May 13, 1947. E. A. CARSEY ET AL 2,420,520

AUTOMATIC SHAKE-OUT HOOD

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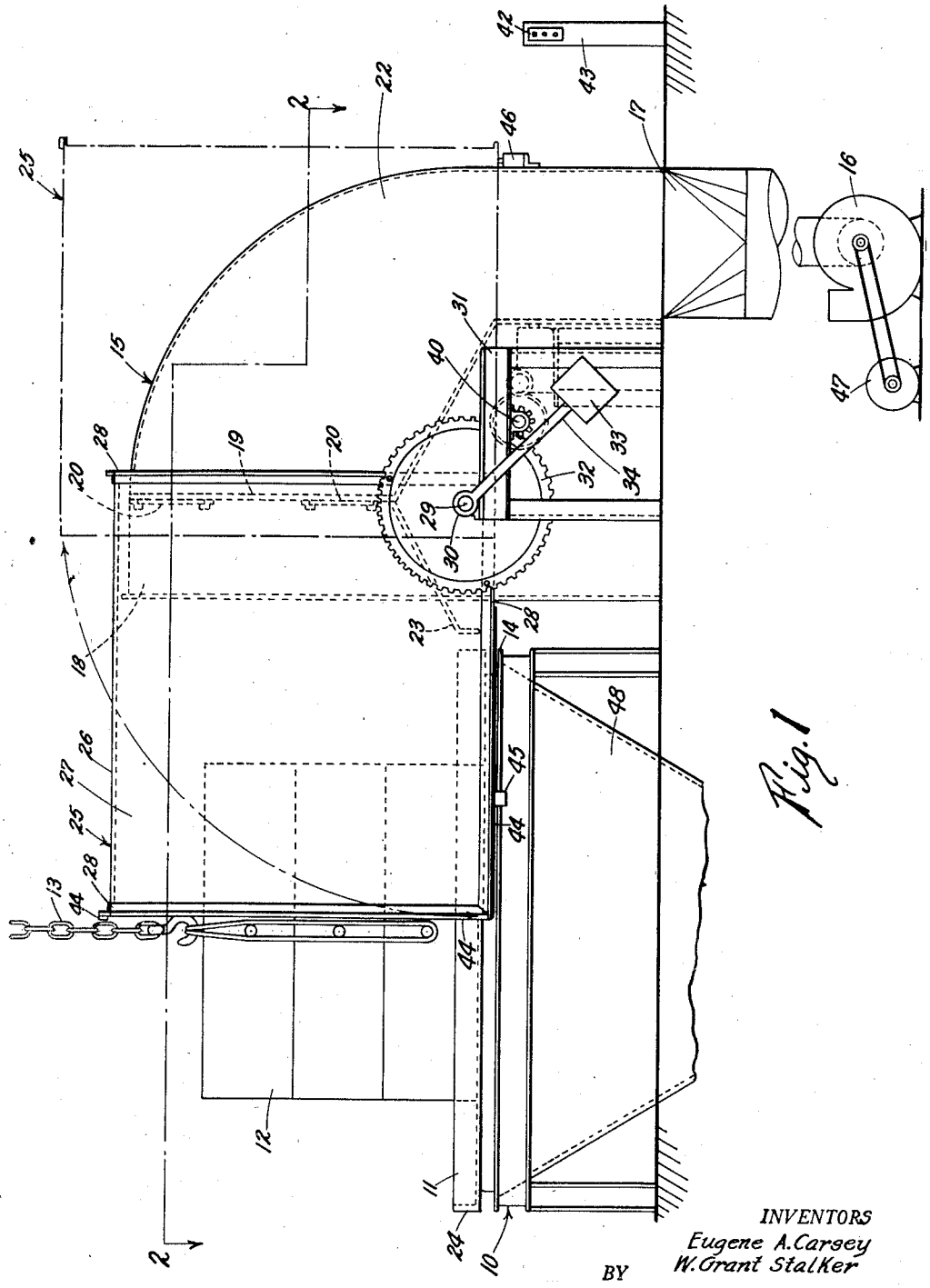


