This invention relates to new and useful improvements in furnace and boiler cleaners. It is one of the principal objects of my invention to provide simple and efficient means for removing soot, ashes, dust and other foreign matter from the recesses of furnaces, boilers, retorts, ranges, stoves and other similar devices by suction and the delivery of said particles to a proper receptacle.

It is a further object of my invention to provide simple and efficient means for removing foreign matter from the inaccessible recesses of furnaces, boilers, retorts, and the heat pipes, smoke pipes and air ducts used in connection therewith, by directing a blast of air through the above and causing said foreign matter to be carried along until deposited in a desired place, such as an ash pit or clean-out chamber.

Other important and incidental objects will be brought out in the following specification, and particularly set forth in the subjoined claims.

In the accompanying drawings, Figure 1 is a side elevational view of my furnace and boiler cleaning device. Figure 2 is an elevational view of the blower end. Figure 3 is a plan view of my device. Figure 4 is a longitudinal sectional view taken through the same on the line 4—4 of Figure 2. Figure 5 is a sectional view taken through the blower on the line 5—5 of Figure 1. Figure 6 is an end view showing my device arranged for suction purposes. And Figure 7 is an end view of the device when operating as a blower.

Referring to the accompanying drawings for a detailed description of the form of embodiment of my invention illustrated therein, the numeral 1 designates a container which is preferably constructed of sheet metal and mounted on feet or supports 2, with an outwardly projecting flange 3 formed along its upper edge.

The container 1 is provided with a suitable cover 4 which also serves as a mounting for the apparatus to be hereinafter described. This cover is maintained in an air tight relationship with the container 1 by means of a suitable gasket 5 and a removable thumb screw 6 which passes through the cover, gasket and rim. (See Figures 4 and 5.) Mounted upon the cover 4 near one end of it is a sub-base 7 for an electric motor 8. This sub-base is formed with a curved passage 9 which terminates at one end in the outer face of the sub-base and at its other end in an opening 10 in the cover 4. The outer end of the passage 9 is provided with a tubular portion 11 for the reception of one end of a suction hose. (See Figures 4, 6 and 7.)

Secured at the opposite end of the cover 4 is a centrifugal blower 12 whose shaft 13 is in alignment with the shaft of the motor 8 and connected thereto by means of a coupling 14. (See Figures 1, 4 and 5.) The centrifugal blower 12 is provided with a split casing 15, 15, having integral with one half of it a suitable bearing 16 for the shaft 13, and at its lower edge being formed with a mounting flange or support 17. The other half 15 of the casing has centrally located in its outer face an inlet passage 18 communicating with the top of the container 1 by means of a passage 19 through the latter.

The inlet passage 18 is provided with a bypass 20 which has hinged to its outer face a cover 21. The latter is held in place by a hinge bolt 22 and thumb nut 23 which engages in a slot 24 in said cover. Attached to the inner face of the cover 21 is a deflector 21* to direct air into the blower from the passage 19. (See Figure 4.)

The two halves 15, 15 of the casing are connected together by means of bolts 25 through the flanges 26, 26 of adjacent faces of the casing halves. (See Figures 4 and 5.)

Secured to the inner end of the shaft 13 within the casing 15, is an impeller 27 having secured to its hub eight equally spaced radial blades 28 having a curved contour and provided with a web 29 between the blades. The web has its greatest thickness adjacent to the bearing side, and tapers toward the hub at the opposite side of the blade, thus providing a cone-shaped center. It is the function of this webbing to provide additional mechanical strength for the blades and to eliminate an air pocket or vacuum adjacent the shaft, thus giving an initial out-
ward impetus to the air as it is drawn in through the passage 18. (See Figures 4 and 5.)

The casing 15 is provided on one side with an outlet 30 whose outer face is tangent with the casing and which is provided at its lower end with a flange 31. This flange has on diametrically opposite sides projections or ears 32 formed with threaded holes 33 adapted to receive the threaded ends of thumb screws 34. (See Figure 1.) When the device is used for suction purposes, the foreign particles drawn into it are discharged through the outlet 30 into a receptacle or bag 35; and when the device is used as a blower, the outlet is provided with an adapter 36 to receive one end of a flexible hose 37. (See Figures 6 and 7.)

