

(No Model.)

R. NEWTON.

COMBINED STEAM, WATER, AND DIRT SEPARATOR.

No. 354,730.

Patented Dec. 21, 1886.

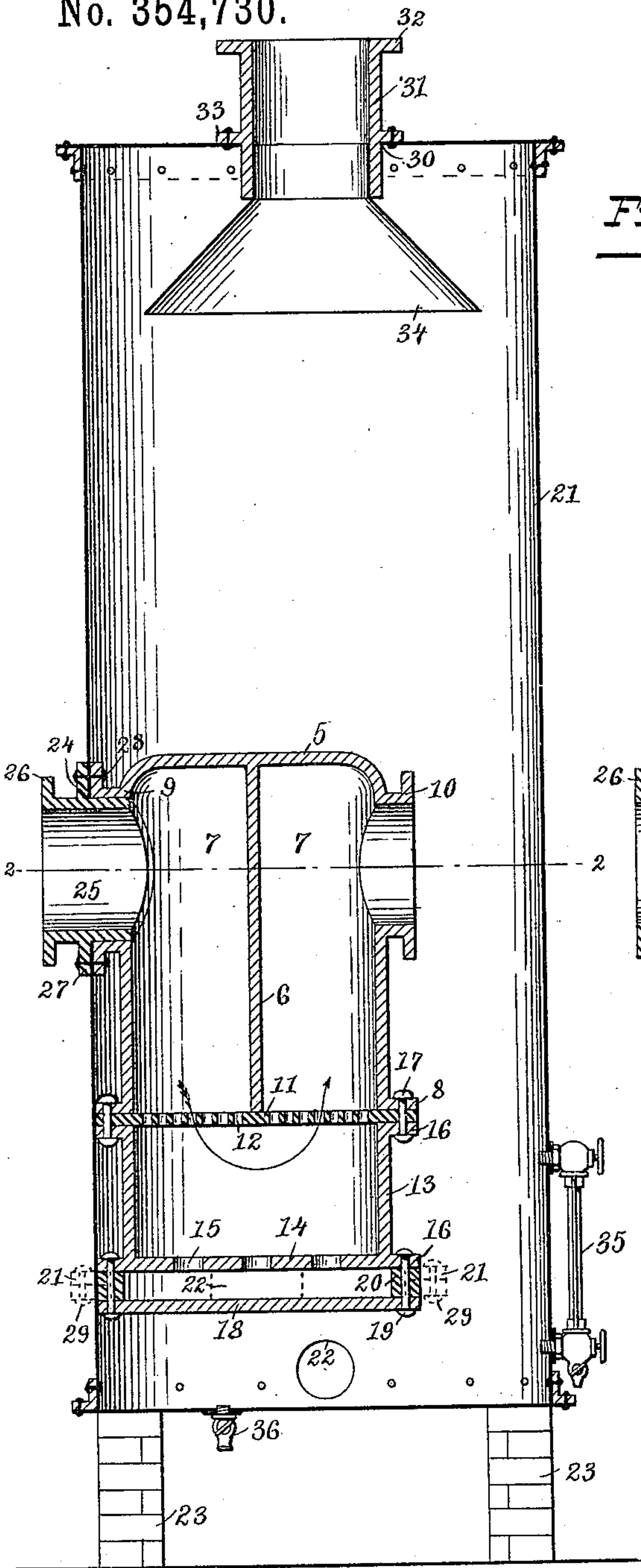


Fig. 1.

