No. 692,390.

Patented Feb. 4, 1902.

E. P. WAGGONER.

SEPARATOR.

(Application filed Apr. 2, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

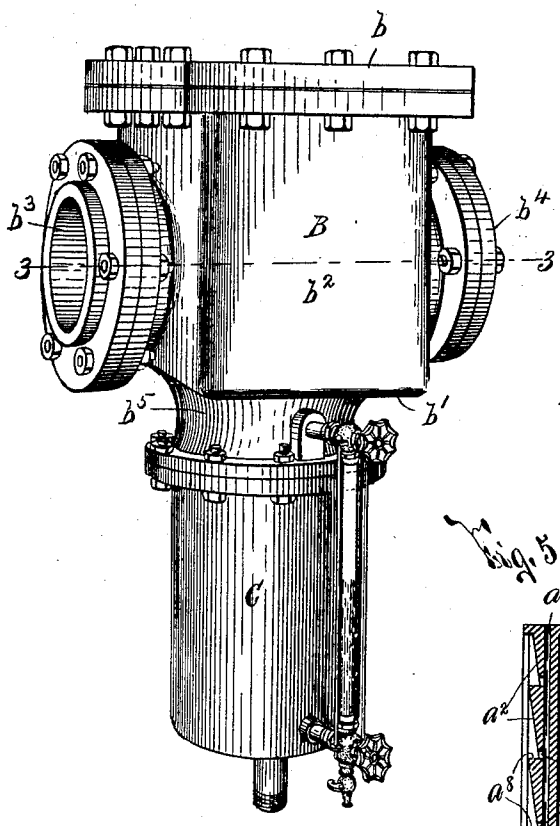


Fig. 2.

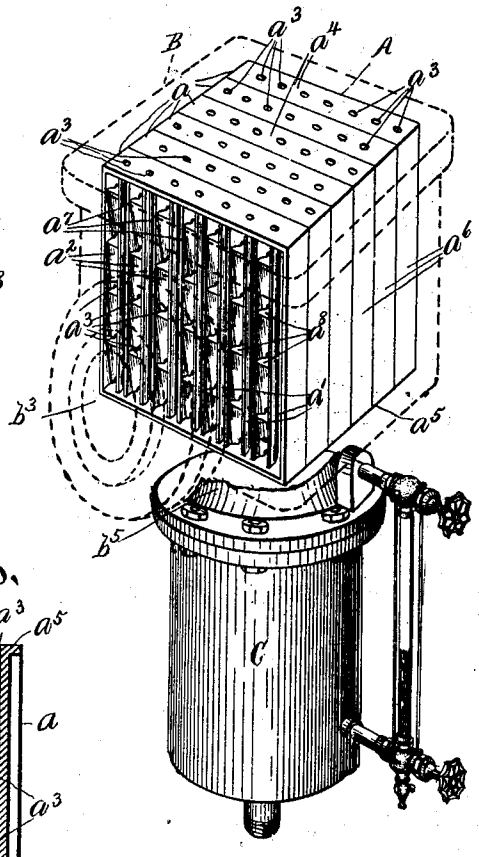
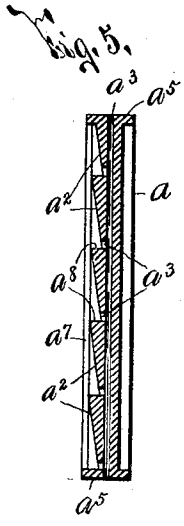


Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

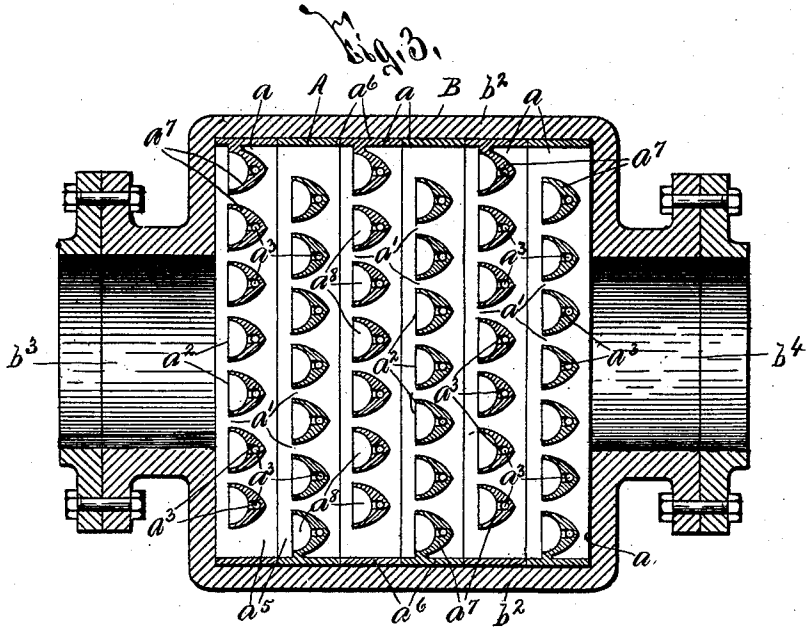
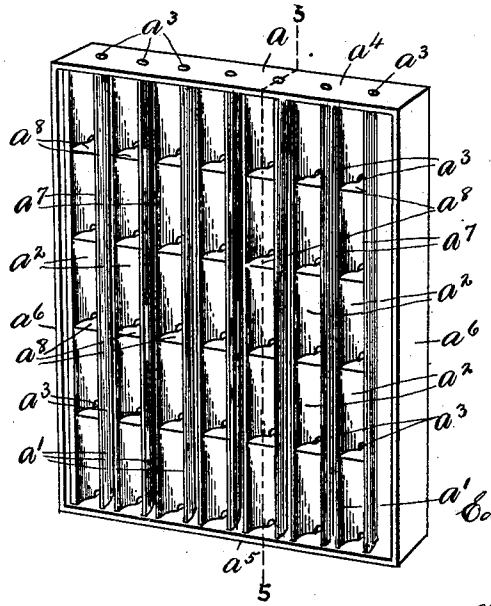


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWARD P. WAGGONER, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE A. A. GRIFFING IRON COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 692,390, dated February 4, 1902.

Application filed April 2, 1898. Serial No. 676,170. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. WAGGONER, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Separators, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in separators particularly applicable for removing water, oil, &c., from exhaust-steam or other moving fluids, and has for its object the production of a device which is simple in construction and is highly positive and effective in use; and to this end the invention consists in the combination, construction, and arrangement of the component parts of a separator, as hereinafter fully described, and pointed out in the claims.

In describing this invention reference is had to the accompanying drawings, forming part of this specification, in which like letters indicate corresponding parts in all the views.

Figures 1 and 2 are perspective views of this improved separator, the inclosing shell or casing for the separating-frame being indicated by dotted lines in Fig. 2. Fig. 3 is a horizontal sectional view taken on line 3 3, Fig. 1. Fig. 4 is an isometric view of one of the sections of the separating-frame of this improved separator. Fig. 5 is a sectional view taken on line 5 5, Fig. 4.

In the practical operation of separators designed for the same use as this invention only a portion of the passing steam or other fluid is operated upon, and the water, oil, &c., removed in one part of the separator from said portion of the steam or other fluid is afterward permitted to flow or drop into a rapidly-moving current of said passing steam or other fluid, which picks up a large proportion of the separated water, oil, &c., and carries the same onward to the exit of the separator. This invention is radically different from said type of separators, for the reason that the passing steam or other fluid is caused to impinge against a large number of separating-surfaces of particularly effective shape which deflect the water, oil, &c., adhering thereto to a number of inclosed conduits for preventing access of the passing steam or other fluid to said separated water or oil.

As preferably constructed this improved separator comprises a frame A, an inclosing shell or casing B, and a receiving-chamber C. The frame A usually consists of a series of sections a, arranged one in advance of the other within the shell or casing B and each formed with one or more fluid-openings a', separating-surfaces a^2, and inclosed conduits a^3. The sections a are generally removably arranged crosswise within the inclosing shell or casing B' with their upper, lower, and side faces a^4 a^5 a^6 a^6 in close proximity to the inner faces of the top, bottom, and side walls b b' b^2 b^2 of said shell or casing B for preventing the ready escape of the steam or other passing fluid between said faces a^4 a^5 a^6 a^6 b b' b^2 b^2.

The fluid-openings a' in the sections a are usually arranged in substantially upright parallel planes, are comparatively long and narrow, and extend from a plane in close proximity to the lower faces a^5 of said sections to a plane adjacent to the upper faces a^4 thereof. The portions of the sections a interposed between the fluid-openings a' generally consist of a series of substantially upright parallel bars a^7, which are united at their opposite ends, are provided with the separating-surfaces a^2, and inclose the conduits a^3. The front and rear faces of the bars a^7 of one section are separated from the bars of the contiguous sections, and, as clearly seen in Fig. 3, said bars of one section are usually arranged out of alinement with the bars of the contiguous sections for forming a tortuous path for the passing steam or other fluid. The separating-surfaces a^2 are generally of less length than the bars a^7 and are provided one above the other upon the front or advance faces of said bars and in the path of the passing steam or other fluid. The surfaces a^2 are usually formed by grooves which extend lengthwise of the bars a^7 from transverse shoulders a^8, provided upon the front faces of the bars a^7 and decrease upwardly in depth. The conduits a^3 are generally provided with outlet-openings in their lower ends opening through the lower faces of the sections a, extend up-

wardly through the bars a^1 in proximity to the rear faces of said bars and along the separating-surfaces a^2, and are formed with forwardly-extending inlet openings or branches communicating with the lower ends of the grooves forming the separating-surfaces a^2.

