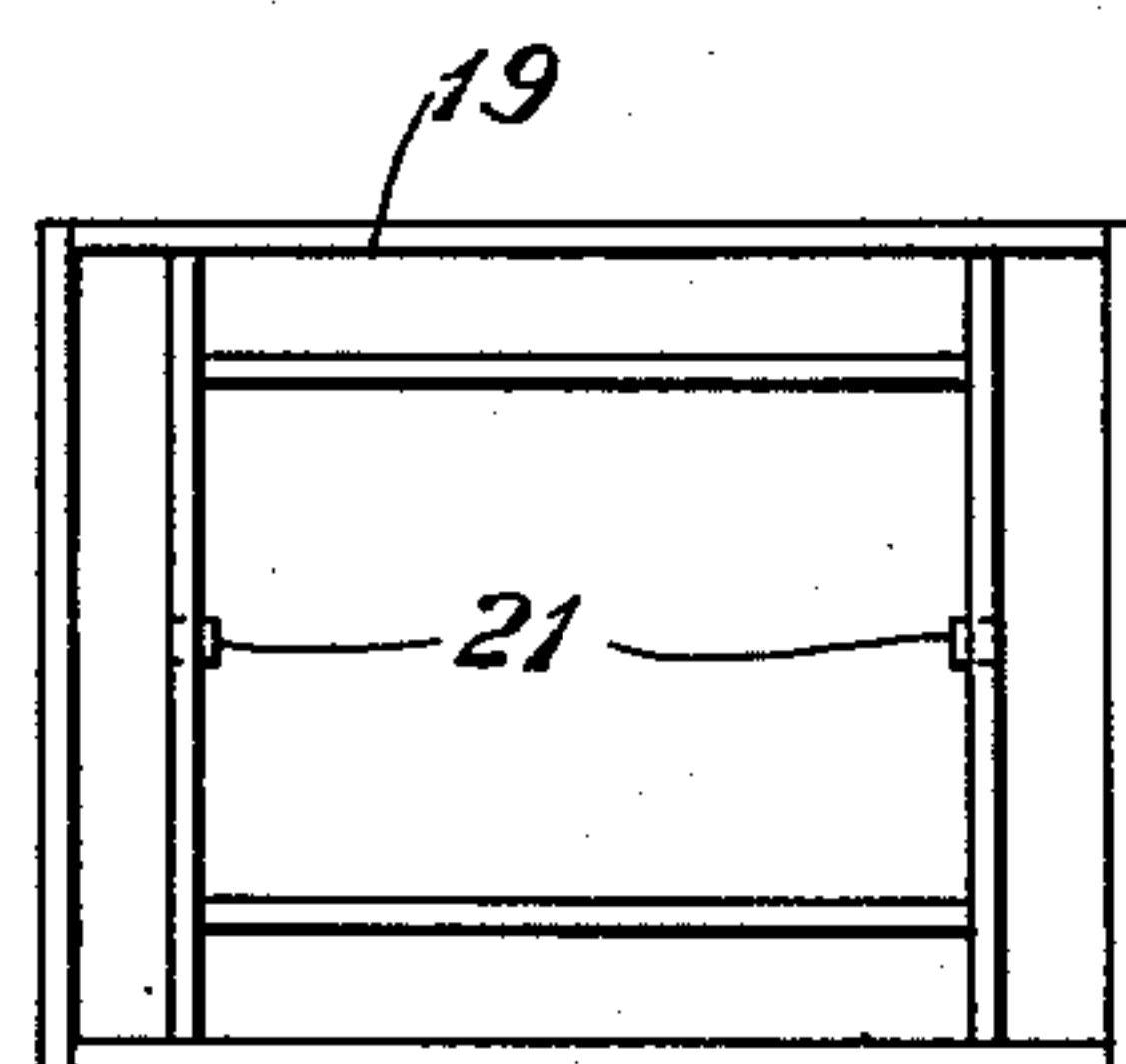


Fig. 5

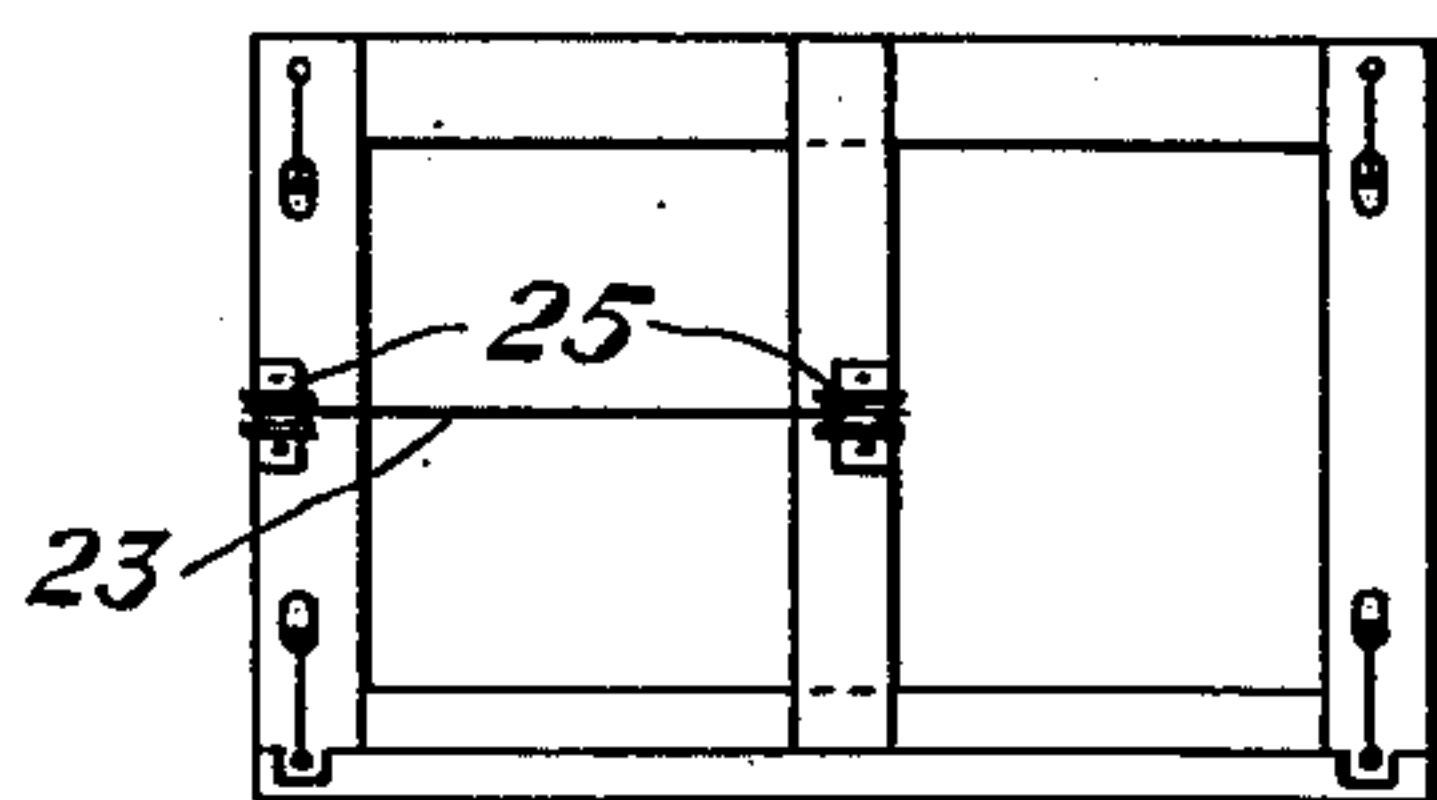


Fig. 6

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UNITED STATES PATENT OFFICE

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DEVICE FOR CLEANING ELECTRICAL AND ASSOCIATED EQUIPMENT

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4 Claims. (Cl. 15—14)

The collection of dust or other foreign matter upon telephone and telegraph equipment, and especially upon switchboards, racks and frames which provide mountings for various instrumentalities at central offices, has caused serious interference with the proper functioning of the delicate mechanism, and the numerous contacts or small parts of the equipment. This interference has sometimes resulted in the interruption of service and the consequent loss in revenue. The cleaning of this apparatus in the past has been unsatisfactory for the reason that an undue amount of time was required or in other cases that the dust particles dislodged during the cleaning process were frequently redeposited on the same or other equipment.

