

May 17, 1955

J. STOKOE

2,708,489

PORTABLE MATERIALS COLLECTOR

Filed July 17, 1951

2 Sheets-Sheet 1

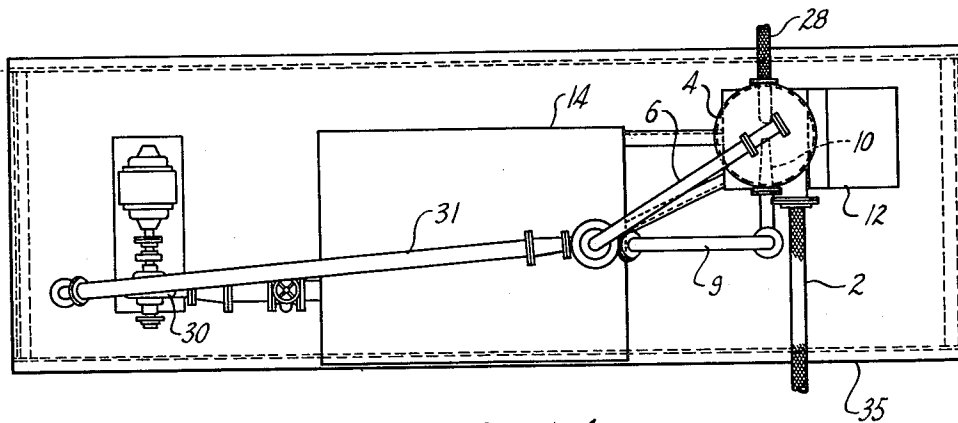


Fig. 1

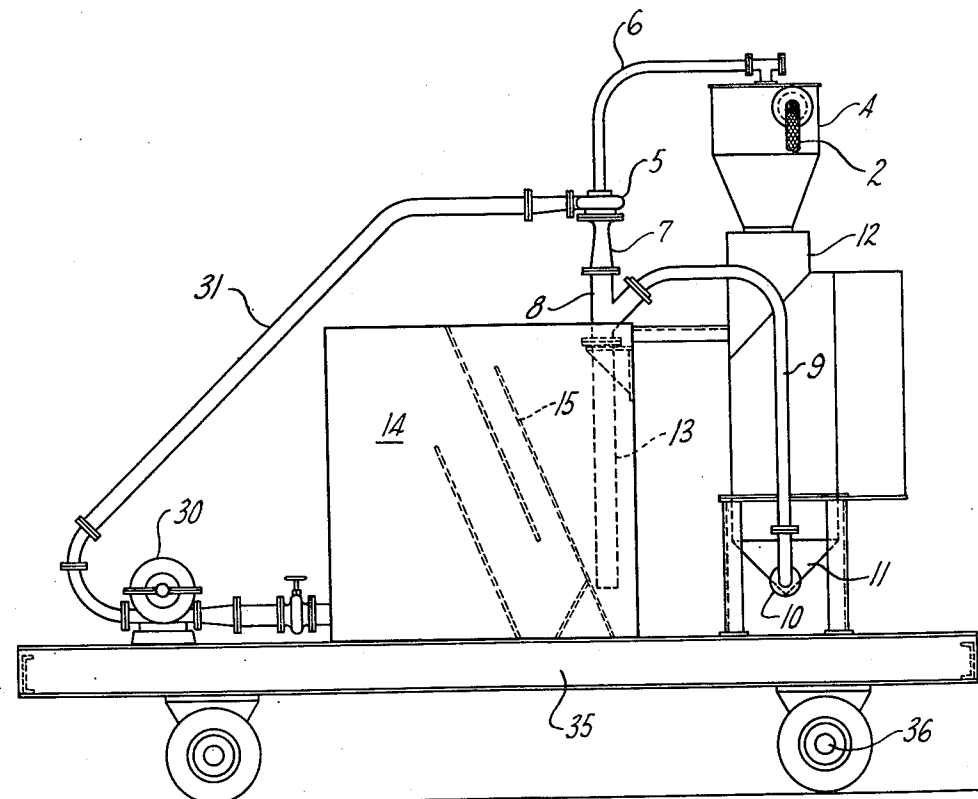


Fig. 2

INVENTOR.
James S. Stokoe
BY William B. Jansert
Attorney.