Fig. 1

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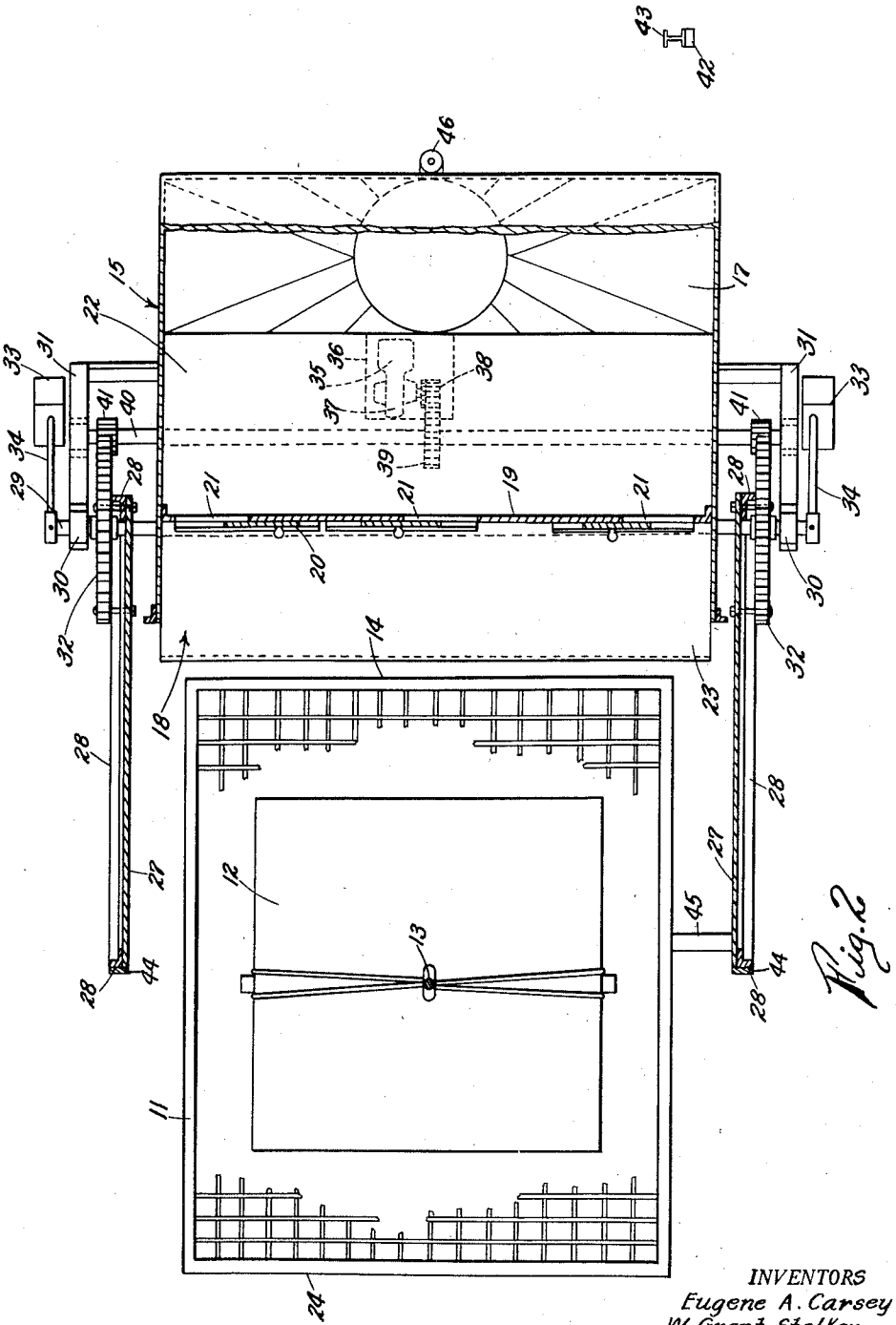


