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 AND OTHER IMPURITIES.

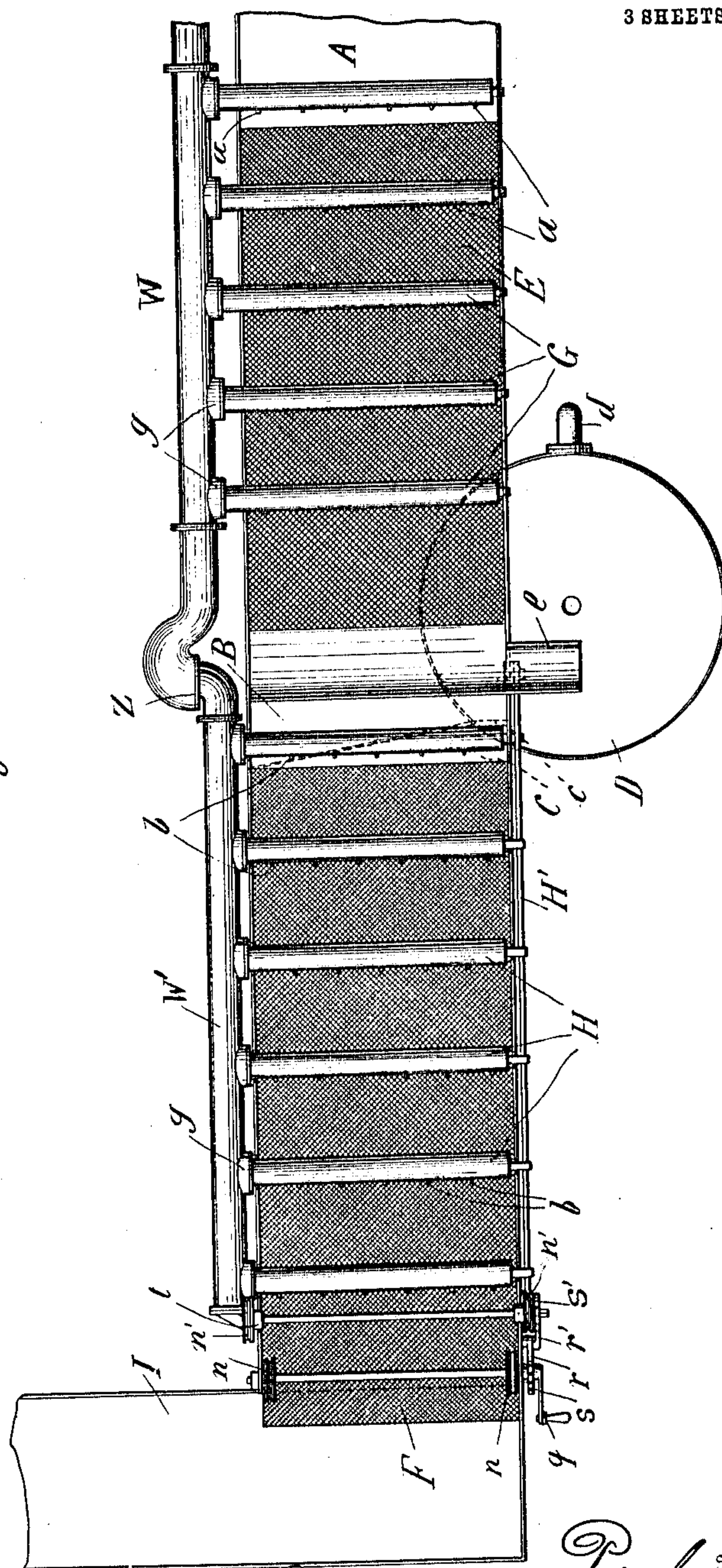
APPLICATION FILED OCT. 28, 1909.

Patented Apr. 26, 1910.

3 SHEETS—SHEET 1.

955,990.