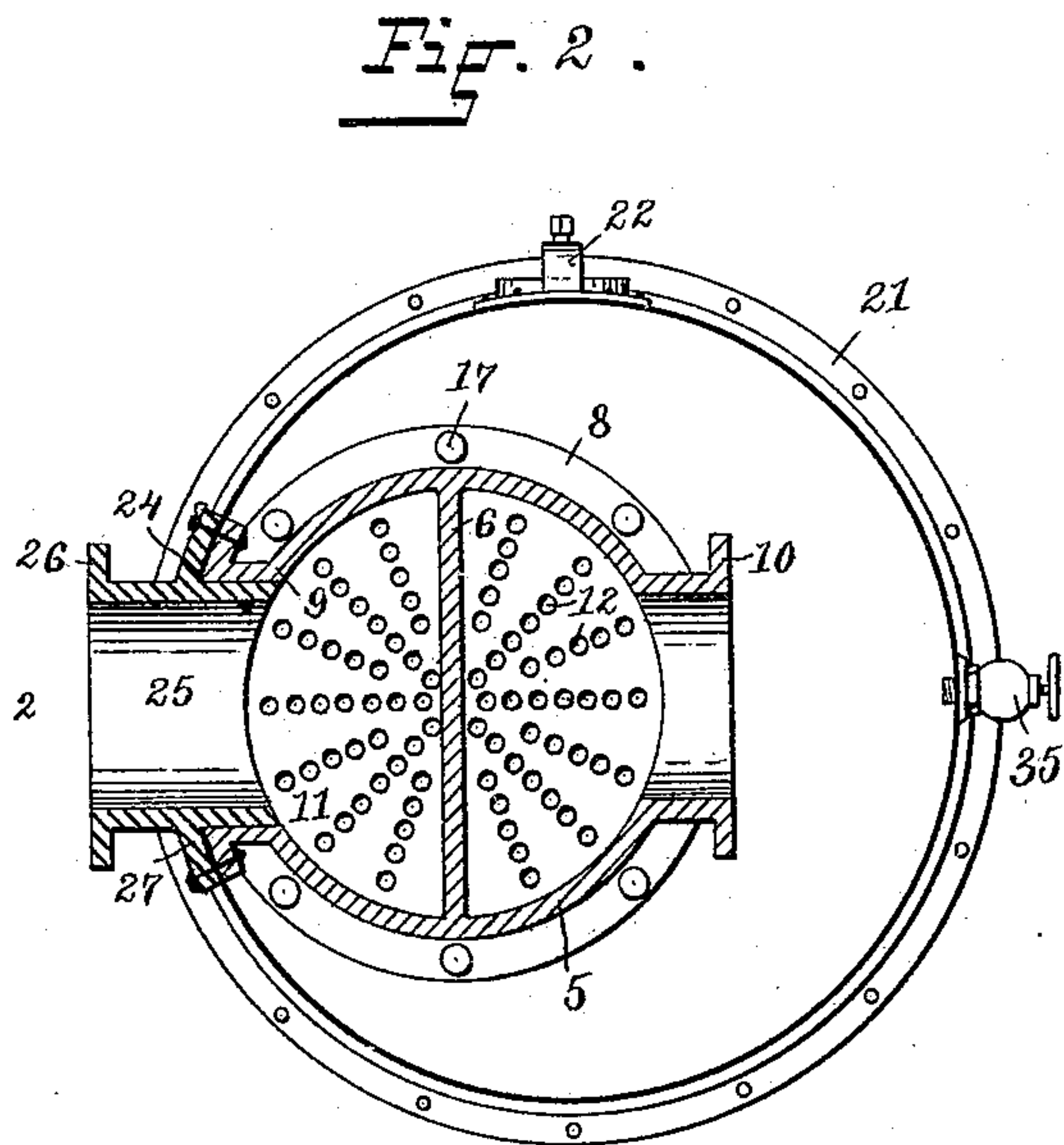


Fig. 2.

WITNESSES:

M. F. Bligh.
Willis Fowler.

INVENTOR:

Robert Newton
by Joseph A. Miller & Co
Attys

UNITED STATES PATENT OFFICE.

ROBERT NEWTON, OF PROVIDENCE, RHODE ISLAND.

COMBINED STEAM, WATER, AND DIRT SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 354,730, dated December 21, 1886.

Application filed September 9, 1886. Serial No. 213,073. (No model.)