Accordingly, it is one of the objects of this invention to provide cleaning equipment for the removal of dust particles from the above described or like apparatus in an effective and efficient manner, and to so collect the greater portion of such particles that they cannot be redeposited on the same or other apparatus.

Another object is to provide adjustable and flexible equipment of this character whereby apparatus located at various heights or mounted at irregular positions may be readily reached and cleaned.

A further object is to provide control apparatus by which the improved device may be operated from a remote point.

These and further objects will be apparent from the following description, when considered in connection with the accompanying drawings, of which

Figure 1 is a side elevation of the improved device;

Fig. 2 is a front elevation thereof;

Fig. 3 is a view similar to that shown in Fig. 1, but with the apparatus illustrated as in applied position to electrical equipment;

Fig. 4 is a section taken on the line 4—4 of Fig. 2;

Fig. 5 is a front elevation of the detached horizontally movable or collapsible airdust bellows, and

Fig. 6 is a plan view of the device.

In Fig. 3 of the drawings, the improved device is shown, for the purpose of illustration, as applied to telephone apparatus 5 of the automatic type. This type of apparatus is provided with various styles of automatic switch devices conventionally illustrated at 6. The apparatus is open at the front and rear to give access to the switches, and this construction also permits the

use of an air blast nozzle 7 for detaching particles of dust from the switch contacts and other parts. The nozzle 7 is connected by a flexible hose 8 with a high pressure air supply (not shown).

Apparatus of this type are usually spaced about two feet apart to permit maintenance and inspection of the switches. This spacing provides room for a portable dust collector such as is used in conjunction with the air blast nozzle 7 in carrying out this invention.

The dust collector consists of a base or platform 9 which is mounted on swiveled casters 10 so that the device may be readily moved about. A housing, including a suction chamber 11, is carried by the base, and a door 12 permits access thereto. This door is opened when it is desired to clean the lower portion of an equipment frame or the like. An exhaustor set 13, or other suitable suction means, is mounted longitudinally on the base with its intake end inserted in the chamber 11 and its exhaust end connected to a filter bag 14 or the like. A tower-like frame 15, which is preferably made from light material, extends vertically above the suction chamber 11, and is of such height that it may reach and operate on any equipment which may be encountered. The framework may be made in separable sections to permit passage through doorways.

A receiving chamber or vacuum head 16 is vertically adjustable in the frame 15, and this chamber comprises a box-like structure which is open on the side of the frame that faces the equipment to be cleaned. The bottom of the receiving chamber 16 is also open, and this chamber is connected to the suction chamber 11 by means of a collapsible air duct 17. This air duct may be made from any suitable material, and corresponds in size and shape to the rectangular formation of the edges of chambers 11 and 16 about which its ends are snugly secured. The receiving chamber 16 is provided with a baffle plate 18 which serves to efficiently deflect the dislodged dust into the air duct, as will be presently described. An extensible head 19, comprising a frame of substantially rectangular cross-section, is connected to the receiving chamber 16 by an air duct funnel 20. This air duct funnel may be made from material similar to that of the air duct 17. The funnel permits the head to be moved outwardly in a horizontal direction, collapsed against the chamber 16, as shown in Fig. 4, or the head may be adjusted angularly to meet irregularities in the contour of the equipment to be cleaned. The air duct funnel resembles the bellows of a large camera. Horizon-

tally positioned brackets or racks 21 mounted on the side walls of the chamber 16 are extensible with and maintain the head 19 in the position to which it is adjusted in an obvious manner. When the head 19 is in position, it lies near a surface of the portion of the equipment to be cleaned and provides an intake area which directs stray air currents and dislodged dust into the chamber 16 and air duct 17, through suction chamber 11 and bag 14 through which the air is filtered and the dust is collected.

A target, shown in the form of a lamp 22, is mounted centrally in the orifice of the head, as shown in Figs. 2 and 3 and is suitably wired to a source of power. This light provides a target at which the compressed air from the nozzle 7, held by an operator at the other side of the frame, is directed. It also permits the operator to see the dirt in the air stream and tell when the equipment is clean.

