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PORTABLE APPARATUS FOR CLEANING ELECTRICAL EQUIPMENT

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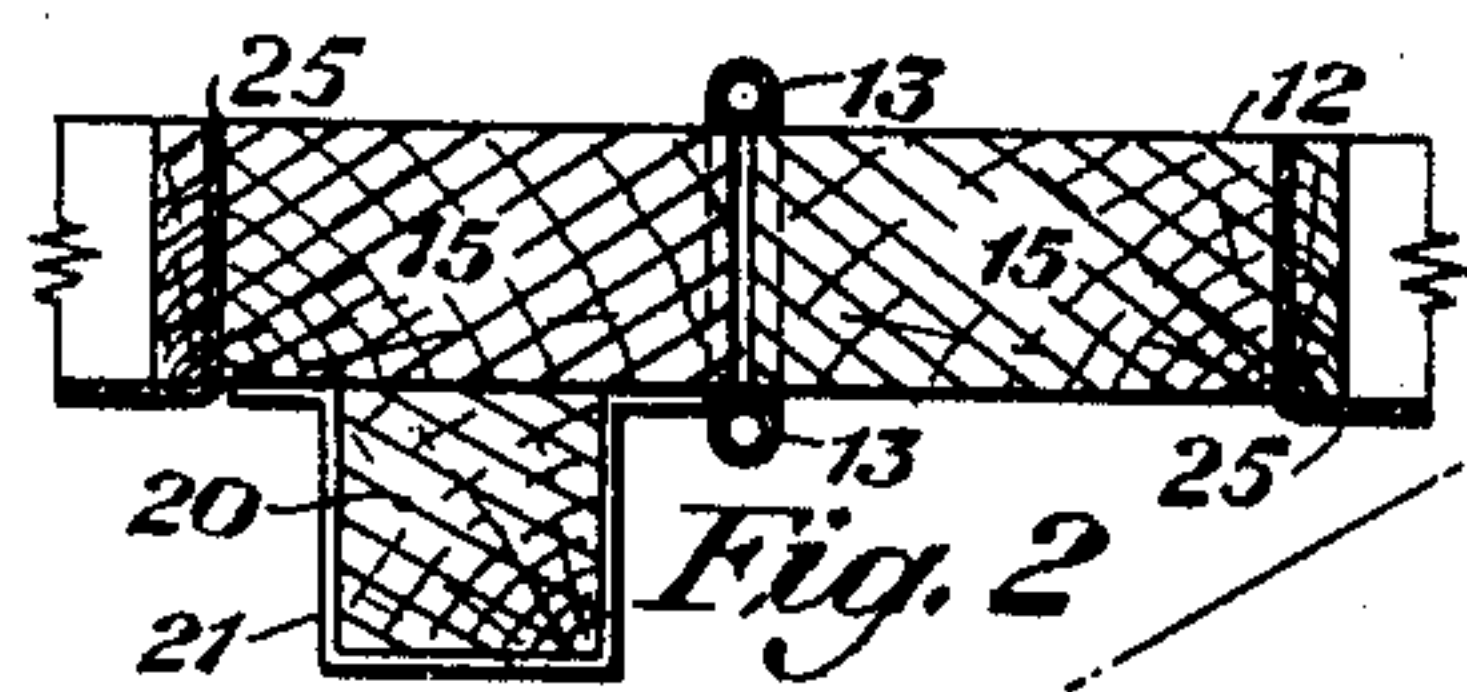