To all whom it may concern:

Be it known that I, ROBERT NEWTON, of the city and county of Providence and State of Rhode Island, have invented a certain new and useful Combined Steam, Water, and Dirt Separator and Collector, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 This invention relates to a combined apparatus for the manipulation of exhaust-steam, whereby the steam may be separated from the water and dirt suspended therein, and the separated parts may be collected and confined at
15 certain portions of the apparatus.

It is well known that exhaust-steam contains a considerable quantity of water and dirt, the dirt consisting generally of sediment and oily matter received from the engine. It is desirable to clean and purify this exhaust-steam before subsequently using it for motive power or dyeing or other purposes.

The objects of my invention are to provide a combined apparatus of a compact form that
25 may be readily adapted to any kind of steam generator or engine, and that will perform efficiently the work of purifying the steam and collecting the same and the extracted foreign matter.

30 To the above purposes my invention consists, essentially, of a separator device comprising a deflecting-chamber having compartments for deflecting or baffling the impure steam in its course, and a separator-plate and
35 receiving box or apartment combined with the deflecting-chamber, and, further, of the collector, designed to be used or not conjointly with the separator.

My invention further consists in other features and peculiar constructions and arrangements of the several parts of the apparatus, all as hereinafter fully described and claimed.

In the accompanying drawings, illustrating my invention, Figure 1 represents a vertical
45 longitudinal sectional view taken on the central line of my combined separator and collector, shown as mounted in operative positions. Fig. 2 represents a transverse sectional view taken on line 2 2 in Fig. 1.

50 In the said drawings like numbers of reference designate corresponding parts throughout.

Referring to the drawings, 5 designates the deflecting-chamber, which is constructed of a hollow cylindrical form and with the upper
55 end closed. The vertical partition 6 is set diametrically across the interior of chamber 5 and divides the same into the semi-cylindrical compartments 7. The bottom of the cylindrical chamber 5 is provided with the external
60 flange 8.

Near the closed top of the deflecting-chamber 5 and at opposite points of the sides thereof are arranged the tubular inlet and outlet ports 9 and 10, respectively, which lead into the
65 respective compartments 7. The exterior mouths of the ports 9 and 10 are flanged, as shown.

The separator-plate 11 is provided with numerous perforations, 12, in the body of it, and
70 is of a circular form, designed to fit over the bottom of the chamber 5 and the compartments therein and across the lower end of the partition 6.

The receiving-box 13 is circular in shape
75 and is hollow, and provided with an integral bottom or drip plate, 14, formed with the perforations 15, which are quite few in number. The top and bottom edges of the box 13 each have a flange, as 16, formed thereon. The
80 separator-plate 11 is placed between the bottom of the chamber 5 and the top of the box 13, and the bolts 17 are passed through the flanges 8 and 16 and the interposed plate 11, to firmly secure these members together, as
85 illustrated.

At a little distance below the drip-plate 14 is swung the check-plate 18, of a disk form and imperforate. The check-plate is hung in position by means of the bolts 19 being passed
90 through the lower flange, 16, and through the rim of the plate itself. The blocks 20 are channeled pieces, which are pierced by the bolts 19, and are for the purpose of spacing the catch-plate from the drip-plate, as clearly
95 shown in the drawings.

The separator device above described may be used alone without the large surrounding collector hereinafter described. In this case the collector 21 is formed beneath the drip-
100 plate 14 by constructing the extra flanges (shown in broken lines in Fig. 1) upon the rims of both the drip-plate 14 and check-plate 18, and fastening the flanges together by the

bolts 29. This construction will form a closed apartment between the plates 14 and 18 in place of the open apartment of the construction shown in full lines. When the small collector 21 is used it may be formed with the hand-hole 22 cut in the side thereof for removing the objectionable foreign matter extracted from the impure steam and deposited there. The separator I show may be used with any suitable form of collector placed beneath the drip-plate, and when used without the large collector 21 the inlet-port 9 and the outlet-port 10 are connected directly with the pipe-mains (not shown) of the inflowing and outflowing steam, respectively.