Fig. 2

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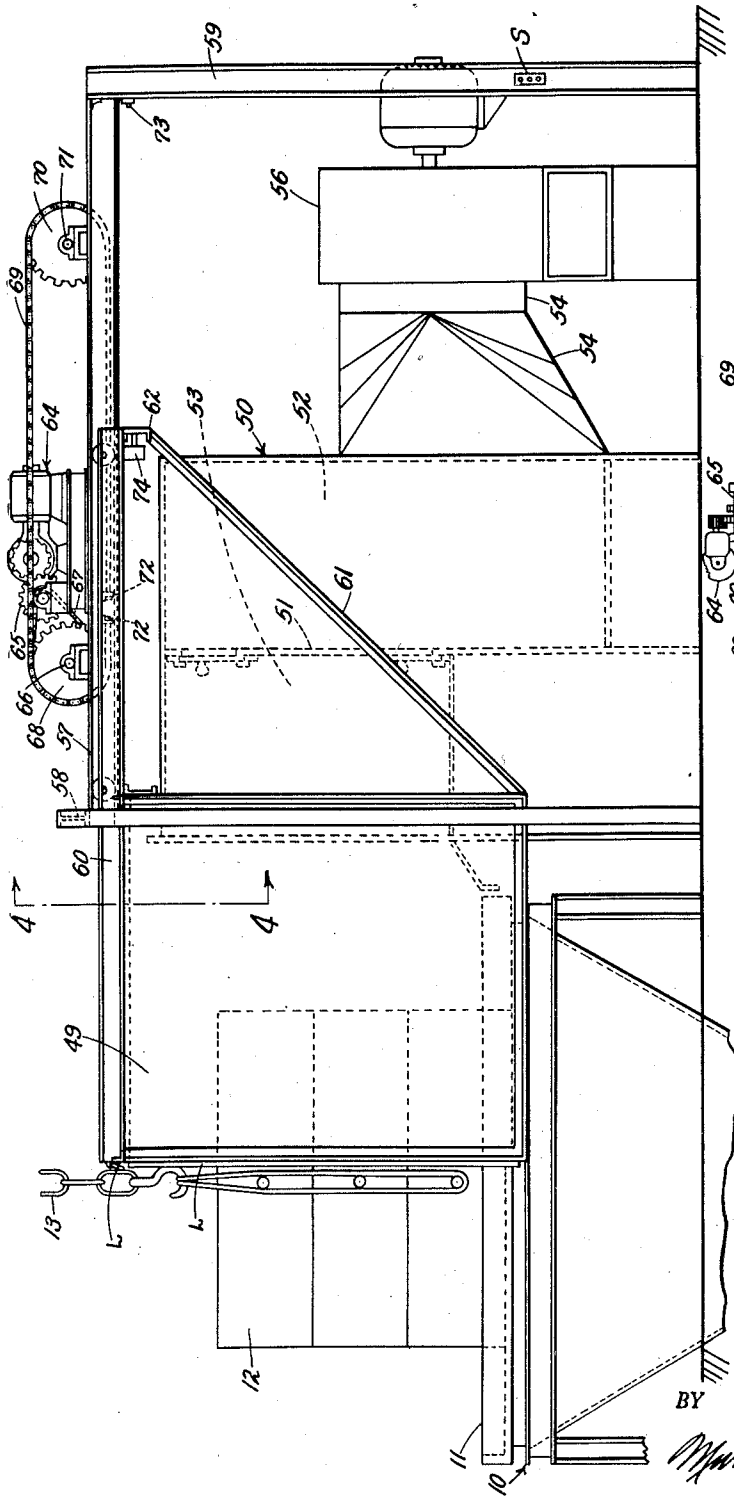


Fig. 3

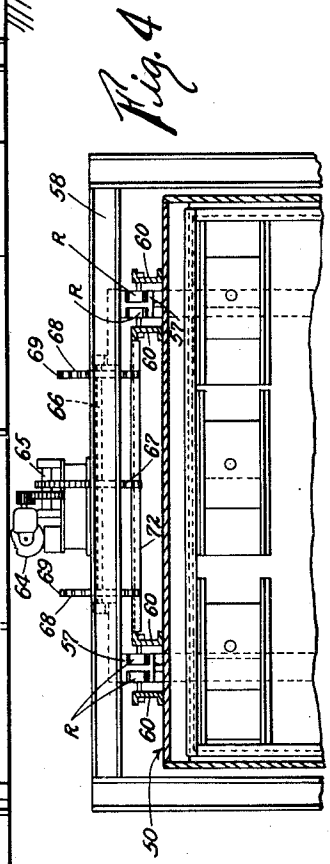


Fig. 4

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AUTOMATIC SHAKE-OUT HOOD

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Application December 20, 1943, Serial No. 514,908

1 Claim. (Cl. 98—115)

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The present invention relates to industrial equipment installations such as foundry shake-outs which, in operation, release air-borne substances that must be removed; and particularly to the larger of such installations wherein the control of these objectionable substances has been unsatisfactory because of difficulties arising from the manner of handling the large objects to be operated upon.