May 17, 1955

J. STOKOE

2,708,489

PORTABLE MATERIALS COLLECTOR

Filed July 17, 1951

2 Sheets-Sheet 2

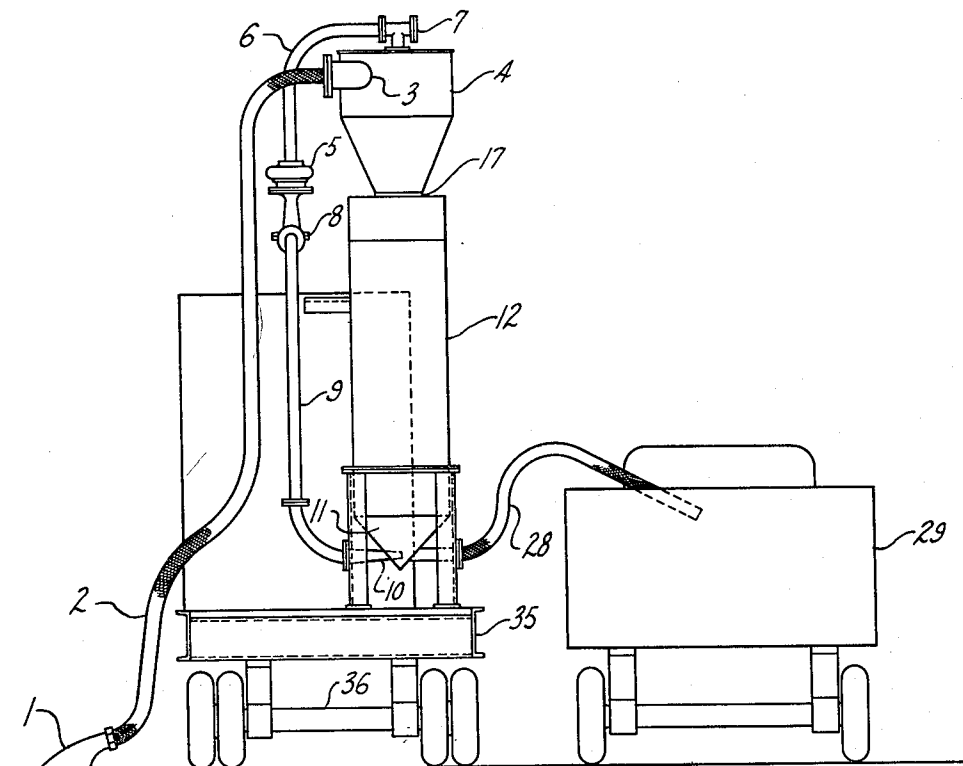


Fig. 3

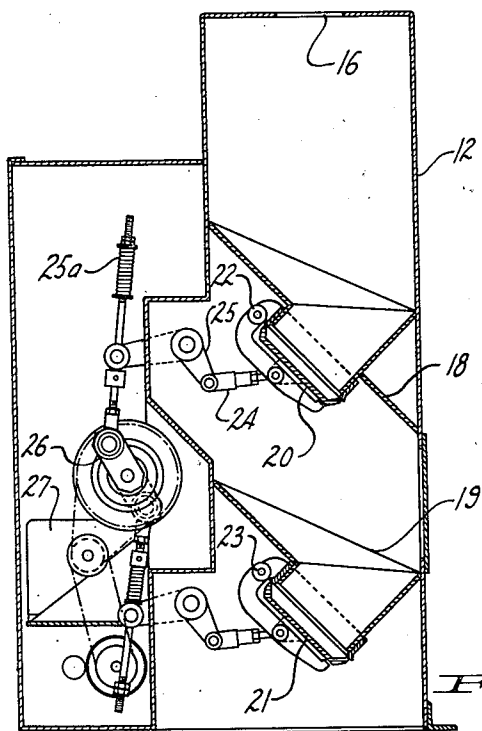


Fig. 4

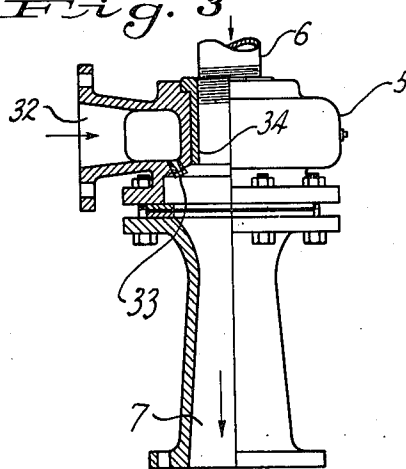


Fig. 5

INVENTOR.
James Stokoe
BY William B. Jaspert
Attorney.

1

2,708,489

PORTABLE MATERIALS COLLECTOR

James Stokoe, Chicago, Ill., assignor to Hydro-Ash Corporation, Chicago, Ill., a corporation of Illinois

Application July 17, 1951, Serial No. 237,269

2 Claims. (Cl. 183—38)

This invention relates to new and useful improvements in portable materials collectors, more particularly flue dust collectors for use in cleaning checkerwork of open hearth steel furnaces and the like.

It is among the objects of the invention to provide improved means employing vacuum and pressure for handling materials such as granular or conglomerate materials from a point of collection to a point remote therefrom in a highly efficient rapid and economical manner.

It is a further object of the invention to provide apparatus of simple compact construction which shall eliminate long and costly ducts.

These and other objects of the invention will become more apparent from a consideration of the accompanying drawings, constituting a part hereof, in which like reference characters designate like parts, and in which—

Fig. 1 is a top plan view of a portable materials collecting apparatus embodying the principles of this invention;

Fig. 2 a side elevational view thereof;

Fig. 3 an end elevational view illustrating the materials collecting apparatus and a truck for removing the collected materials;

Fig. 4 a vertical cross-sectional view of an interceptor embodied in the structure shown in Figs. 1 to 3, inclusive; and

Fig. 5 an enlarged side elevational view, partially in cross section, of an exhaustor.