Fig. 1.



Witnesses:

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V. Braun.

Bismarck Wm Petsche, Inventor

By *Schreiter & Mathews, his Attorneys.*

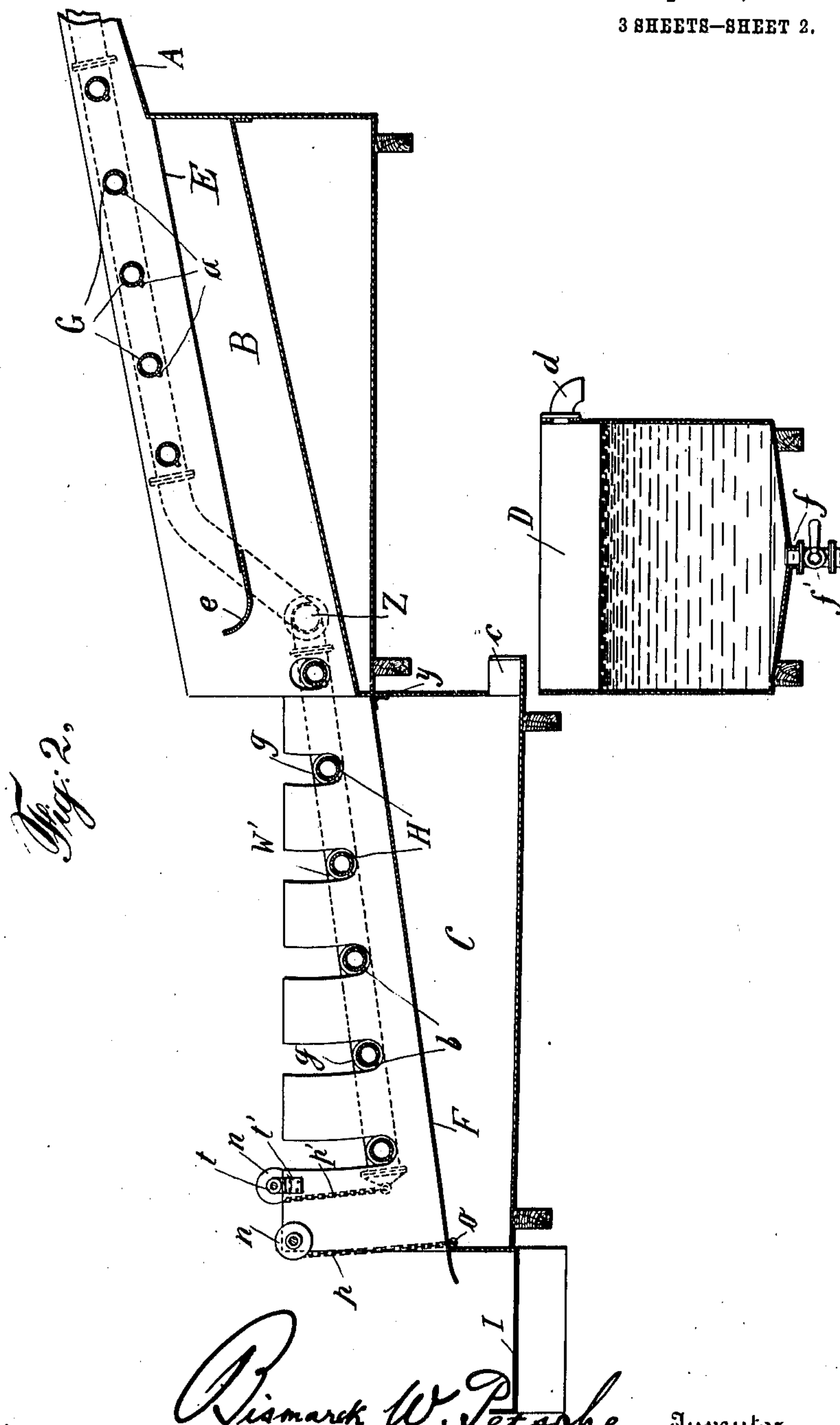
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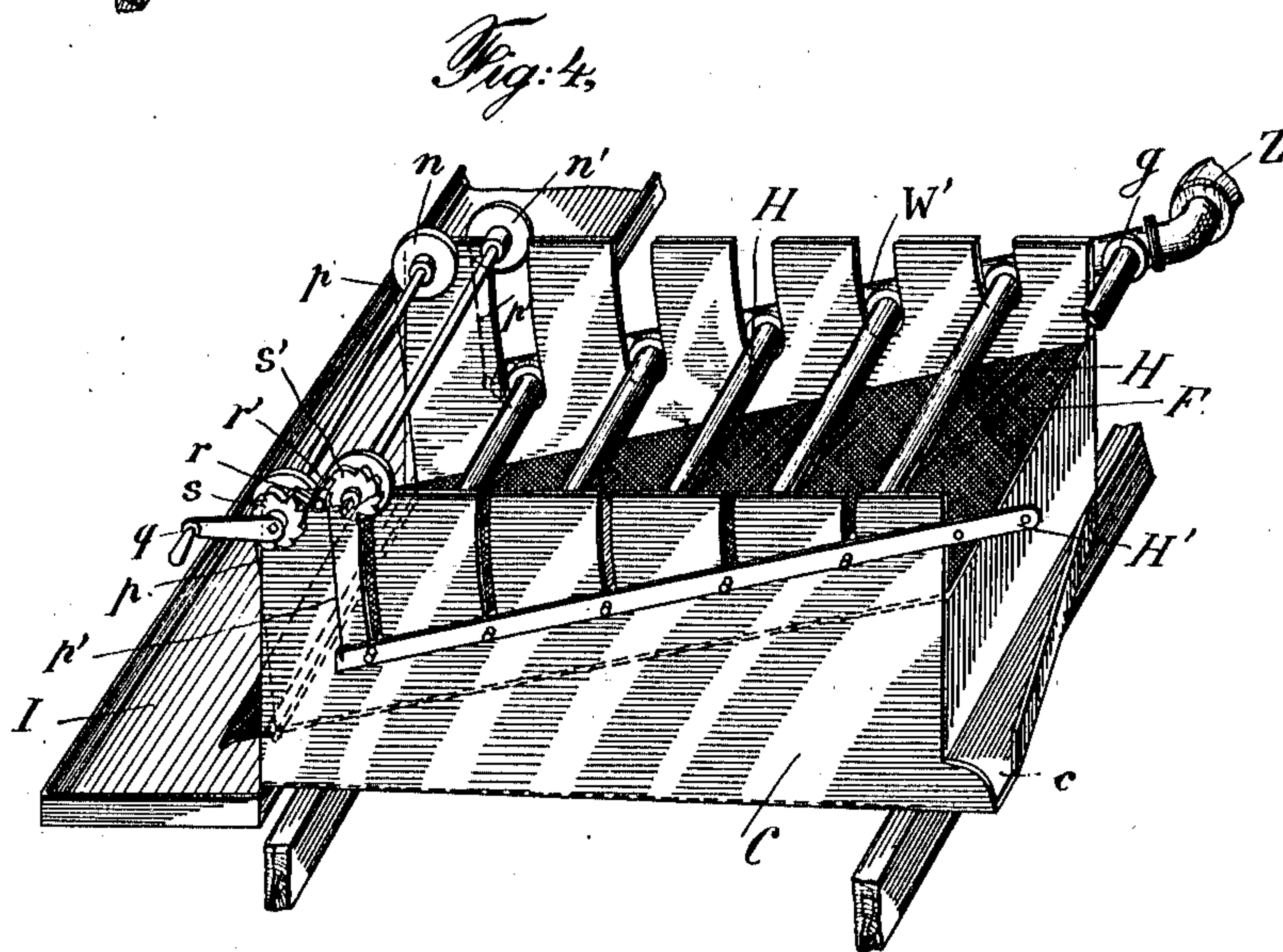