Fig. 2

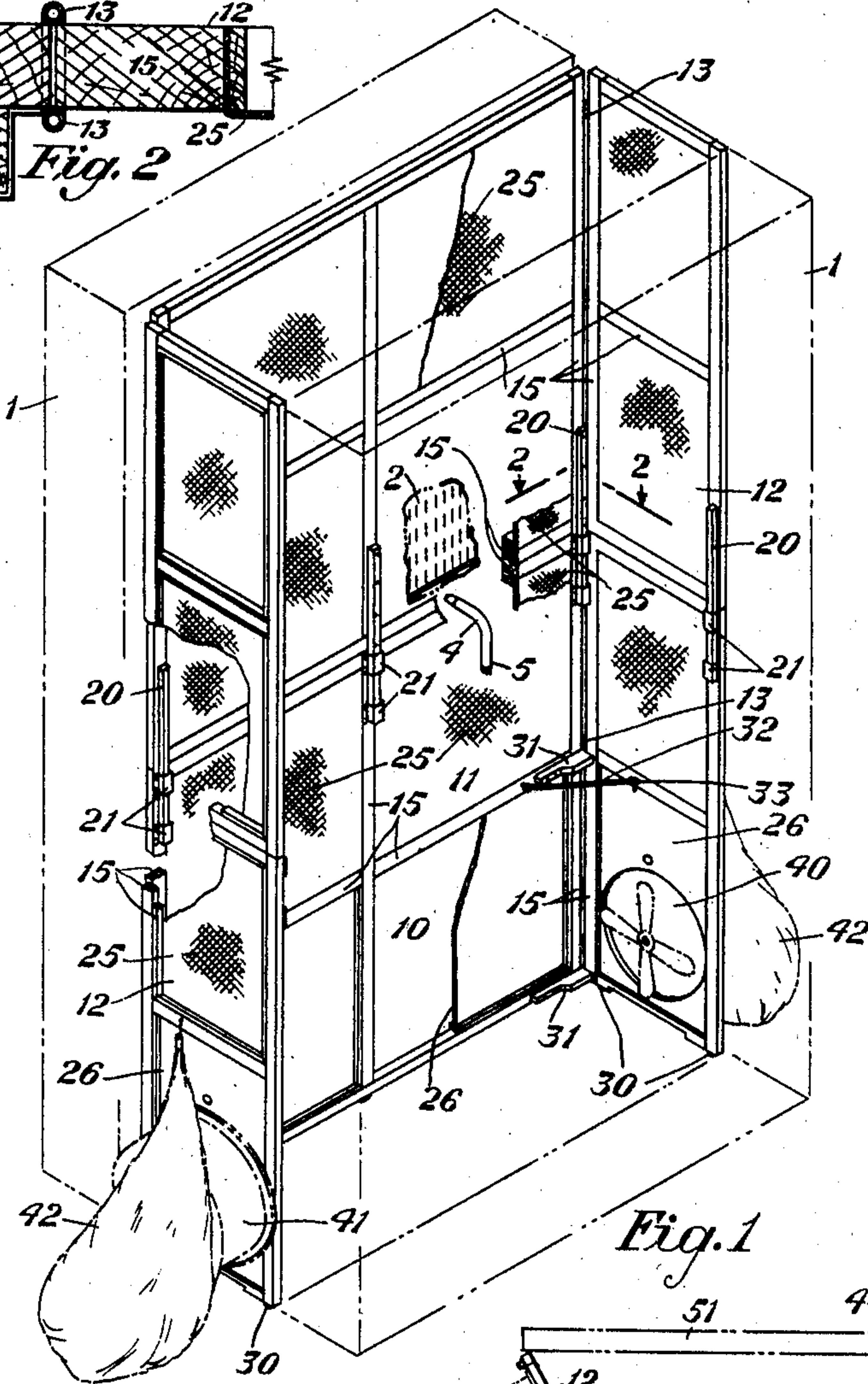


Fig. 1

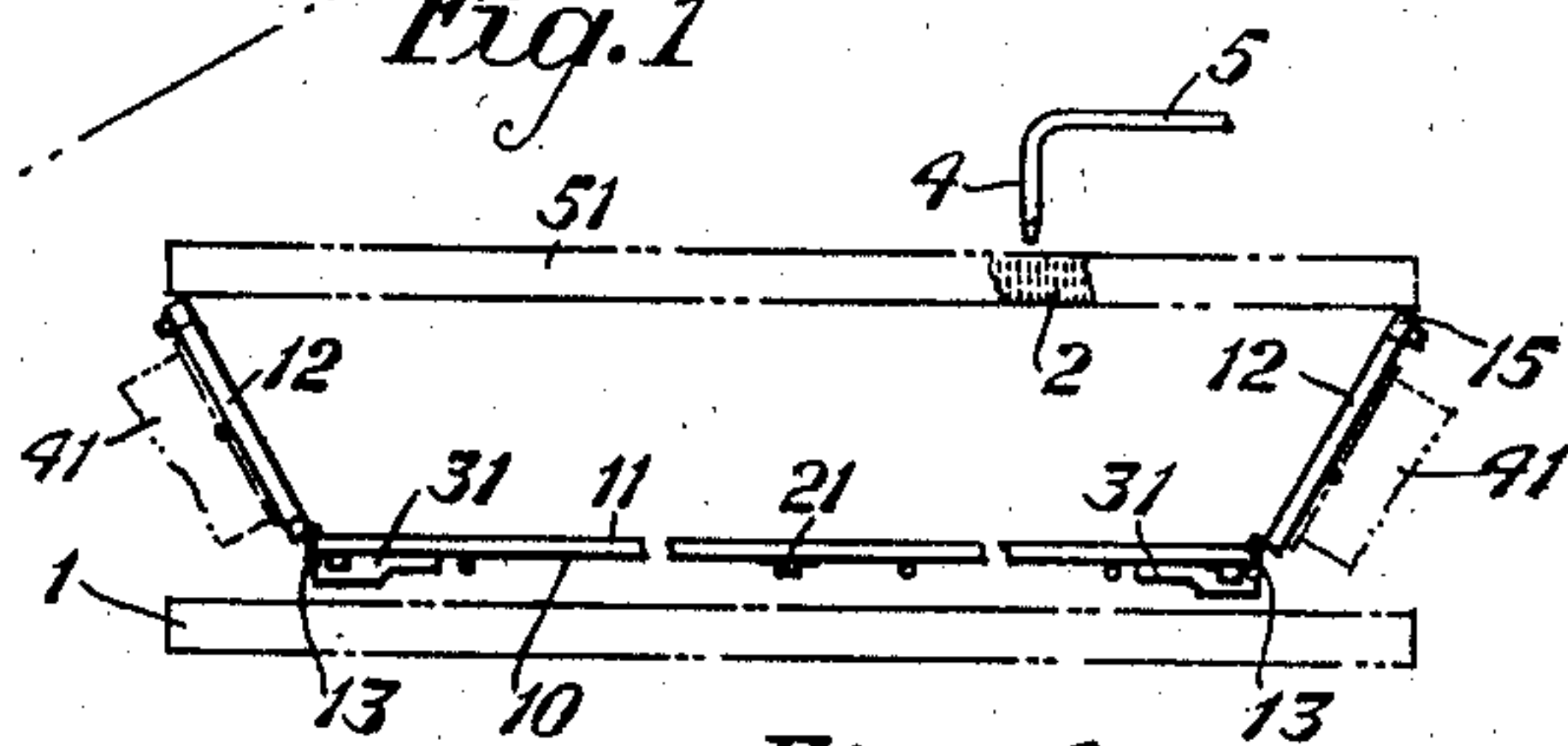


Fig. 4

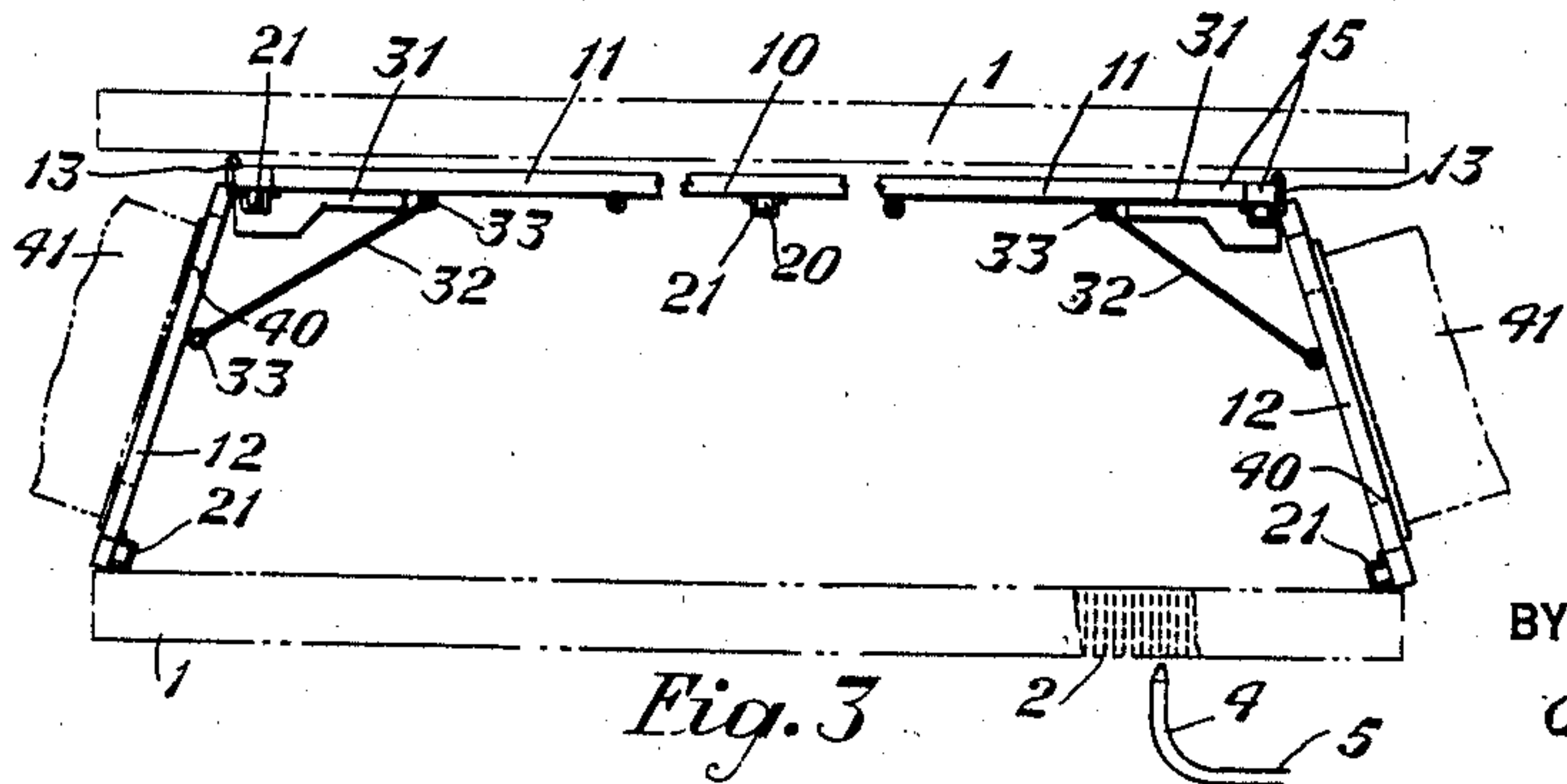


Fig. 3

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PORTABLE APPARATUS FOR CLEANING
ELECTRICAL EQUIPMENT

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1 Claim. (Cl. 15—15)

This invention relates to cleaning apparatus and more particularly to cleaning apparatus of the so-called "screen" type in which air under pressure is supplied to a region partly enclosed by a screen and air is simultaneously removed by exhausting apparatus associated with the screen.

The collection of dust or other foreign matter on telephone or telegraph equipment and especially on dial systems equipment frames which provide mountings for various instrumentalities at central offices, if uncontrolled, would cause 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, entailed considerable maintenance work and the attendant expenses.

Several types of apparatus have heretofore been proposed for cleaning telephone central office apparatus. According to one arrangement, the frame to be cleaned is enshrouded with twill-jean sheeting or other material substantially impervious to air, the sheeting being equipped with eyelets so that the sheeting may be suspended from the top of the cable rack by means of suitable hooks. Compressed air is directed at the enclosed apparatus to be cleaned, and exhausters mounted in openings in the sheeting are employed for the purpose of moving and filtering the dust-laden air. This arrangement requires much time to place in position and to remove and is otherwise objectionable.

