

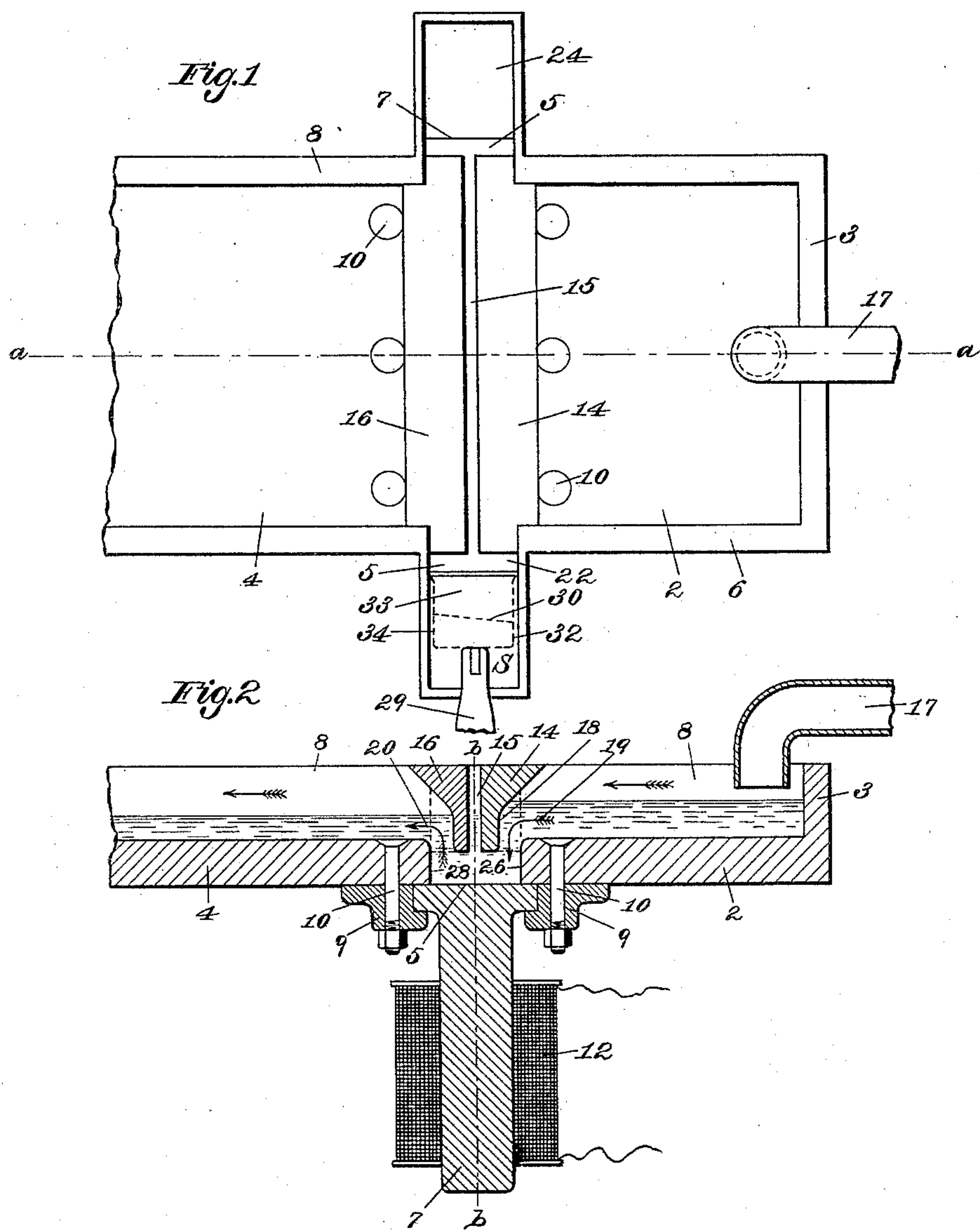
(No Model.)

2 Sheets—Sheet 1.

F. H. RICHARDS.
MAGNETIC SEPARATOR.

No. 467,645.

Patented Jan. 26, 1892.



Witnesses:

Henry R. Restard.
Hans Mallner.

Inventor:

Francis H. Richards

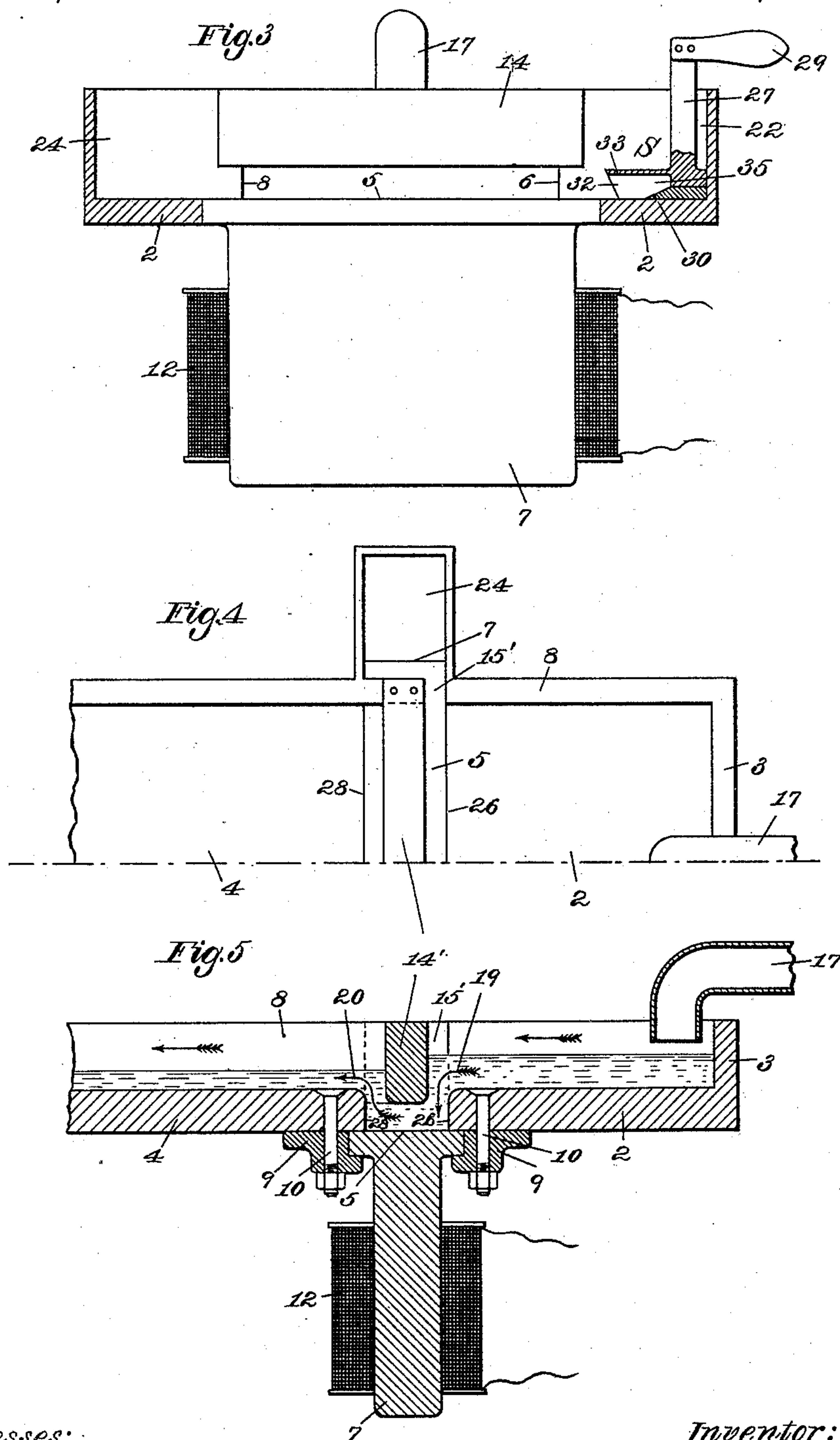
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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT, ASSIGNOR OF TWO-THIRDS TO OSCAR S. GREENLEAF, OF SPRINGFIELD, AND ROSWELL M. FAIRFIELD, OF HOLYOKE, MASSACHUSETTS.

MAGNETIC SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 467,645, dated January 26, 1892.

Application filed October 12, 1891. Serial No. 408,442. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Magnetic Pulp-Separators, of which the following is a specification.

This invention relates to that class of magnetic separators adapted for separating particles of iron or other magnetic materials from paper-pulp, the object being to furnish an effective separator having a non-revolving magnet and provided with means for cleaning the magnetic surface while this is in use.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of a magnetic separator embodying my present improvements. Fig. 2 is a vertical longitudinal section in line *a a*, Fig. 1. Fig. 3 is a cross-sectional view of the machine in line *b b*, Fig. 2. Figs. 4 and 5 are views similar to Figs. 1 and 2, illustrating a modification of the apparatus.

Similar characters designate like parts in all the figures.

The separator apparatus shown in the drawings is used in connection with a suitable frame-work and trough, which may be constructed of wood or of wood and metal, after the usual manner of making paper-mill machinery and apparatus. The trough or box may properly consist of the bottom board, (herein shown formed in two parts 2 and 4) the end wall 3, the side walls 6 and 8, and suitable means (not herein shown) for supporting the same. That part of the trough over the end 2 of the floor of the trough constitutes the receiving-box, while the opposite end, over the portion 4 of said floor, constitutes the delivery-trough. Intermediate to said receiving and delivery troughs the floor of the trough is depressed and is formed of the upper surface 5 of the magnet 7, which closes the space between said floor portions 2 and 4 and should extend entirely across the trough, as will be understood from Figs. 1 and 3. The magnet may be held in place underneath the floor of the trough by means of the clamps or clips 9 9 and suitable bolts, as

magnet 7 is provided with the usual energizing coils of wire 12, of a size and quantity corresponding in any particular case to the magnetic force required. Immediately over the depressed magnetic floor 5 I place a pulp-deflector, which in Figs. 1, 2, and 3 consists of the two guide-bars 14 and 16, having between them the narrow space 15, which space is for the purpose of permitting the passage between said bars of the handle of the magnet-cleaner hereinafter described.