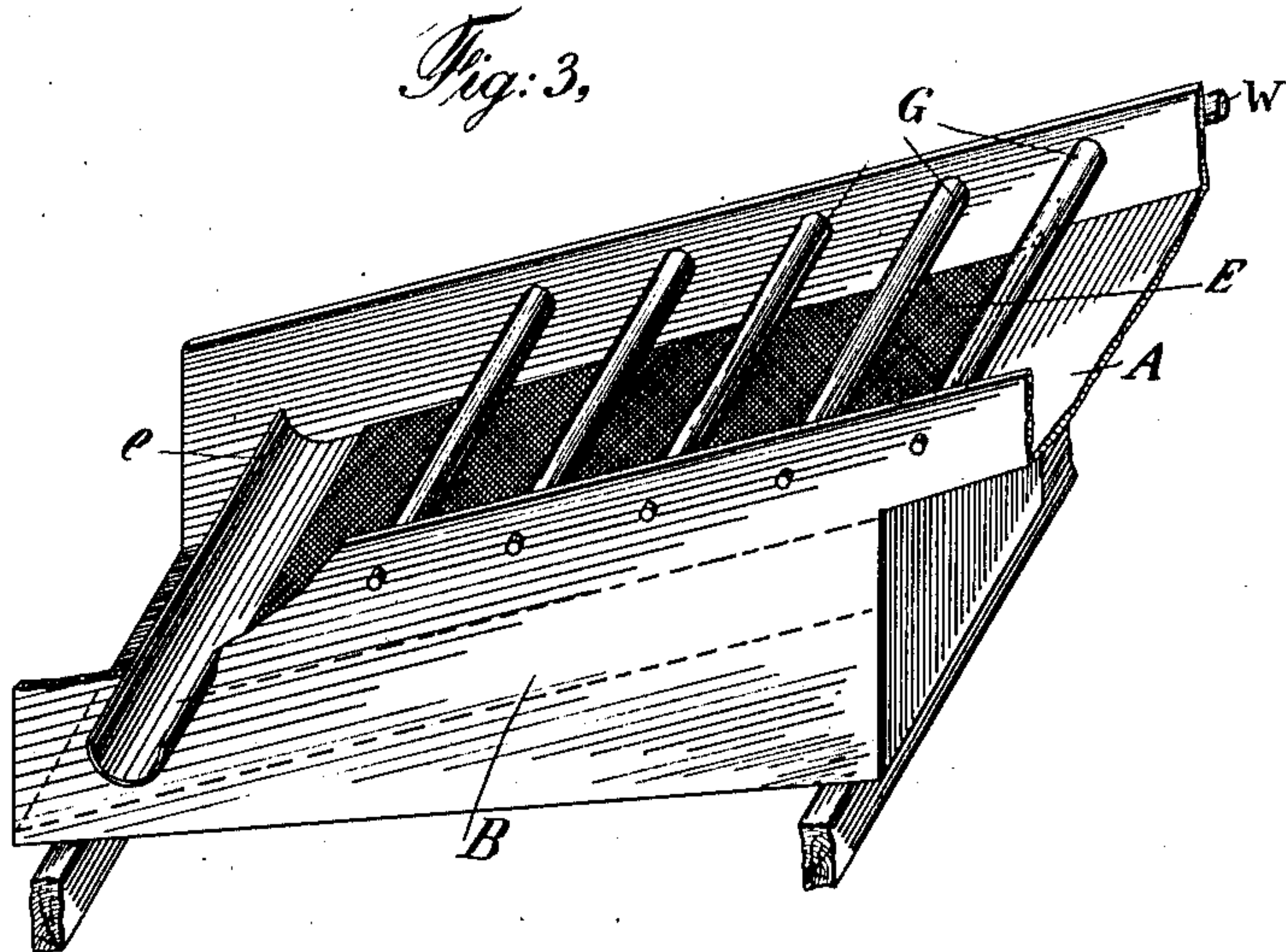
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UNITED STATES PATENT OFFICE.