The inclosing shell or casing B is of any desirable size, is preferably provided with suitable conduits or passages b^3 b^4 b^5, and serves to support the separable sections of the frame A in their operative position. The conduits or passages b^3 b^4 communicate with the front and rear portions of the inner chamber of the shell or casing B for conducting the steam or other passing fluid to and from the frame A, and the conduit or passage b^5 communicates with the lower portion of said inner chamber for receiving the water, oil, &c., discharged from the outlet-openings in the lower ends of the conduits a^3. The receiving-chamber C, which is of suitable form and size, is usually arranged beneath the inclosing shell or casing B and communicates with the conduit or passage b^5 for receiving the water, oil, &c., discharged from the conduits a^3 and separated within the frame A. The top wall b of the inclosing shell or casing B is usually detachable for facilitating the entrance and removal of the sections of the frame A. A number of the inclosing shells or casings B may be formed of unequal length and of substantially the same width, and the separating-frames arranged within said shells or casings may be made up of a greater or less number of sections of the same size, thus greatly decreasing the cost of the separators and facilitating the shipment of different sizes thereof. The inclosing shell or casing B forms a particularly practical and effective means for conducting the steam or other fluids to the separating-frame A of this improved separator; but it is obvious that any other suitable means for accomplishing this result and permitting the removal of the water, oil, &c., from the conduits a^3 may be used, if desired.

In the operation of this invention the exhaust-steam or other passing fluid enters the conduit or passage b^3 and strikes against the separating-surfaces a^2 of the front section a of the frame A. A considerable portion of the water, oil, &c., carried by the steam or other passing fluid adheres to said separating-surfaces and passes downwardly along the same into the corresponding conduits a^3 and thence into the receiving-chamber C. The steam or other passing fluid escapes in thin sheets through the fluid-openings a' of the front section a, impinges against the separating-surfaces of the contiguous section a, passes in thin sheets through the fluid-openings in said contiguous section, and continues its onward passage to the separating-surfaces and through the fluid-openings of the various sections of the frame A until divested of its water, oil, &c., it escapes through the outlet conduit or passage b^4. During the onward passage of the steam or other passing fluid after its escape through the fluid-openings a' of the front section a additional quantities of water and oil are separated from said steam or fluid by the separating-surfaces a^2 of the additional sections a and pass downwardly through the conduits a^3 of said additional sections into the receiving-chamber C.

The construction and operation of this improved separator will now be readily understood upon reference to the foregoing description and the accompanying drawings, and as the exact construction and arrangement of the parts of said separator may be more or less varied without departing from the spirit of this invention I do not herein specifically limit myself to such exact construction and arrangement.

Having thus fully described this invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. A separator comprising a frame having an opening for the passing fluid, a separating-surface arranged in the path of said fluid, an inclosed conduit for the oil or other material to be separated, said conduit extending along the separating-surface and having an inlet-opening arranged in proximity to the separating-surface, means for conducting the passing fluid to and from the frame, and a receiving-chamber communicating with the conduit, substantially as and for the purpose described.

2. A separator comprising an inclosing shell or casing, a frame arranged within the inclosing shell or casing, and having an opening for the passing fluid, a separating-surface arranged in the path of said fluid, and an inclosed conduit for the oil or other material to be separated, said conduit extending along the separating-surface and having an inlet-opening arranged in proximity to the separating-surface, and conduits for conducting the passing fluid to and from the inclosing shell or casing, substantially as and for the purpose specified.

3. A separator comprising an inclosing shell or casing, a frame arranged within the inclosing shell or casing, and having an opening for the passing fluid, a separating-surface arranged in the path of said fluid, an inclosed conduit for the oil or other material to be separated, conduits for conducting the passing fluid to and from the inclosing shell or casing, and a receiving-chamber arranged beneath the inclosing shell or casing and communicating with the conduit of the frame, substantially as and for the purpose set forth.