The bag 35 is preferably of close-woven, dust-tight material, and closed, except at its upper end which is provided with a neck 38. The latter receives the lower end of an elbow 39, which is secured to it by means of a clamping ring 40 provided with a thumb screw 40 by whereby the bag may be easily removed for cleaning purposes. (See Figure 6.)

The upper end of the elbow 39 is provided with a flange 41 similar to the flange 31 and having on its one side a radial U-shaped slot 42 and on its other side a circular slot 43. The slots 42 and 43 in conjunction with the screws 34, provide an easy means of detaching the bag 35 and elbow 39. (See Figures 1 and 2.)

The adapter 36 consists of a tubular member 44 terminating at its lower end in a reduced portion 45 over which the blower tube or hose 37 is forced and clamped in place by a hose clamp 46 or any other suitable means. The opposite end terminates in a flange 47 similar to the flange 41 and provided with slots 48 and slots 49 similar to the slots 42 and slots 43. (See Figure 3.)

The container 1 is provided with a screen 50 extending the full depth and width of the container. The screen 50 is preferably of wire mesh of sufficient coarseness to pass small particles, yet preventing the passage of coarse particles of foreign matter. (See Figure 4.)

Between the screen 50 and the inlet passage 19 to the blower 12, is another screen 51 parallel to the screen 50 and likewise extending the full depth and width of the container 1. (See Figures 4 and 5.) The screen 51 is preferably of coarse fabric similar to common burlap, and is secured upon a framework 52 which is mounted within the container. It is the function of this screen to pass minute particles of foreign matter such as dust, yet to prevent the movement through it of the larger particles which have passed through the screen 50.

The operation of my device will first be described as a suction one for the removal of accumulated soot, ashes and dust from the recesses of a furnace, boiler or similar structure. The electric motor 8 may be operated from a standard household, socket connection to cause the blower 12 to be rotated at high speed. A suction hose 53 is adapted to be attached to the tubular portion 11 of the passage 9 to create a suction through it and the container 1 when the bypass connection 21 is closed and the blower 12 is rotated by the motor. The hose 53 is free to be inserted in the space or recess to be cleaned to draw from the latter by suction the foreign matter therein. The large particles of foreign matter lodge in the first compartment of the container 1, since they are unable to pass through the screen 50, the lesser particles being drawn through the latter into the middle compartment between the screens 50 and 51, while the dust is drawn through both screens and the lower end of an elbow for deposit within the bag 35 whose neck 38 is attached to the elbow 39. (See Figure 5.) To permit the removal of the large and small particles of foreign matter from the first and middle compartments of the container, the cover 4 with all the apparatus attached thereto may be easily detached from the latter.

When the device is used as a blower to clean out places difficult of access, the bag 35 is removed and the adapter 36 and hose 37 attached in its place. The hose 37 is also removed from the device and the bypass cover 21 opened to permit the air to be drawn in through the passage 19 instead of through the passage 19, and forced out through the hose 37 into recesses difficult of access in boilers, furnaces and the like to blow therefrom particles of foreign matter which has lodged within them.

Having described my invention, I claim:

1. A device of the type described comprising a rectangular container open at the top, a removable cover for said container, a pair of vertical screens projecting from the bottom of said container to its removable top to divide it into three compartments, said cover formed with a suction hole for the first compartment, said cover also formed with a hole over the third compartment, a blower mounted on said cover over the last mentioned hole and in communication therewith through the suction passage that leads from the suction hole over the first compartment through the screen partitions to the third compartment, and a motor in operative connection with said blower also mounted on said cover.

2. A device of the type described comprising a rectangular container open at the top, a removable cover for said container, a pair of vertical screens projecting from the bottom of said container to its removable top to divide it into three compartments, said cover formed with a suction hole over the
first compartment, a sub-base mounted on the cover over said hole and having a suction passage communicating through the last mentioned hole with the first compartment, a motor mounted on said sub-base, said cover also formed with a hole over the third compartment, and a blower in operative connection with the motor, mounted on said cover over the last mentioned hole and in communication therethrough with the suction passage that leads from the sub-base through the screens to the third compartment.

In testimony whereof I have hereunto set my hand this 16th day of January, 1925.

FRANK E. ROBERTS.