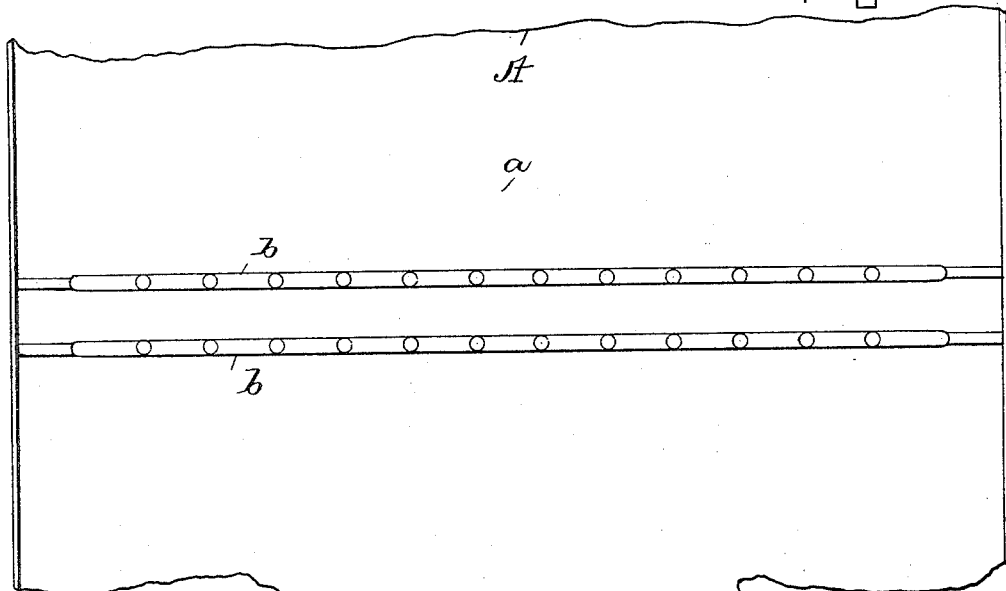
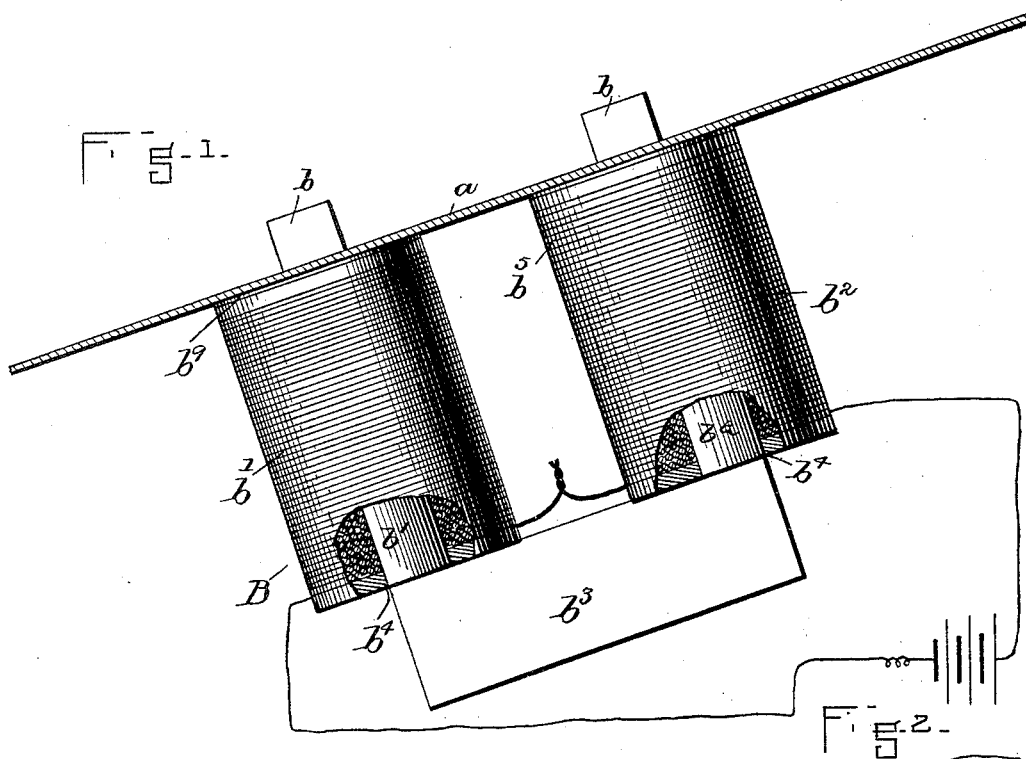


C. H. ATKINS.

MAGNETIC SEPARATOR FOR PAPER PULP.