The large collector 21 is of a hollow cylindrical form with closed ends, and is set with the bottom resting on the masonry 23. This collector may be constructed of sheet or boiler iron, or any suitable material. In one side of the collector is made an opening, 24. The above-described separator device is placed down within the collector 21, provided with the removable top and bottom portions, as fully shown in the illustrations. The separator is set with the mouth of the inlet-port registering with the opening 24 in the collector. The removable pipe-section 25 is formed like a short tube, and with the integral flanges 26 and 27 constructed about one end and about the body thereof, respectively. The end of pipe-section 25 remote from flange 26 is inserted in the inlet-port 9, and the flange 27 is forced snugly against the outer face of the collector. In this position the rivets 28 are placed through the flange 26, the side of the collector, and the flange formed about the mouth of the port 9. In the top of the collector 21 is arranged the discharge-opening 30, in which is fitted a pipe-section, 31, similar to the above-described pipe-section 25, being provided with the flanges 32 and 33. The lower end of the section 31 has inserted therein the inverted funnel 34. Near the lower end of the collector is arranged the ordinary form of water-gage 35, inserted in the side of the wall of the collector. The blow-off cock 36 is placed in the bottom of the collector, as shown.

In the operation of my combined form of apparatus the impure steam is introduced through the pipe-section 25 into the first or left-hand compartment, 7, of the deflecting-chamber 5. The steam is here deflected through the perforated separator-plate and into the receiving-box, from whence it passes upwardly, as shown by the large arrow in Fig. 1, into the second compartment. From the second compartment it enters the collector 21 through the outlet-port 10. The passage of the steam through the deflecting-chamber and separator-plate serves to extract from the steam the suspended water and the dirt contained therein, which falls through the receiving-box and drip-plate onto the check-plate, and thence it passes into the collector. Though most of the steam will pass through the deflecting-chamber and out of the separator, some little of it will flow

down into the receiving-box, through the drip-plate, thence into the collector. The passage of the steam through the various parts of the separator affords a very extended surface for the steam to deposit the water and dirt on, and so the steam may be rendered quite pure when it is passed into the collector. The pure steam will collect in the upper part of the collector, from whence it may be drawn off by coupling a pipe to the section 31. The extracted water and dirt will be deposited in the bottom of the collector, from where it may be readily removed by the use of the blow-off cock 36 and the hand-hole 22.

In order to prevent the water formed by the steam condensing upon the walls of the collector from creeping up into the pipe-main when connected to the section 31, and to prevent the same from being sucked therein, I provide the funnel-shaped body 34, which is inverted and operates in an obvious manner, and allows the water to drip back into the collector from its lower edge.

The separator I show has the deflecting-chamber 5, with the compartments 7 and ports 9 and 10, all constructed preferably of cast-iron and in a single casting. The receiving-box 13 and the drip-plate 14 are also cast in one piece, and likewise the removable pipe-sections 25 and 31. The plates 11 and 18 and the blocks 20 are preferably made of cast-iron.

My apparatus may be used for other analogous purposes to those herein mentioned, and there may be various modifications made in the principal parts of my invention without, however, substantially departing from the spirit of the same, as herein described and claimed.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a deflecting-chamber having compartments therein and provided with inlet and outlet ports, a receiving-box communicating with the deflecting-chamber, and a collector communicating with the receiving-box, substantially as described.

2. The combination of a deflecting-chamber having compartments therein and provided with inlet and outlet ports, the compartments open at the bottoms, a receiving-box subjacent to the compartments and opening therein, and a collector lying beneath the receiving-box and communicating therewith, substantially as described.