4. A separator comprising an inclosing shell or casing, a frame removably arranged within the inclosing shell or casing and having openings for the passing fluid, separating-surfaces arranged in the path of said fluid, inclosed conduits for the oil or other material to be separated, said conduits being arranged at the rear of the separating-surfaces and

having inlet-openings arranged in proximity to the separating-surfaces and having outlet-openings in their lower ends, conduits for conducting the passing fluid to and from the inclosing shell or casing, and a receiving-chamber arranged beneath the inclosing shell or casing and communicating with the outlet-openings of the conduits of the frame, substantially as and for the purpose described.

5. A separator comprising a frame composed of separable sections, each section having an opening for the passing fluid, a separating-surface arranged in the path of said fluid, and a conduit for the oil or other material to be separated, said conduit extending along the separating-surface and having an inlet-opening arranged in proximity to the separating-surface, and means for supporting the separable sections in position, substantially as and for the purpose specified.

6. A separator comprising an inclosing shell or casing, a frame arranged within the inclosing shell or casing and composed of separable sections, each section having an opening for the passing fluid, a separating-surface arranged in the path of said fluid, and a conduit for the oil or other material to be separated, said conduit extending along the separating-surface and having an inlet-opening arranged in proximity to the separating-surface, and conduits for conducting the passing fluid to and from the inclosing shell or casing, substantially as and for the purpose set forth.

7. A separator comprising a frame composed of separable sections, each section having an opening for the passing fluid, a separating-surface arranged in the path of said fluid, and a conduit for the oil or other material to be separated, the opening of one of said sections being arranged out of alinement with the corresponding opening in an adjacent section, and means for conducting the passing fluid to and from the frame, substantially as and for the purpose specified.

8. A separator comprising an inclosing shell or casing, a frame arranged within the inclosing shell or casing and having an opening for the passing fluid, a series of separating-surfaces arranged one above the other in the path of said fluid, and an inclosed conduit for the oil or other material to be separated, said conduit having a plurality of inlet-openings arranged in proximity to the lower ends of the separating-surfaces, and conduits for conducting the passing fluid to and from the inclosing shell or casing, substantially as and for the purpose described.

9. A separator comprising an inclosing shell or casing, a frame arranged within the inclosing shell or casing and provided with a plurality of bars having adjacent edges thereof separated, said bars being formed with transverse shoulders, grooves extending upwardly from the shoulders, and lengthwise conduits communicating with the lower ends of the grooves, and conduits for conducting the passing fluid to and from the inclosing shell or casing, substantially as and for the purpose specified.

10. A separator comprising an inclosing shell or casing, a frame arranged within the inclosing shell or casing and provided with a plurality of bars having adjacent edges thereof separated, said bars being formed with lengthwise conduits, and having their front or advance faces formed with transverse shoulders and grooves interposed between the shoulders and communicating with the conduits, said grooves being decreased upwardly in depth, and conduits for conducting the passing fluid to and from the inclosing shell or casing, substantially as and for the purpose set forth.

11. A separator comprising an inclosing shell or casing, a frame arranged within the inclosing shell or casing and provided with a plurality of bars having adjacent edges thereof separated, said bars being formed with lengthwise inclosed conduits, and having their front or advance faces formed with transverse shoulders, and grooves interposed between the shoulders and communicating with the conduits, said grooves being decreased upwardly in depth, conduits for conducting the passing fluid to and from the inclosing shell or casing, and a receiving-chamber arranged beneath the inclosing shell or casing and communicating with the conduits, substantially as and for the purpose described.

12. A separator comprising a frame composed of separable sections, each section being provided with a plurality of bars having adjacent edges thereof separated, the bars of one section being arranged out of alinement with the bars of contiguous sections, and having their front and rear faces separated from the bars of said contiguous sections, and each of said bars being formed with a lengthwise conduit and having its front or advance face formed with a groove communicating with said conduit, and means for conducting the passing fluid to and from the frame, substantially as and for the purpose specified.

13. A separator comprising an inclosing shell or casing, a frame composed of separable sections removably arranged one in advance of the other within the inclosing shell or casing, each section being provided with a plurality of bars united at their opposite ends and having adjacent edges thereof separated, the bars of one section being arranged out of alinement with the bars of contiguous sections, and having their front and rear faces separated from the bars of said contiguous sections, and each of said bars having its front or advance face formed with transverse shoulders, and grooves interposed between the shoulders and decreased upwardly in depth and being provided with a lengthwise inclosed conduit communicating with the lower ends of the grooves and having an outlet-opening in its lower end, conduits for conducting the passing fluid to and from the

inclosing shell or casing, and a receiving-chamber communicating with the outlet-openings of the lengthwise conduits in said bars, substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Jersey City, in the county of Hudson, in the State of New Jersey, this 14th day of July, 1897.

EDWARD P. WAGGONER.

Witnesses:
S. E. BRYNET,
T. E. NARY.