An object of the invention is to provide a relatively simple and inexpensive means to overcome the difficulties and objections attending the use of the larger installations of the indicated class, and to reduce power costs in the operation thereof.

Another object of the invention is to provide means of this kind that are adapted for cooperation with existing installations for securing increased efficiency at reduced power costs.

Still another object of the invention is to provide an automatically controlled adjustable hood for a shake-out.

A further object of the invention is to provide means of the class described that are easily and safely operated.

These and other important objects are attained by the means described herein and exemplified in the accompanying drawings, in which:

Fig. 1 is a side elevational view of a foundry shake-out device having a preferred form of the invention embodied therein.

Fig. 2 is a cross sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a side elevational view of a foundry shake-out having a modified form of the invention embodied therein.

Fig. 4 is a view taken on line 4—4 of Fig. 3.

In the industrial arts it is generally required that dust, smoke, gases and any other air borne noxious or dangerous substances be removed in order to protect workers and the community in general against pulmonary diseases such as silicosis. While many machines that produce dust or other air borne substances have been safeguarded by the use of the so-called dust collecting systems, there are notable instances, for instance large foundry shake-outs which handle large flasks by traveling crane hoists, where it is not feasible in practice to employ fixed tunnels or fixed hoods overhanging the sites of operation. In such instances, the practice has been to dispose the open inlet side of an air exhauster apparatus close to the rear-edge of the shake-out grate or vibratory platform in an attempt to set up a velocity air flow over the space above

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the grate and its dust producing burden. The rapid drop in velocity of the air at points progressively farther from the inlet of the exhauster apparatus reduces the dust collecting efficiency at the front of the shake-out grate to such an extent as to allow much of the released dust to escape.

By the present invention there is provided a simple, power driven and automatically controlled means which allows the unimpeded loading and unloading of the grate by means of a crane hoist, but which mechanically alters the effective position of the air intake to a position much closer to the front edge of the grate. In this manner, the air velocities at various points are increased. Under conditions of actual practice it is thus possible to increase the lowest velocity at the front of the grate five fold without the use of more powerful apparatus and without increased power consumption by the means of the invention. Usually only a small increase in air velocity is required in the space over the front of the grate to raise the capacity of the dust collector mechanism from an unsatisfactory to a completely satisfactory performance. Hence, the invention permits the use of smaller and less expensive air exhauster apparatus, with lower power consumption.

Referring now to Figs. 1 and 2 of the drawings, a foundry shake-out 10 has a vibratory grate or platform 11 of considerable extent for receiving foundry flasks 12, suitably transported to and disposed thereon by a crane hoist or the like (not shown) having the usual chain 13. Spaced at a short distance from the rear edge 14 of the shake-out 10 is a casing 15 forming part of a dust collector apparatus, said casing being suitably connected, for example, at the bottom thereof with an air exhauster 16 of suitable design by means of connector 17, which communicates with the inlet side of the air exhauster 16. The casing 15 has a front opening 18 of a width slightly greater than the width of the grate 11 and of a height somewhat greater than the flasks intended to be handled on the grate. A transverse wall or baffle 19 within the casing 15 is set back at a distance from the mouth of the open front 18, and this wall 19, is provided with a plurality of slides 20 controlling openings 21 in said wall. The enclosed portion 22 within casing 15 constitutes an equalizing plenum chamber from which air is exhausted by the exhauster 16 at a rate sufficient to produce a desired air velocity movement through ports or openings 21. The open space in front of wall 19 constitutes, in ef-

fect, a reservoir into which velocity air streams move to the plenum chamber 22 through opening or ports 21. Inasmuch as the movement of flasks 12 to and from grate 11 entails the hazards of damage to the forward portion of the casing 18 above the level of grate 11, it is customary to provide a projecting apron 23 at the bottom of the casing and to extend this apron as close as possible to the rear edge 14 of grate 11.

