No. 703,329. Patented June 24, 1902.

J. C. WINDER.

MAGNETIC SEPARATOR.

(Application filed Mar. 25, 1902.)

(No Model.)

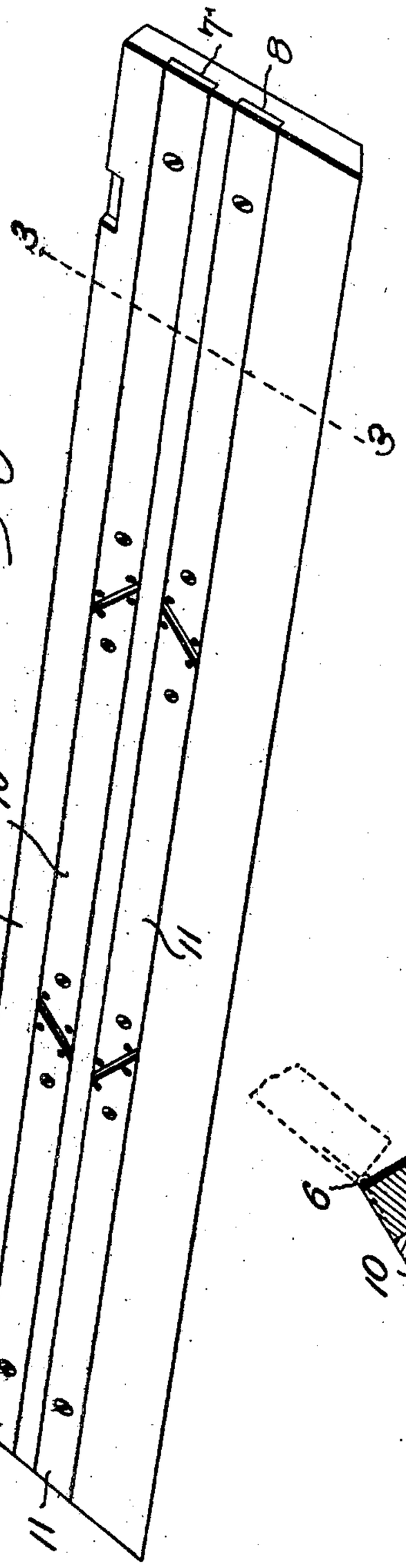

Fig. 1.

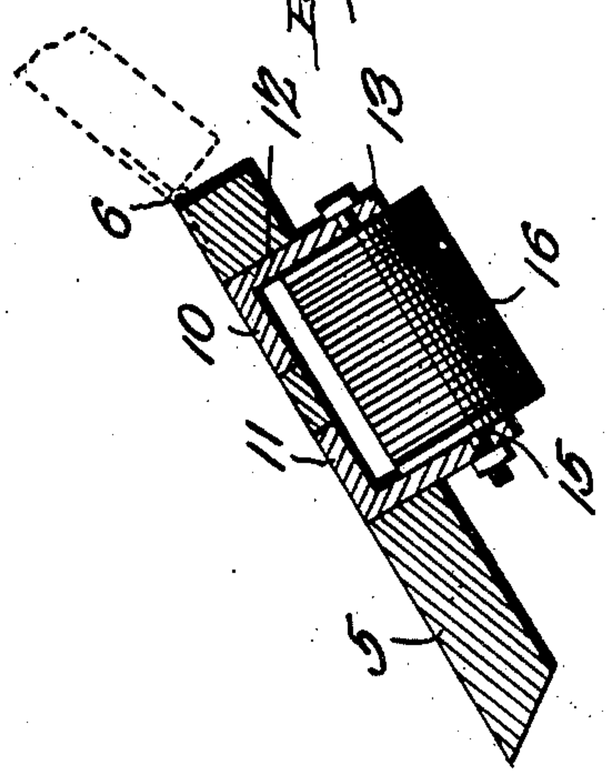

Fig. 3.