The vertically adjustable receiving chamber 16 and its connected air duct 17, together with the intake head 19, may be elevated from a collapsed position on the top of the suction chamber 11 to a raised position near the top of the tower 15 by means of a rope or chain 23 controlled by a winch driven by a reversible motor 24. The rope or chain 23 extends from the winch over pulleys 25 and is fastened to the top of the chamber 16. The motor and associated equipment may be mounted on a shelf 26 carried on the side of the tower above the exhaustor 13. The reversible motor for raising and lowering the chamber 16 and associated apparatus, may be operated by any suitable remote control apparatus, and a conductor cord 27 connected thereto may be passed through to the opposite side of the equipment from that where the dust collector is positioned. By means of this remote control, a single operator can carry on the entire cleaning operation.

In the operation of the improved device, the tower is rolled to the rear of the equipment to be cleaned and the various conductor cords are connected to a suitable source of power supply.

With the receiving chamber 16 at the lowest vertical position, the remote control switch is operated to raise the adjustable head to the top of the tower. During this period, the operator may stand on the side of the equipment where the tower is positioned, in order to insure that the head and the funnel are adjusted so as to clear the equipment on the upward movement of said head and funnel. The operator may then move to the opposite side of the frame. Starting at the top of the equipment, the chamber 16 is gradually lowered, and said equipment is cleaned by the compressed air supplied from a compressor set through the nozzle in accordance with the position of the chamber 16. The nozzle is directed toward the light, or as nearly so as feasible, considering the nature of the equipment cleaned. The dirt is blown from the contacts and other parts of the equipment into the receiving chamber whence it is drawn by the air current into the exhaustor bag.

As the cleaning proceeds the receiving chamber is lowered a few inches at a time by the operation of the switch connected to the conductor leading to the remote control apparatus. The rate of progress is determined by the operator

on the basis of the amount of dirt observed in the air stream passing the light.

When the receiving chamber reaches the top of suction chamber 11, the door 12 in the front of the suction chamber can be swung inward in such manner as to partially close the opening into the receiving chamber and permit blowing directly into the suction chamber, such as is necessary in cleaning at the bottom of the equipment.

When all of the equipment from top to bottom of a particular section has been cleaned, in the manner previously described, the tower is moved along equipment and the operation repeated.

While the arrangements of this invention have been illustrated as embodied in connection with the cleaning of telephone apparatus of the automatic type, it will be understood that they are capable of embodiment in connection with many and widely varied types of equipment, without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. A device for dislodging dust from electrical and associated equipment and collecting such dust, including a suction intake member, means for adjusting said intake member in vertical, horizontal and angular directions with respect to an area of the equipment which it is desired to clean, a target carried by the device forming a focal point for said area and toward which dislodged dust is directed, and means for collecting the dust as it is dislodged.

2. A device for dislodging dust from electrical and associated equipment and collecting such dust, including an intake member, means for adjusting said intake member in vertical, horizontal and angular directions with respect to an area of the equipment which it is desired to clean, a target carried by the device forming a focal point for said area, and toward which dislodged dust is directed, and suction means including a filter for collecting the dust as it is dislodged.

3. A device for dislodging dust from electrical and associated equipment and collecting such dust, including a tower-like frame, a receiving chamber vertically adjustable in said frame, a head surrounding an intake area and connected with said chamber by a collapsible duct, said head being adjustable in horizontal and angular directions with respect to an area in the equipment it is desired to clean, a target carried by the head forming a focal point for said area, and toward which dislodged dust is directed, and suction means connected to the receiving chamber for collecting the dust as it is dislodged.

4. A device for collecting dust dislodged from electrical and associated equipment, including a tower-like framework of open construction, a receiving chamber vertically adjustable in said framework, a head surrounding an intake area and connected with said chamber by an accordion-like collapsible air duct, said head being adjustable in a horizontal direction towards and away from the receiving chamber, a suction chamber at the bottom of said framework and connected to said receiving chamber by a second accordion-like collapsible air duct, and suction means associated with said suction chamber.

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