With reference to the several figures of the drawings the reference numeral 1 designates a collector shoe attached to a suction duct 2 having a side connection at 3 to a cyclone separator 4. An exhaustor 5 is connected by a suction duct 6 to the top of the cyclone 4 by a T-connection 7. The exhaustor 5 is more clearly shown in Fig. 5 of the drawings with the inlet 6 at the top of the exhaustor and an outlet 7 which is connected to a Y 8, Fig. 3, having a duct 9 leading to a nozzle 10 in a hopper 11 of an interceptor generally designated by the numeral 12. Another connection 13, Fig. 2, leads from the Y 8 to a water storage tank 14. The latter is provided with baffles 15.

With reference to Figs. 3 and 4 of the drawings, the interceptor 12 is provided with an opening 16 at the top of Fig. 4 for receiving the small end 17 of the cyclone separator 4, Fig. 3. The interceptor is constructed with baffles 18 and 19 having motor operated doors 20 and 21, respectively, the partitions 18 and 19 dividing the interceptor into separate air-tight chambers. Doors 20 and 21 are hinged at 22 and 23, respectively, and are connected by links 24 to bell crank levers 25 that are operated by cranks 26 driven by a motor 27. The interceptor is mounted on the receiving hopper 11 which has a disposal duct 28 by which the material or dust may be discharged to a receiving truck 29, Fig. 3.

With reference to Figs. 2 and 3 of the drawings, a water pump 30 is connected to the water storage tank 14 and is provided with a duct 31 that is connected to the

2

inlet 32, Fig. 5, of the exhaustor 5. A plurality of water nozzles 33 are angularly disposed around the bushing 34 to impinge high pressure jets downwardly to create a suction in the duct 6 and the water passes downward through pipe 13 into the water storage tank 14. Air under pressure produced by the pressure jets 33 is delivered through duct 9 to the nozzle 10 in hopper 11 to force the accumulated granular or conglomerate materials through the disposal duct 28. The discharge of air from the exhaustor is sealed by the column of water in pipe 13 to produce the necessary air pressure in conduit 9. The pressure in conduit 9 may be varied by lengthening or shortening pipe 13.