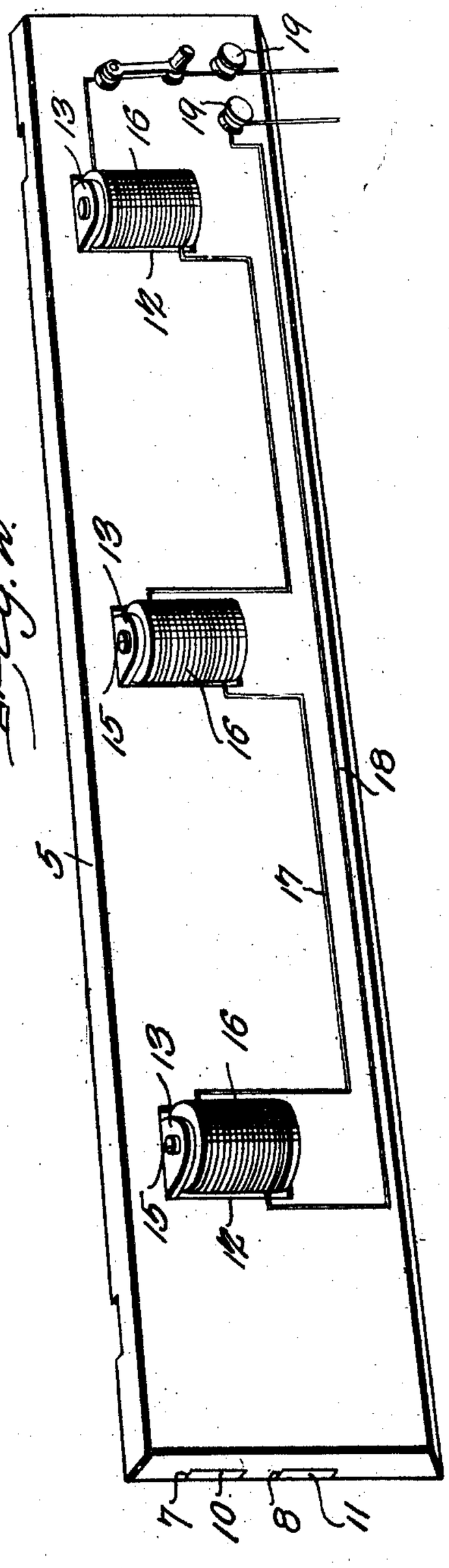

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

JAMES C. WINDER, OF EASTPOINT, GEORGIA, ASSIGNOR OF ONE-HALF TO DANIEL C. LYLE, OF EASTPOINT, GEORGIA.

MAGNETIC SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 703,329, dated June 24, 1902.

Application filed March 25, 1902. Serial No. 99,914. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. WINDER, a citizen of the United States, residing at Eastpoint, in the county of Fulton and State of Georgia, have invented a new and useful Magnetic Separator, of which the following is a specification.

My invention relates to certain improvements in magnetic separating devices of that class employed in connection with cotton-gins and similar machinery for the purpose of arresting all foreign metallic substances—such as nails, bolts, or scraps of metal—and preventing their passage into the machine along with material to be treated.

The principal object of the invention is to provide an improved device of this character in which both the cost of construction and expense of operation may be materially reduced and in which the entire width of the feed-board or similar device of a cotton-gin, linter, or huller may be protected by a comparatively weak electrical current and which may be applied to any of the usual forms of feed-boards at but slight expense.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claim.