BISMARCK WM. PETSCHÉ, OF YONKERS, NEW YORK.

APPARATUS FOR SEPARATING PULP FIBERS FROM PIGMENTS, SIZE, FILLER, AND OTHER IMPURITIES.

955,990.

Specification of Letters Patent.

Patented Apr. 26, 1910.

Original application filed May 7, 1909, Serial No. 494,711. Divided and this application filed October 28, 1909. Serial No. 525,049.

To all whom it may concern:

Be it known that I, BISMARCK WILLIAM PETSCHÉ, a citizen of the United States, and a resident of Yonkers, county of Westchester, and State of New York, have invented certain new and useful Improvements in Apparatus for Separating Pulp Fibers from Pigments, Size, Filler, and other Impurities, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, wherein—

Figure 1 is a plan view, and Fig. 2 a longitudinal sectional view of the apparatus; Fig. 3 a perspective view of the upper trough, the (coarse) screen and gutter; and Fig. 4 a similar view of the lower trough, the separating (finer) screen and of the series of sprinklers arranged in connection therewith.

My invention relates to apparatus for treating pulped waste paper, particularly such as newspapers, books and the like, for the purpose of separating the pulp fibers, contained therein, from the impurities, particularly printers' ink, size, filler and the like, adhering thereto as the result of the previous use of such papers, and consists in devising the apparatus as hereinafter described and claimed. The apparatus heretofore designed for carrying on such a process, were either filters, developed upon the erroneous theory that the impurities, adhering to, or mixed with, the pulp fibers, obtained by disintegrating of such waste papers, may be removed by filtration, or washers, provided with devices for floating and carrying these substances away by an overflow, it being assumed that the pulp fibers will settle on the bottom and that the pigments of the ink, the filler, size and other impurities will be carried away with the overflow. In some processes both methods were employed. Inasmuch, however, as it is practically impossible to separate the pulp fibers from such impurities by any known method of filtration, and inasmuch as the specific gravity of pulp fibers is not greater than that of the pigments of the ink, the filler and size used in paper making, it is not feasible, to my best knowledge and belief, to recover really clean pulp by such treatments of pulped waste papers, and no one has yet succeeded to carry on any of such filtering or floating processes success-

fully in a commercially, practical, or economical way.

In my improved process set forth in my application for Letters Patent, filed May 7, 1909, Sr. No. 494,711, and of which this application is a subdivision, the pulp fibers are separated from the residue of the ink, size and filler by screening, the operation being performed by streams of water acting upon the pulped material to pass it over the screens, the impurities being driven through the screens and the purified fibers conveyed over the screens to a receptacle, and the apparatus, forming the subject-matter of this application, is designed with the object in view to carry on the process in a commercially suitable and economical way.

The apparatus consists of the troughs A, B and C; tank D, screens E and F and sprinklers G and H, arranged substantially as shown. The screen E is a comparatively coarse screen, having eighteen to twenty-four meshes to an inch, and is preferably fixed in the trough B in the position as shown in the drawing. It terminates in the gutter *e*, which, as shown in Fig. 1, extends beyond the side wall of the trough B and over the tank D, located underneath. Alongside of the trough B, a water-pipe W, connecting with a tank or pump, not shown, is suitably supported, and sprinkler-pipes G, turnably connected thereto, have their other ends also turnably supported in collars *g*, secured to the opposite wall of trough B. In each of these pipes G, a suitable number of nozzles *a* are set to discharge streams of water upon the screen E at an angle of from 30° to 45° to its plane. It is not essential, but it is advisable to mount the sprinkler-pipes G turnably, so that the angle, under which the streams of water are discharged from the nozzles *a* upon the screen E, may be varied. Trough C is set below the trough B, and the screen F, which is a fine screen of about 50 meshes to an inch, is preferably hinged thereto at the point *y*, about where the end wall of the trough C intersects with the bottom of the trough B. The other end of screen F, extended slightly over the opposite end wall of the trough C, is preferably suspended by chains *p*, secured to roller *n*, and to the bar *o*, whereon the free end of screen F rests. The roller *n* is operated by handle *q*, detachably fitted thereto, to raise or lower the screen F, and pawl *r*, engaging