The apparatus as thus far described is typical of present day practice in modern foundries. The dust, smoke, vapors and gasses which are often explosively discharged from flasks 12 when the sand and casings are released under the vibratory action of the grate, requires that air streams which enter the mouth 18 of casing 15 at an excessively high velocity in order to control the objectionable substances near the front edge 24 of a large shake-out grate. In practice, it has not been considered feasible to operate the air exhauster 16 at such capacity as will control the occasional violent discharges of dust and the like at the front of the grate, and therein the present day devices of the larger sizes continue to operate as industrial health hazards despite the large expenditure in high capacity dust collection equipment and in spite of the heavy power consumption entailed in the operation thereof.

In the preferred form of the invention, it is proposed to overcome these shortcomings by providing an adjustable hood such as 25, which is power-projected to a position over-hanging a substantial portion of the top and sides of grate 11 and its burden 12 during the nuisance producing operation, as shown in full lines in Fig. 1. For the purpose of loading and unloading the grate by means of the crane hoist chain 13 without danger of damage to the structure, the hood is retractable to a position completely overhanging the casing 15, as shown, for example, in broken lines in Fig. 1. The hood 25 comprises a top wall 26 and depending side walls 27. The hood 25 is preferably constructed of sheet metal walls having a reenforced frame of angle irons 28 along the edges thereof. In the preferred form of the invention, the hood 25 is mounted for pivotal movement about a horizontal axis within the body lines of casing 15. A transverse shaft 29 extends beneath apron 23 and substantially parallel to the rear edge 14 of the grate 11. This shaft is mounted in suitable bearings 30, fixed on the tops of short beams 31. Fixed on shaft 29 are gear wheels 32 to which are bolted, or otherwise rigidly secured, the angle irons 28 which bound the lower rear corner of the hood. Counter-balance weights 33 are mounted on arms 34, which are fixed to shaft 29.

The hereinbefore described movable hood may be shifted with a minimum of power expenditure to turn about the axis of shaft 29 to assume the operative and inoperative positions shown respectively by full and broken lines in Fig. 1.

Power movement of hood 25 is effected by means of an electric motor 35 mounted on a pedestal 36 beneath the overhanging bottom part of casing 15. The motor has an associated speed reducer 37 which turns a pinion 38, which drives a gear wheel 39, mounted intermediate the ends of shaft 40. Pinions 41 on shaft 40 mesh with gear wheels 32 which are bolted to the frame of the hood 25. Motor 35 is of the reversible type and has in its wiring circuit (not detailed) a starting switch station 42 conveniently mounted at an accessible location, for example, on a suitable support 43. On the forward top and side edges and

on the bottom edges of the hood 25 are limit switch strips 44, of known construction for opening the motor circuit upon contact with any obstruction and thereby preventing damage to the hood as it travels to its operative position under power. One of the said limit switch strips 44 on the bottom edge of the hood may be arranged to engage a fixed stop 45 for arresting power movement as it reaches the fully operative position, as shown in full lines in Fig. 1. Should the chain 13 of the crane or any foreign body be disposed in the path of the hood in its forward movement the power circuit is immediately broken.

A limit stop switch 46 is disposed at the rear of casing 15 to open the power circuit when the hood contacts said switch on reaching the rearward limit of movement.

In operation the hood is left in the inoperative position while the flasks 12 are carried by the crane hoist chain to a nearly central position on the shake-out grate 11. The proper switch is then actuated at the station 42, whereupon the hood is power driven to an operative position overhanging a portion of the flask or flasks 12 and the corresponding portion of grate 11. In the meantime the motor 47 of exhauster fan 16 is placed in operation if it had previously been at rest. The air is now being exhausted from plenum chamber 22 at a rate which causes air streams to enter the open front of the lowered hood 25 at a predetermined velocity, which velocity is practically uniform throughout the length of the hood and the open front of the reservoir space which communicates with the rear of the hood. The vibratory grate is now set in motion in known manner, whereupon the sand and castings are loosened from the flasks and drop onto the grate. The major portion of the sand passes through grate 11 and into hopper 48 beneath it while fine dust, smoke, gases and the like are liberated in the air around the open top and bottom portions of the flask. The directional velocity air flow in the space above the grate and in front of the hood is strong enough to carry with it practically all of the air borne substances that are thus released and the latter are carried rearwardly through ports 21 and the plenum chamber 22. The dust laden velocity air stream is usually directed through an air cleaning device (not shown) so that the substances are removed before the air is returned to free atmosphere.