No. 454,555.

Patented June 23, 1891.



WITNESSES.

J. W. Golan
Fred. B. Deane.

INVENTOR.

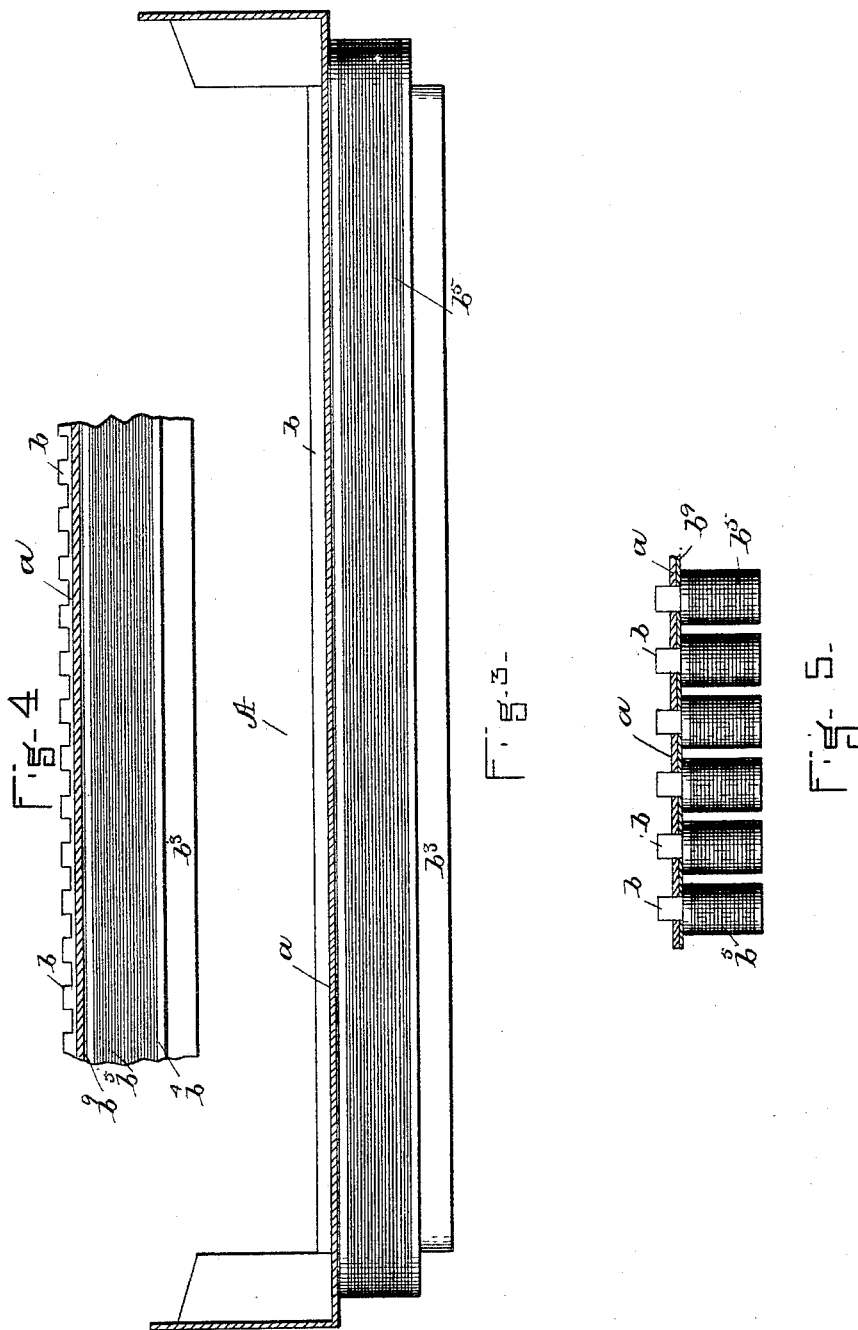
Chas. H. Atkins
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J. W. Dolan
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UNITED STATES PATENT OFFICE.

CHARLES H. ATKINS, OF PALMER, MASSACHUSETTS.

MAGNETIC SEPARATOR FOR PAPER-PULP.

SPECIFICATION forming part of Letters Patent No. 454,555, dated June 23, 1891.

Application filed August 11, 1890. Serial No. 361,606. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. ATKINS, of Palmer, in the county of Hampden and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Apparatus for Separating Iron from Paper-Stock, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

This invention is an improvement upon that described in my patent, No. 393,348, dated November 27, 1888, and it relates especially to the manner of employing or using a magnet as a separating device in connection with the trough through which the pulp passes from the pulp-vats of the pulping-engine to the pulp-vat of the paper-making machine. In my said patented invention I have described the bottom of the trough as provided with depressions or riffles extending across the same from side to side, which riffles are filled with mercury and have represented the magnet as below the bottom of the trough and not extending continuously its width.