with the ratchet-wheel *s*, secured to the end of roll *n*, holds it in position.

The water-pipe *W'* is flexibly connected (or hinged) at the joint *Z* to the pipe *W*, or to other source of supply of water, and the sprinkler-pipes *H*, turnably connected therewith, have their other ends also turnably secured in frame *H'*. The rear end of this frame is pivoted at a point in line with joint *Z*, and its other end, and the free end of the water-pipe *W'*, are connected by chains *p'* to roller *n'*, pillowed in suitable bearings *t*, set on the side walls of the trough *C*, and supported by brackets *t'*. Roller *n'* is also provided with means for rigidly attaching thereto the handle *q*, whereby it is rotated to raise or lower pipe *W'*, and sprinkler-pipes *H*, relatively to the screen *F*. Pawl *r'*, engaging with the ratchet-wheel *s'*, secured to the end of roller *n'*, holds the pipe *W'* and sprinkler-pipes *H* in position. Sprinkler-pipes *H* are also provided with nozzles *b* and by turning them, the angle, under which the streams of water strike against the screen *F*, may be varied, to accelerate or retard the motion of the pulped material over this screen.

At the forward end of trough *C*, a trough or gutter *I* is located, into which the pulp fibers, separated from the impurities, are delivered. The bottom of trough *C* slopes toward the rear end thereof, and an opening *c* is provided in its rear end wall for the outflow of the water, and of the impurities separated from the fibers into the tank *D*, set underneath it. This tank *D* is provided with an overflow *d* and a discharge outlet-pipe *f*, wherein a stop-cock *f'*, is set. The bottom of tank *D* is preferably made sloping, and the outlet-pipe *f* is set in its lowest point.

The separating process is carried on in this apparatus as follows: The pulped waste papers, after having been subjected, in a chest, where the pulped material is prepared, to the action of the mechanical agitator and the alkaline solution, for a sufficient time to destroy the adhesivity of the oil of the ink and of such size, filler, etc., or to reduce it to an extent as necessary for separating these impurities from the fibers of the pulp, are pumped into the trough *A*, from where the material slides, or flows, onto the coarse screen *E*. By the streams of water, discharged upon it from the nozzles *a* of the sprinkler-pipes *G*, at an angle approximately of from 30° to 45°, the pulped material is propelled over the screen and driven through it, upon the bottom of trough *B*, such coarse particles of the stock, as might not have been sufficiently pulped in the beating engines, and all foreign coarse substances as may be contained in the pulped material, being carried over the screen *E* into the gutter *e* and finally delivered into

the tank *D*. All finer particles of the pulped material that passed through the screen *E*, are conveyed, in a rather rapid flow, upon the screen *F*. The streams of water, ejected from the nozzles *b* of sprinkler-pipes *H*, propel and roll over the pulped material toward the farther, open end of screen *F*. The impurities, such as particles of the ink pigments, size, filler, etc., are thereby separated from the fibers of the pulp, being driven through the meshes of the screen to the bottom of trough *C*, while the purified pulp fibers, also separated from each other, are carried over it into the trough *I*, by which they are conveyed to where pulp is to be accumulated or used. The particles of ink pigment, size, etc., floating on, or driven by, the water, pass through the opening *c* into the tank *D*, where the heavier than water impurities settle, while the overflow *d* carries away such as float on the water. The sediment in tank *D* is discharged, from time to time, through the bottom outlet *f*, and the clarified water, remaining in the tank, may be used over again for the beating engines.