3. The combination of a deflecting-chamber having one or more vertical partitions forming compartments therein, the initial compartment provided with an inlet-port and the terminal compartment provided with an outlet-port, said compartments open at the bottoms, a receiving-box placed subjacent to the compartments over the bottoms thereof, a perforated separator-plate interposed between the receiving-box and the compartments, whereby they are in communication, a perforated drip-plate forming the bottom of the receiving-box, and a collector-chamber disposed below and about said box and

communicating therewith by means of the drip-plate, substantially as described.

4. The combination of a deflecting-chamber having compartments therein open at the bottoms, the first and last compartments provided with an inlet and an outlet port, respectively, a receiving-box lying beneath the bottoms of said compartments, a separator-plate having perforations formed therein and interposed between said compartments and receiving-box, the bottoms of the receiving-box provided with openings, and an imperforate check-plate secured beneath the bottom of the receiving-box and spaced therefrom, substantially as and for the purpose described.

5. The separator consisting of the deflecting-chamber having compartments therein, and provided with inlet and outlet ports, a receiving-box communicating with the deflecting-chamber and also with the exterior of the separator, said separator combined with a collector and the former contained therein, the separator in communication with the exterior and interior of said collector by means of the inlet and outlet ports, respectively, and the collector provided with a discharge-opening, substantially as and for the purpose described.

6. The separator consisting of a deflecting-chamber having compartments therein and provided with inlet and outlet ports, the compartments open at the bottoms, a receiving-box subjacent to and communicating with said compartments and opening to the exterior of the separator, the separator combined with a collector surrounding the same, the separator in communication with the exterior and interior of the collector, and the latter provided with a discharge, substantially as described.

7. The separator consisting of a deflecting-chamber having two or more compartments therein formed of vertical partitions, the compartments open at the bottoms, and the initial compartment provided with an inlet-port and the terminal compartment provided with an outlet-port, a perforated separator-plate secured across the bottoms of the compartments, a receiving-box disposed beneath said separator-plate and provided with openings in the bottom thereof, an imperforate check-plate set beneath the bottom of the receiving-box and spaced therefrom, the separator combined with a collector incasing and surrounding the same, the inlet and outlet ports communicating, respectively, with the exterior and interior of the collector, the receiving-box also opening into the interior of the collector, and the collector provided with a discharge, substantially as and for the purpose described.

8. The combination, with a separator and the collector constructed substantially as described, of the removable pipe-section formed of a single casting and adapted to connect the inlet-port of the separator with the exterior of the collector, substantially as described.

9. The separator consisting of the deflecting-chamber having compartments therein, and provided with inlet and outlet ports and formed of a single casting, the perforated separator-plate subjacent to the deflecting-chamber, and the receiving-box having an integral bottom formed with openings therein, substantially as described.

10. The combination, with a separator constructed substantially as described, of a collector surrounding the separator and the latter in communication with the exterior and interior of the former, the collector having a discharge-opening provided with a pipe-section and an exit-chute, a removable pipe-section for the inlet-port of the separator, a gage device for the collector, a blow-off cock, and a hand-hole for said collector, all constructed substantially as and for the purpose described.

11. The separator consisting of the deflecting-chamber 5, having one or more compartments therein, and provided with the inlet and outlet ports, the perforated separator-plate 11, and the receiving-box 13, having a perforated bottom, substantially as described.

12. The separator composed of the deflecting-chamber 5, having the compartments 7, and provided with the ports 9 and 10, the separator-plate 11, having perforations 12 therein, the receiving-box 13, the drip-plate 14, having perforations 15, and the collector 21, substantially as described.

13. The combination, with the separator constructed substantially as described, of the collector 21, provided with the discharge-opening, and the pipe-section 25, all substantially as described.

14. The combination, with the separator constructed substantially as described, of the collector 21, provided with the discharge-opening 30 and the opening 24, the pipe-sections 25 and 30, the funnel 34, the water-gage 35, the hand-hole 22, and the blow-off cock 36, all constructed and arranged substantially as described.

ROBERT NEWTON.

Witnesses:

J. A. MILLER, Jr.,
WILLIS FOWLER.