The dust collector apparatus is mounted on a supporting frame 35 having wheeled axles 36 by which it may be readily transported to avoid use of long and costly connecting ducts.

The operation of the above-described dust collector mechanism is briefly as follows. The pump 30, Figs. 1 and 2, is energized as is the motor 27 of the interceptor, Fig. 4. Water under pressure is delivered through duct 31 to the exhaustor 5 and through jet nozzles 33 which creates a partial vacuum in the duct 6 leading to the top of the cyclone 4. The duct 2 which is a flexible member is likewise subjected to a partial vacuum and the collecting shoe 1 is submerged in the dust or other materials to be collected, which is drawn up through duct 2 into the cyclone separator 4. The exhaustor, by means of the venturi action and the high pressure jets 33, sets up air pressure in the ducts 9 which produces a high air velocity at the nozzle 10 in the hopper 11.

The dust collected in the cyclone separator 4 drops into the upper chamber of the interceptor 12. The doors 20 and 21 of the interceptor are opened and closed at about 20 second intervals and the cycle of operation is such that one of the two doors is always closed to the atmosphere and no vacuum can be produced in the ash tank or hopper 11. Sufficient power is available to maintain a tight seal but after each door is pulled from its seat it is free to drop open. Adjustable compression springs 25a control the time of closure and limit the pressure on the doors to insure positive operation. The collected material in the hopper is ejected by the air pressure from nozzle 10 which is in alignment with the outlet connection to the disposal duct 28; thus a continuous flow of ash or other materials is maintained through the disposal duct 28.

It is evident from the foregoing description of this invention that apparatus as herein described will remove materials from one or more points of collection to a point of discharge by means of a fluid flowing in a number of conduits mounted with other equipment on a portable unit. The apparatus eliminates long and expensive ducts and may be quickly moved intact from place to place. It may be self-propelled or moved by external means. If the material handled is dusty, water sprays, not shown, may be used to eliminate the dust at the point of final disposal.

Although one embodiment of the invention has been herein illustrated and described, it will be evident to those skilled in the art that various modifications may be made in the details of construction without departing from the principles herein set forth.

I claim:

1. In a portable materials collecting apparatus, a cyclone separator for receiving the material, an exhaustor having a duct communicating with the top of the separator, said separator having a suction duct for charging the material into the separator, an interceptor comprising a housing open at the top for receiving the material from the separator and having a hopper at the bottom, partitions dividing the interceptor into a plurality of air-tight chambers, said partitions having doors and means for

3

alternately opening and closing the same, a disposal outlet for said hopper, and an air pressure inlet therefor, said exhauster being connected to a water pump and being connected to the air pressure inlet of said hopper, said exhauster including a venturi and a plurality of nozzles angularly spaced to impinge high pressure water jets from the pump into the venturi tube to create a vacuum in the duct connected to the cyclone separator and to create a high pressure air stream for the hopper air pressure inlet.

2. In a portable materials collecting apparatus, a cyclone separator for receiving the material, an exhauster having a duct communicating with the top of the separator, said separator having a suction duct for charging the material into the separator, an interceptor comprising a housing open at the top for receiving the material from the separator and having a hopper at the bottom, partitions dividing the interceptor into a plurality of air-tight chambers, said partitions having doors and means for alternately opening and closing the same, a disposal outlet

4

for said hopper, and an air pressure inlet therefor, said exhauster being connected to a water pump and being connected to the air pressure inlet of said hopper, said exhauster including a venturi and a plurality of nozzles angularly spaced to impinge high pressure water jets from the pump into the venturi tube to create a vacuum in the duct connected to the cyclone separator and to create a high pressure air stream for the hopper air pressure inlet, and said exhauster having its venturi tube connected to a water storage tank by a duct having its open end submerged in said tank.

References Cited in the file of this patent

UNITED STATES PATENTS

1,873,884 Harris ----- Aug. 23, 1932

FOREIGN PATENTS

734,716 France ----- Aug. 8, 1932