Normally, the screen *F* is sloping toward the gutter *I* at almost the same angle of descent as the bottom of the trough *B* toward it, but if the pulp fibers, delivered into the gutter *I* should appear not to be fully separated from the impurities, or absolutely clean, it would indicate that the pulp was progressed too rapidly over it. To remedy this, the free end of the screen *F* is raised by turning roller *n*, whereby the screen *F* is brought into a more horizontal position and the process of the pulped material over it is retarded. If this is done, it may also be necessary to raise the sprinkler-pipes *H*, by turning roll *n'* correspondingly. The angle, at which the streams of water are discharged from nozzles *b* upon the pulped material, is adjusted by turning sprinkler-pipes *H* correspondingly. This may be done by hand, or suitable handles may be secured to these sprinkler-pipes. It is better to start the operation of the apparatus with the screen *F* in the position shown in the drawings (sloping toward trough *I*), to prevent waste of water, and to raise the free end of the screen gradually, if it be found necessary to do so. This treatment of the pulped material for the recovery of the pulp fibers requires from three to five times its weight of water, but more than two-thirds of the water may be recovered for use in the beating engines. The quantity of cleaned pulp, recovered in this process, is hardly any less, in proportion to the quantity of the waste material pulped in the beater, than what is obtained in the ordinary pulping process, and the costs of the process are only a small fraction over and above the costs of the ordinary pulping process of such materials.

The pulp recovered by this process requires no bleaching, being as clean and white as it was originally, and while it may be used for manufacture of print papers, the same as fresh sulfite pulp, it is particularly suitable for manufacture of pulp boards, for vat lining of chip and straw boards, and for manufacture of combination and coated boards of all kinds.

10 I claim as my invention:—

1. An apparatus for separating pulp fibers from pigments, size, filler and other impurities, the apparatus consisting of a trough, a screen in the trough; a series of water-
15 pipes, turnably mounted above the screen and provided with perforations, arranged to deliver streams of water upon the screen at a more or less acute angle to its plane by turning the water pipes accordingly; means
20 connecting the water-pipes with a supply of water, and means for conveying pulped material upon the screen.

2. An apparatus for separating pulp fibers from pigments, size, filler and other impuri-
25 ties, consisting of a trough, a screen set movably in the trough; a series of water-pipes, movably supported above the screen, a series of nozzles set in the water-pipes, means for raising and lowering the screen
30 and the water-pipes and means for changing the position of the nozzles relatively to the plane of the screen; means connecting the water-pipes with a supply of water and means for delivery of pulped material upon
35 the screen.

3. An apparatus for separating pulp fibers from pigments, size, filler and other impuri-
ties, consisting of a series of troughs, a coarse and a fine screen arranged succes-
sively in the troughs; sprinklers, set above 40 the screens and adapted to discharge streams of water thereupon at an angle to their planes; means connecting the sprinklers with a supply of water, means for conveying the pulped material into the apparatus and
45 means for removing the impurities, separated from the fibers of the pulp, from the apparatus, substantially as herein shown and described.

4. An apparatus for separating pulp fibers 50 from pigments, size, filler and other impurities, consisting of a series of troughs, a coarse screen fixed above the first trough of the series and a fine screen set movably
above the next trough and means for de- 55 livery of pulped material upon the coarse screen; a series of water-pipes movably supported above the fine screen, a series of nozzles set in the water-pipes, means for rais-
ing and lowering the screen and the water- 60 pipes and for changing the position of the nozzles relatively to the plane of the screen; means connecting the water-pipes with a supply of water, and means for removing
the impurities from underneath the screen. 65

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Witnesses:

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