In the modified embodiment of the invention shown in Figs. 3 and 4, there is provided a hood 49 of a generally inverted U-shape, corresponding to the hood 25 in the device of Fig. 1. This hood 49, in its operative position, bears the same relation to the shake-out 10 as the previously described embodiment of the invention. The casing 50 of the air exhauster type collecting apparatus is mounted to the rear of the shake-out 10 and if desired may have a flat plane top and vertical side walls. A vertical wall or baffle 51 divides the interior of casing 50 into an equalizing plenum chamber 52 and an open front reservoir 53. The connection 54 may extend from either side, or the rear or bottom of chamber 52 to form a connection with the inlet end 55 of a suitable air exhauster fan 56, which is conveniently located and driven in conventional manner. The hood 49 is tractionally mounted for reciprocating movement from its operative position overhanging a substantial portion of the shake-out grate 11 where it forms, in effect, and extension of reservoir 53, to an inoperative posi-

tion overhanging the casing 50, and entirely free of the space above grate 11. The mounting consists of suitably supported parallel I-beams 57 secured to the bottom of cross beam 58 and to uprights 59 behind the casing 50. Pairs of channel members 60 have the hood 49 secured thereto at one end and said members 60 project rearwardly for a considerable distance beyond the rear edge of the hood. Brace members 61 extend diagonally from the bottom rear corners of hood 49 to the ends of a cross beam 62 which is fixed to said channels 60. On the side of each channel 60 adjacent the rear edge of hood 49 and again near the free ends of said channels are rollers R which ride on the flanges of the I-beams 57 which serve as overhead tracks for the suspended hood. Mounted on a cross plate or brace 63 on top of tracks 57 is reversible gear motor power unit 64 which drives a shaft 65 from which a shaft 66 is driven by a short sprocket and chain connection 67. On the ends of shaft 66 are sprockets 68 which carry conveyor chains 69 which pass over sprockets 70 on a shaft 71. The ends of each conveyor chain 69 are connected to cross bars 72 which are fixed between adjacent channels 60 so that as shaft is rotated, hood 49 is drawn along the tracks 57 in a corresponding direction. The motor circuit (not shown) is energized from a push button station S and is normally deenergized at the opposite limits of travel of the hood by means of limit stop switches 73 and 74 as they are engaged by the cross member 62. On each of the leading edges of hood 49 is a limit switch bar L operating in known manner to deenergize the motor circuit in the event of contact with an obstruction during power movement of the hood. The operation of the reciprocably mounted hood will be readily understood from the foregoing description and the operation of the entire device will be understood to be in all practical respects similar to that of the device of Figs. 1 and 2.

It will be understood that the invention may be applied to devices, other than shake-outs, which, in use, do not allow any permanently overhanging hoods or the like, and which devices release substances that are desirably collected from the atmosphere.

It will further be appreciated that, in any such devices, the movable hood structure may be arranged to move to completely overhang the site of work operations if the crane hoist is customarily detached and removed from the site during operations.

What is claimed is:

In a device of the class described, the combination of an air exhauster apparatus, said air exhauster apparatus having an inlet port in an upright wall thereof, a hood structure movable to and from a position projecting beyond said upright wall structure and along the top and sides thereof, means for tractionally supporting said hood structure, electrical power means for moving the hood on its tractional support, limit stops for automatically deenergizing the power means at predetermined limits of movement of the hood, remote control means for initiating operation of the power means and a safety control means on a forward edge of the hood for arresting power movement of the hood to its operative position independently of the said limit stop.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
807,480	Mathis	Dec. 19, 1905
2,277,271	Schneible	Mar. 24, 1942
2,341,245	Sonntag	Feb. 8, 1944
499,210	Canavan	June 13, 1893
607,976	Amos	July 26, 1898
818,003	Thorelius	Apr. 17, 1906
1,720,400	Peck	July 9, 1929
1,793,716	Parvin	Feb. 24, 1931
1,969,564	Klemme	Aug. 7, 1934
1,741,954	Reymiller	Dec. 31, 1929

FOREIGN PATENTS

Number	Country	Date
395,698	Germany	May 22, 1924
30,845	Germany	Apr. 16, 1885