In using the apparatus, the magnet being energized by a suitable magnetic current passed through the aforesaid coils of wire, the paper-pulp is delivered into the tank through a pipe or conduit, as 17, Fig. 2, into the receiving end of the trough. The pulp flows forward against the side or surface 18 of the guide-bar 14, and is thereby deflected downward, as indicated by the arrow 19, against the magnetic floor 5, and then flows forward and upward, as indicated by the arrow 20, into the delivery end of said trough, whence it flows to the paper-making machine or is otherwise disposed of. During the passage of the paper-pulp underneath said deflector and in close proximity to the magnetic floor of the trough the pulp is powerfully acted upon by the magnet, which attracts any magnetic particles floating in the pulp downward to itself. Said particles when once seized by the magnet, being held thereon with great force, are not likely to be washed away by the pulp-current. The action of the magnet is assisted by the abrupt downward deflection of the current at the place indicated by the arrow 19, at which point gravity, the downward momentum of the particles in the current, and the attraction of the magnet all co-operate to carry the magnetic particles directly downward onto the magnetic floor.

For the purpose of cleaning the magnetic floor of the magnetic particles accumulated thereon, I construct the apparatus with "pockets" or "catch-basins" 22 and 24 at the sides of the pulp-trough, as will be understood from Figs. 1 and 3. Preferably the magnetic floor should extend for some distance into said catch-basins, into which the aforesaid slot or

passage-way 15 between the guide-bars 14 and 16 opens at either end of said bars. For the purpose of cleaning the magnetic floor as aforesaid, the scraper (designated in a general way by S) is constructed to fit closely between the vertical walls 26 and 28 at the sides of the magnetic floor, which vertical walls should extend, as shown, into the catch-basins. Said scraper has an arm 27 extending upward between said guide-bars, being provided at the upper end thereof with a handle 29, whereby the instrument may be operated by hand. The forward end of the cleaner S has a knife 30, or scraper proper, fitting closely upon the magnetic floor. This knife-edge or scraper is or should be of magnetic material, and is guarded at the ends and above it by the non-magnetic guards 32, 33, and 34, respectively, which reach forward of the magnetic edge 30. In using the cleaner this is set into one of the catch-basins, as shown in Fig. 1 and at the right hand in Fig. 3. The operator then draws the scraper over the magnetic floor, the arm thereof passing through the slot 15 to the opposite catch-basin. During that operation the non-magnetic guards 32, 33, and 34 precede said scraper 30, and thereby prevent the current from washing away any of the magnetic particles when these are disturbed by the advance of said scraper, whose edge as it passes over the magnetic floor and being itself of magnetic material is closely held upon said floor, and, after the manner of a scraper-knife, lifts the accumulations from said floor and collects them upon the scraper under the upper guard 33. Said cleaner, having been drawn entirely through the slot 15 into the opposite catch-basin 24, is then taken out of the machine and the "pocketful" of collected material washed out of the cleaner-pocket 35.

In practice the guide-bars 14 and 16 should be made readily movable, so that when the machine or apparatus is subjected to a general cleaning ready access may be had to the magnetic floor.

In the modification shown in Figs. 4 and 5 the pulp-deflector consists of a single bar 14', depending into the space over and midway of the width of the depressed magnetic floor 5, the arm of the cleaner passing back of the deflector through a slot 15' in the side wall of the trough into the catch-basin, which basin

is otherwise substantially the same as hereinbefore described in connection with Figs. 1, 2, and 3. The cleaner for use in connection with this modification should of course have its stem 27 located near one edge thereof, to correspond with the position of said slot 15' relatively to the magnetic floor 5, as will be understood from Figs. 4 and 5.

Having thus described my invention, I claim—

1. In a magnetic separator for paper-pulp, the combination, with a trough having a depressed transverse magnetic floor-section, of a pulp-deflector depending into the trough over said section, substantially as described.

2. In a magnetic separator for paper-pulp, the combination, with the trough having transversely thereof a depressed magnetic floor, of a pulp-deflector consisting of two bars having between them a passage-way extending into one or more catch-basins, substantially as described, whereby a magnet-cleaner may be passed over the magnetic floor, substantially as described.

3. In a magnetic separator for paper-pulp, the combination, with a trough having a depressed magnetic floor-section transversely thereof and having at the end of said magnetic floor a catch-basin opening into the trough, of the deflector depending into the trough over said magnetic section, and a cleaner adapted to slide on said floor underneath the deflector from the trough into the catch-basin, substantially as described.

4. In a magnetic separator of the class specified, the combination, with the trough having the depressed magnetic floor, of the scraper S, fitted to slide on said floor and having the scraper-edge and a guard over and projecting beyond said edge, substantially as described.

5. In a magnetic separator of the class specified, the combination, with the trough having the floor portions 2 and 4, with a space between said portions, of a magnet under and closing said space to form a depressed magnetic floor, and means, substantially as described, for holding the magnet in place, substantially as described.

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Witnesses:

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