A second type of arrangement employs, among other things, a high velocity air jet acting on the parts to be cleaned and the dust-laden air is carried toward the front face of a filter comprising a two-inch thickness of filter media. This filter forms one side of the central passage through which the dust-laden air moves downwardly. This air is then moved upwardly through two adjacent lateral passages, also lined partly by similar filters, in which passages are located suction fans. A strong suction is produced over the front face of the central filter which requires equalization by means of a baffle plate. This arrangement fails to remove a large portion of the dust dislodged from the equipment being cleaned and is inefficient, complicated and expensive.

A third arrangement includes a vertically extensible tower and a horizontally extensible camera bellows attached thereto. The tower may be adjusted in a vertical direction to correspond to the height of the equipment to be cleaned while the mouth of the bellows may be adjusted in a horizontal direction to be within range of the equipment to be cleaned. On the other side of the equipment is the gun supplying the high velocity air jet. Suctioning means, including a filter, is provided at the lower end of the tower to

maintain a current of air at sufficient pressure through the bellows. Although more efficient than the other schemes, this arrangement is rather expensive.

5 The present invention involves a much simpler arrangement for cleaning dust from apparatus by the use of high pressure air jets. It comprises a flat frame including a central section and two end sections hinged to the central section in the manner of a screen adapted to partly enclose a switchboard panel or frame. The upper portions of the central and end sections are made of cloth. Openings in the lower portions of the end sections terminate in exhauster apparatus which, together with a high velocity air jet, produce the air currents within the space bounded by the screen. The space behind the switchboard or frame is limited only by the screen and is otherwise devoid of any filter or other apparatus. This arrangement is light in weight and is set up so as to be readily moved from place to place by a single operator. It is also relatively inexpensive and efficient.

10 The apparatus of this invention will be better understood from the more detailed description hereinafter following when read in connection with the accompanying drawing in which Figure 1 illustrates a perspective of the apparatus included in the present invention, Fig. 2 is a sectional view taken along line 2—2 of Fig. 1, the end section of the "screen" being swung 90 degrees from the view shown in Fig. 1, Fig. 3 is a top view of the apparatus in which the end sections of the "screen" are disposed at angles other than 90 degrees to the central section, and Fig. 4 illustrates the reversability of the end sections of the screen for cleaning operations to be performed on apparatus immediately behind other apparatus previously cleaned.

15 Referring to the drawing, the reference character 1 designates telephone apparatus such as a switchboard, frame, etc., which may house or mount, for example, apparatus of the automatic type. This form of apparatus is usually provided with automatic switch devices as illustrated at 2. This type of apparatus is open at the front and rear to provide access to the switch devices. This construction also permits the use of an air blast nozzle 4 for supplying a high velocity air jet from a source of high pressure air supply (not shown) which is connected by a flexible hose 5 to the nozzle 4. The high velocity air jet supplied through nozzle 4 is directed at the switch contacts and other parts within the switchboard or frame 1 for detaching particles of dust therefrom and carrying these dust particles away.

20 The switchboards or frames 1 are usually spaced in rows about two feet apart to permit maintenance and inspection of the switches. This spacing provides room for a portable dust collector

of simple form which is the subject of this invention and is used in conjunction with the air blast nozzle 4 in carrying out the cleaning operations to be presently described.

The dust collecting apparatus comprises a screen 10 having a central section 11 and two end sections 12 hinged to the central section at 13 by double acting hinges of well-known type. These three sections are formed of a lattice of wooden members of light weight 15, or the like, as shown in the drawing. The screen 10 is divisible into two parts which are preferably equal in size to facilitate the disassembly of the screen 10 for transmission from one building, or part of a building, to another building, or part of a building. The upper part of the screen 10 is provided with vertical brackets 20, preferably made of wood, which may be inserted into corresponding sockets 21, preferably made of iron, which are attached to or supported by the lower part of the screen lattice. When the brackets 20 engage the sockets 21, the screen becomes a unitary structure, with its end sections adjustable to any desired angles with respect to the central section. The openings of the screen lattice members are covered, as shown in the drawing. The upper half of the lattice structure is, for example, covered with cloth 25. The lower half of the lattice structure is covered with cloth 25 at its upper portion and with a hard material 26, such as "Upson" board to form a so-called "kick plate" at its lower portion. The cloth 25 is preferably a twilled cloth of such texture that it will resist the adherence of dust carried by the dust-laden air that may impinge thereon. A twilled cloth as "W. E. R. M. 626404" has been found satisfactory for this purpose.