My present invention is an improvement, in that I do not form in the bottom of the trough the depressions or riffles, and in that I do not use mercury, and in that I apply to the upper surface of the bottom of the trough one or more metal bars which extend across the same from side to side, and which are connected with a magnet or magnets beneath the trough, and which extend practically the full width of the trough. These bars being thus magnetized serve two purposes: first, to form riffles upon the upper surface of the bottom of the trough, and, second, to make a continuous magnetic field across the trough from side to side above its bottom and against and over which the pulp flows, so that all portions of the pulp are brought within the field of attraction of this magnetized bar or bars. I prefer, as a rule, to employ two of these bars and one magnet.

In the drawings, Figure 1 represents a view in longitudinal section of a section of the trough and of the magnetized cross-bars upon the upper surface of the bottom of the trough and the magnet in side elevation. Fig. 2 is a plan view of the bottom of the trough and of the bars.

Fig. 3 is a view in section across the trough from side to side and of the magnet. Figs. 4 and 5 illustrate modified forms of the device, to which reference is hereinafter made.

In the drawings, A represents the trough through which the pulp passes from the pulp-engines to the paper-making machine. The trough, which is necessarily water-tight, is inclined and the pulp flows by gravity through it. The bottom *a* of the trough is preferably composed of copper. Extending across the trough from side to side and resting upon the bottom *a* are two bars *b* of metal, preferably soft iron. These bars *b* are placed over a magnet B below the bottom *a* of the trough and extending across the same from side to side and in fact form the poles of the magnet.

The magnet is represented as constructed in the following manner, viz: from two bars *b'* *b''* of soft iron, extending the full width of the trough and mounted upon a cast-iron block or yoke-piece *b'''*. There is interposed between each of the bars *b'* *b''* and the block or yoke-piece *b'''* a thin bar *b''''* of iron. The bars *b'* *b''* are wound lengthwise with wire *b''''* to form long narrow coils, and upon the upper edge of each bar and the coil about it is placed a piece of sheet-brass. This provides a long magnet extending from one side of the trough to the other. It is so secured in place as to bring its poles below the bars *b* above the bottom of the trough, and it is connected with a dynamo-machine or other source of electric energy. I would say, however, that I do not confine my invention to this especial manner of magnetizing the cross-bars *b*, although I consider it a very desirable way of so doing, and I may use as many of the cross-bars above the bottom of the trough as may be desired, although, as a rule, I consider that two are sufficient.

In operation the pulp flowing through the trough is opposed by the cross-bars and caused to flow over the same, and its course is thereby interrupted, the pulp caused to be broken up to such an extent that practically all portions thereof are brought into close contact with the bars, either by striking against them or in passing in thin sheets over them, so that all sections of the pulp are brought within the field of attraction of the magnetized bars,

and the iron particles are thereby attracted and drawn from the pulp and retained by the bars.

5 It will be understood that the bars *b*, instead of being made plain—that is, of uniform vertical extent, as in Fig. 3—may be provided with rectangular depressions or notches, as in Fig. 4.

10 In Fig. 5 I have shown, instead of one long magnet extending the width of the trough, a series of independent magnets, the cores of which are extended through the bottom of the trough and sufficiently above it to form a series of interrupting bars or projections, 15 which interrupt the flow of the pulp, separate it, and which are also magnetized.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

20 1. In an apparatus of the character specified, the combination, with the conveying-trough, of the magnetized bar or bars *b* within the trough and resting upon and extending across the bottom of the same from side 25 to side and constituting riffle-like obstructions against and over which the pulp flows, as and for the purposes set forth.

2. The combination, with the inclined

trough having the bottom *a*, as set forth, of the overlying bar or bars *b*, extending across 30 the bottom of the trough from side to side thereof, and the electro-magnet B below the bottom of the trough and serving to magnetize the bar or bars *b* within it, substantially as described. 35

3. The combination, with the bottom *a* of the inclined trough A, of the metallic bar or bars *b* upon such bottom, and the magnet B, comprising the block or yoke-piece *b*³, and the long bars *b'* *b*², extending practically across 40 the trough, wound with wire, mounted upon the yoke-piece *b*³, connected with the bar or bars *b*, and adapted to be connected with an electric generator, substantially as and for the purposes specified. 45

4. In combination with a pulp-conveying trough and with magnetizable bars within the same, energizing-coils located beneath the trough and adapted to be connected with a source of electricity, substantially as de- 50 scribed and shown.

CHARLES H. ATKINS.

Witnesses:

F. F. RAYMOND, 2d.,

J. M. DOLAN.