In the drawings, Figure 1 is a perspective view of the upper or inner face of the feed-board of a cotton-gin or delinter, showing the application thereto of a plurality of magnetic bars arranged in pairs and forming the pole-pieces of a corresponding number of electromagnets. Fig. 2 is a similar view of the rear or lower face of the feed-board, illustrating the arrangement of the electromagnets and their connections. Fig. 3 is a transverse sectional elevation through one of the magnets and the feed-board on the line 3 3 of Fig. 1.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, 5 represents the inclined feed-board of a cotton-gin, delinter, or machine of similar character and having hinges 6 for connecting it to the casing of the machine. In the upper face of the board are formed two alining slots 7 and 8, separated by the material forming the board, said slots being adapted for the reception of a series of soft-iron plates forming the pole-pieces of a number of small electromagnets. The plates 10 in the grooves 7 represent the negative or north-seeking poles of the magnets, while the plates 11 in the grooves 8 represent the positive or south-seeking poles, the space between the two sets of plates being quite small, so that any metallic fragment—such as a piece of wire, nail, or tool—passing over the board will form an armature between two sets of plates. The slots extend transversely of the natural flow of material across the board, and the adjacent ends of the plates in each slot are arranged at such an angle to the line of travel of the material passing over the feed-board that there will be no dead space, such as would occur if the plates were separated on lines at a right angle to their length, any metallic particle, however small, being subjected to the action of the magnetized plates in passing over the board. In order not to interfere with the free passage of the material to be treated, the surfaces of the plates or pole-pieces are flush with the surface of the board and do not obstruct the flow of material in any way. In the board are formed a series of openings 12 of a number equal to the number of magnets employed, and through these openings extend metallic plates 13, which are mechanically and electrically connected to the plates 10 and 11. The side plates are mechanically and electrically connected to metallic cores 15, a core being employed for each set of plates or pole-pieces 10 and 11. The core, as usual, may be covered by insulating material, and on said core is wound an insulated metallic wire 16, the various coils being connected in series to wires 17 and 18, having binding-posts 19 at ene end of the feed-board for connection to a storage battery or other source of electrical energy.

In devices of this class as hitherto constructed it has been usual to employ two magnetic plates or pole-pieces extending continuously from end to end of the board, in combination with a core and coil of substantially the same length as the board, this be-

ing considered essential in order that the attractive force of the pole-pieces may be equal throughout their entire length. A construction of this kind not only renders necessary the construction of a special form of feed-board, but entails considerable expense in the construction of the enormous magnet employed, the feed-board and the magnet being several feet in length. Owing to the resistance of a magnet of this size, it becomes necessary to employ a dynamo or generator to energize it, it being impossible from a practical standpoint to employ a storage or other battery for the purpose. This feature is objectionable, owing not only to the constant expense of operation, but to the fact that when the mill shuts down from any reason the metallic particles which have accumulated at the magnetic poles are instantly released and pass into the machine in a body, the accumulated metallic matter being much more injurious than if a number of separate pieces were allowed to pass at intervals into the machine. In carrying out my invention I am enabled to attain the desired result by a comparatively weak electrical current, owing to the smaller resistance of the series of electric magnets and the fact that the reduction in length of the pole-pieces renders it possible to employ a smaller current. The device may be applied to any form of feed-board by simply slotting the upper face thereof and forming the openings 12 for the passage of the side plates 13, while the employment of ordinary electromagnets greatly reduces the cost of manufacture and installation, as well as the expense of subsequent operation. In mills which ordinarily are run during the whole twenty-four hours of a day and electric lights are employed at night the storage batteries may be charged during the night and used during the day, while at the same time the shutting down of the mill will not deënergize the magnets and release the accumulated particles of metal.

While the construction herein described, and illustrated in the accompanying drawings, is the preferred form of the device, it is obvious that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, what I claim is—

In a device of the class specified, the combination with the feed-board having on its upper face two slots 7 and 8 arranged transversely of the natural flow of the material crossing the board, pole-pieces arranged in said slots with their working faces flush with that of the board, there being a plurality of sets of pole-pieces, each having oblique ends and the adjacent ends being arranged in such contiguity as to insure contact with said pieces of all of the material passing over the board, magnet-cores, side plates connected to the cores and to the pole-pieces, and core-windings connected in series, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAMES C. WINDER.

Witnesses:
T. R. LILLY,
T. J. AVERY.