The vertical members of the lattice structure 15 of the screen 10 rest on supports 30 which are sometimes called "domes of silence." The end sections 12 may be rotated on their hinges 13 so as to stand at right angles to the central section 11, as shown in Fig. 1. The side-stops 31 limit the forward travel of the end sections to this perpendicular position. The end sections 12 may be held in this position by means of hooks 32 and eyes 33, if so desired. The hooks 32 may be of the extensible type so as to be adjustable to any required length. Of course the end members 12 may be moved into any desired intermediate positions—one intermediate position being shown in Fig. 3—so as to engage various lengths of switchboards or distributing frames 1 met in the field and this feature of lateral adjustability is an important one in using the apparatus.

The boards 26 of the end sections 12 have large openings 40 for receiving exhaustor units 41 and their attached filter bags 42, which are of well-known type. By virtue of the lateral adjustability of the end sections 12 the exhaustor units 41, 42 may be moved into place at the openings 40 to perform the necessary exhausting functions at any angle to the central section 11.

It will be observed that after the screen 10 is aligned with an equipment frame such as 1, and the exhaustor units 40, 41 installed at openings 40, the gun 4 may be operated to apply a high velocity jet to the apparatus to be cleaned within frame 1. The dust-laden air will travel toward the screen 10 and be practically entirely confined to the space bounded by the frame 1 and screen 10. It has been found that this condition will exist even though the screen is open

at the top. Most of the dust-laden air will be directed to the exhaustor apparatus 41, but a small part may impinge against the cloth 25 with considerably reduced velocity. Upon striking the cloth 25, some of the dust may be separated as a residue from the air carrier. The residue may be removed from time to time.

It will also be observed that there is no obstruction to the high velocity dust-laden air leaving frame 1, except the screen 10 the central section 11 of which is, in general, widely spaced from frame 1. No filter is interposed immediately behind the rear of frame 1, as is the case in prior art arrangements. This is another feature of the present arrangement.

After the apparatus within a frame has been cleaned, the screen 10 may be moved to another frame and the operation repeated. The end sections 12 may be rotated so as to meet the back of the central section 11 to facilitate the movement of the screen within narrow spaces.

The screen 10 is so constructed that whenever desired its end sections 12 may be swung around so as to face the rear switchboard or frame 51. This is shown in Fig. 4. Thus after the apparatus of frame 1 has been cleaned, with the end sections 12 of the screen touching frame 1, the end sections 12 may be rotated about their hinges 13 to touch frame 51. In that case the back of the central section 11 will face the gun 5 for the cleaning operations. The reversability of this screen 10 is another feature of this invention. If desired, additional hooks of, for example, the extensible type, may be employed on the rear of screen 10 to retain screen 10 in its reversed position. When so reversing the screen, the exhaustor apparatus 41, 42 will, of course, be moved to the opposite sides of openings 40.

The arrangement above described is simple, light in weight, flexible, easily manipulated by a single operator and relatively inexpensive. It has been found to be efficient in performing the cleaning operations in telephone plants.

While this invention has been shown and described in certain particular embodiments merely for the purpose of illustration, it will be understood that the general principles of this invention may be applied to other and widely varied organizations without departing from the spirit of the invention and the scope of the appended claim.

What is claimed is:

Apparatus for collecting dust dislodged by the application of a high velocity air jet to the front of a frame structure containing equipment to be cleaned, comprising a flat lattice having a central section and two end sections hinged to the central section, the three sections of said lattice being divisible into separatable upper and lower parts, the upper parts of said lattice supporting flat sheets of cloth to deflect the air impinging thereon and impound the air impinging thereon, the lower parts of said lattice being divided into two portions the lower of which supports a hard material impervious to air, and suction means and air filtering means; and the upper portion flat sheets of cloth, the lower portions of said end sections having openings for communicating with said suction means, the end sections of said lattice being adjustable so as to meet the rear of said frame structure to limit the space within which the dust-laden air may travel.

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