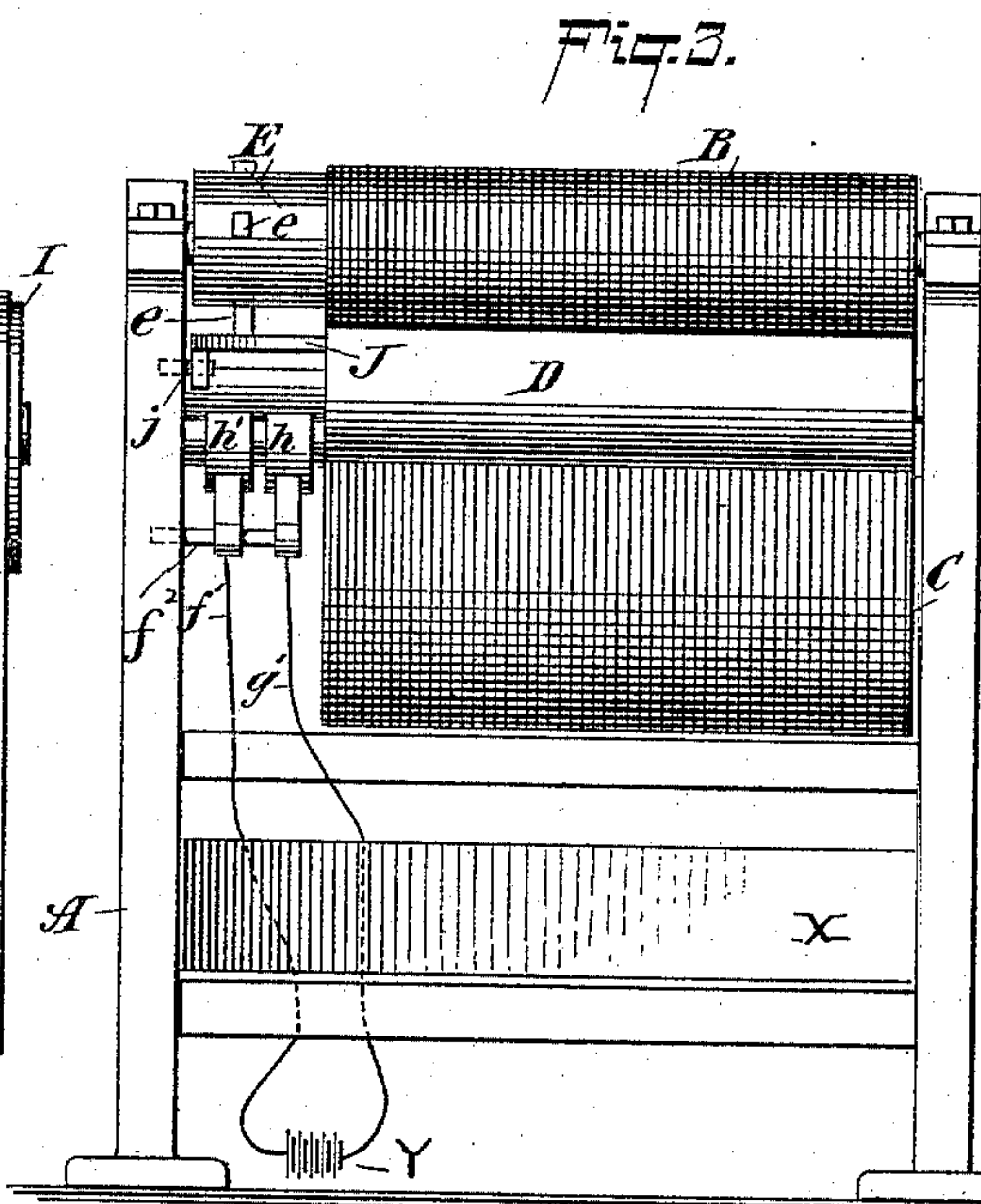
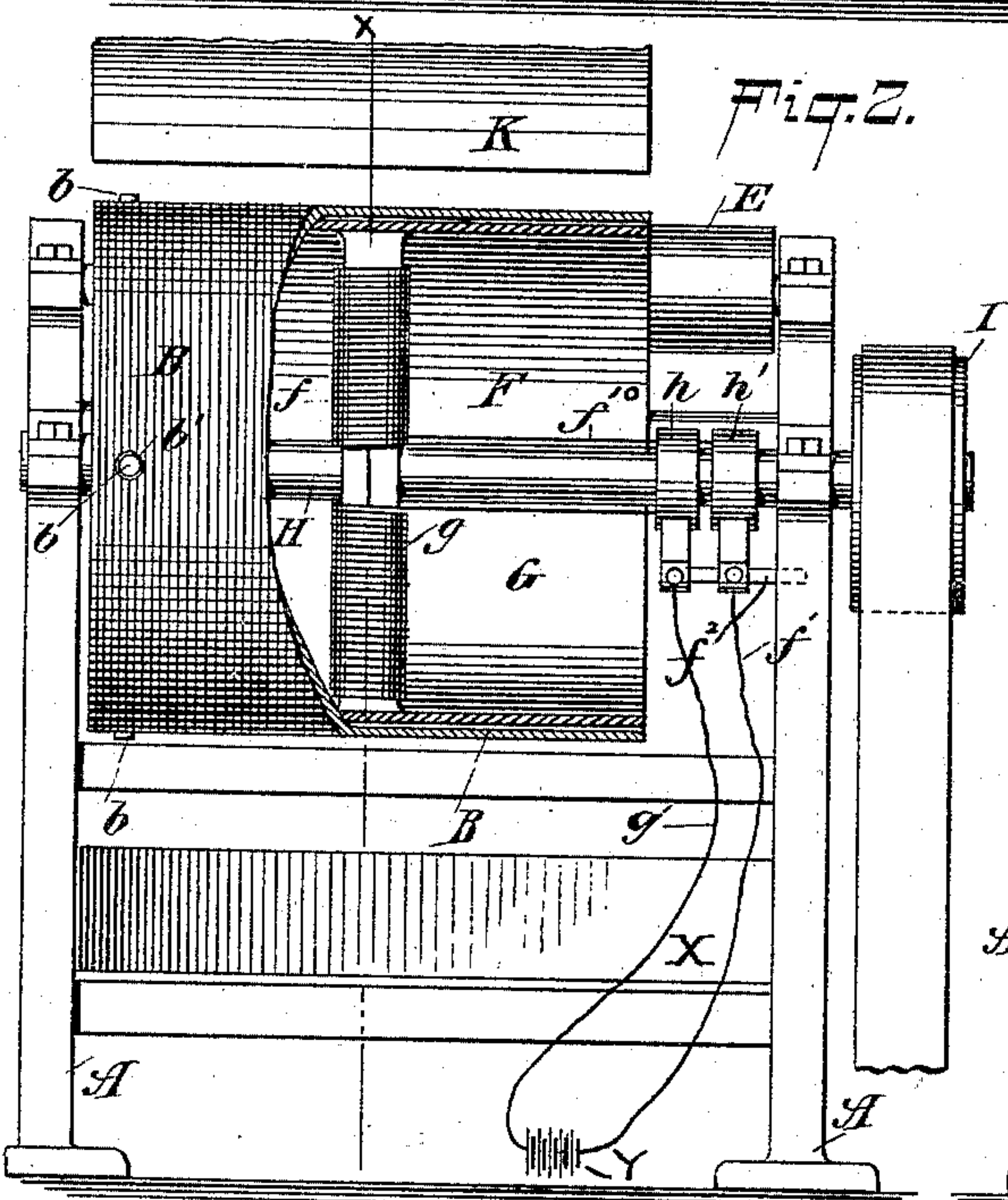
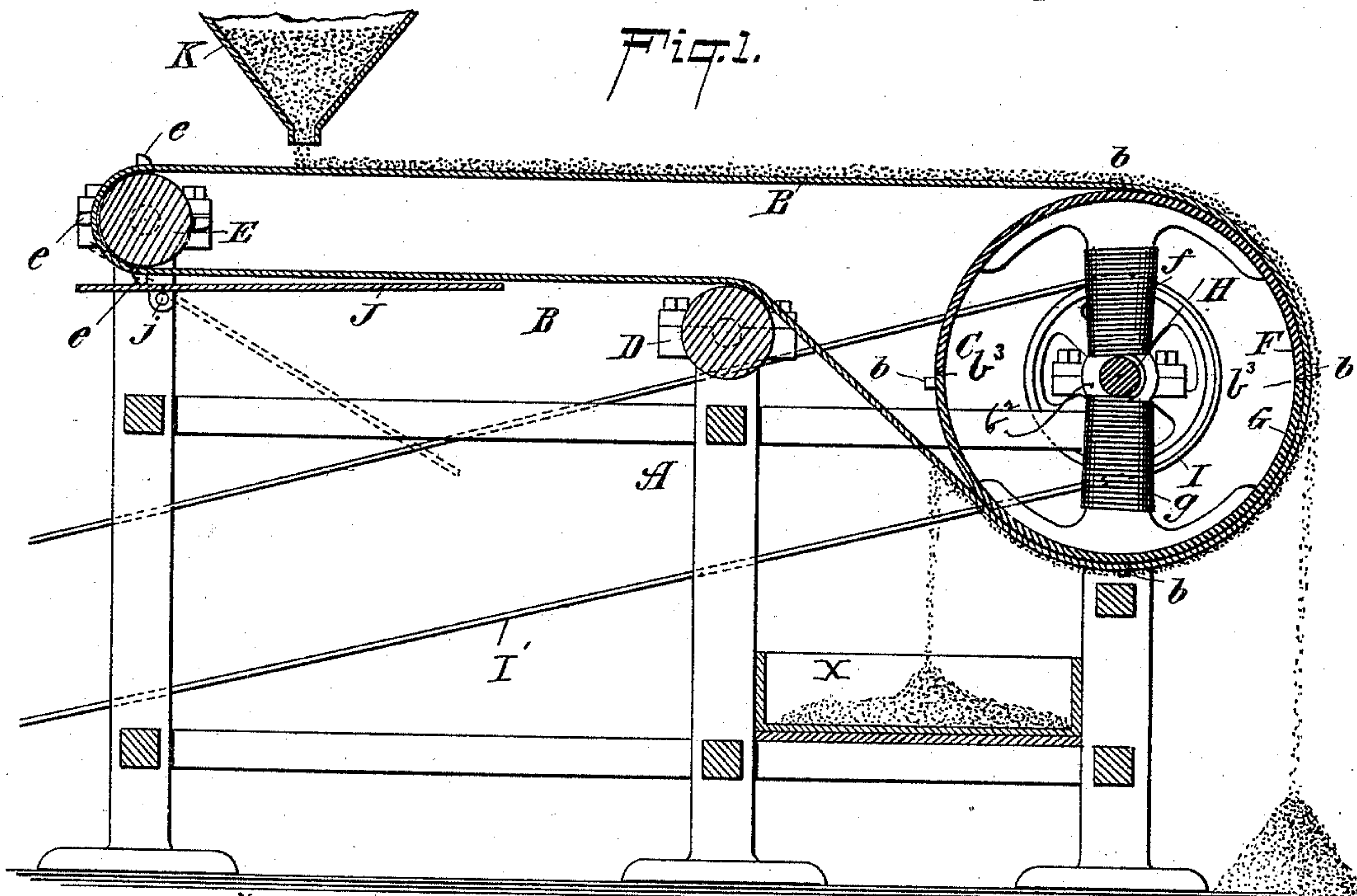


(No Model.)

G. G. CROSBY.
MAGNETIC ORE SEPARATOR.

No. 495,608.

Patented Apr. 18, 1893.



WITNESSES:

William Goebel.
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UNITED STATES PATENT OFFICE.

GEORGE GROSVENOR CROSBY, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE MAGNETIC ORE MILLING COMPANY, OF WEST VIRGINIA.

MAGNETIC ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 495,608, dated April 18, 1893.

Application filed January 27, 1892. Serial No. 419,379. (No model.)

To all whom it may concern:

Be it known that I, GEORGE GROSVENOR CROSBY, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented a certain new and useful Improved Magnetic Ore-Separator, of which the following is a specification.

My invention relates to an improved apparatus for separating magnetic from non-magnetic substances when in a pulverized condition.

The object of the same is to provide a device which will be more certain and effective in its operation of separating the substances than those now in use and with these ends in view, my invention consists in certain novel features of construction as hereinafter fully described and specifically pointed out in the claims.

In the accompanying drawings, Figure 1, is a sectional view of my improved device. Fig. 2 is an end view, a portion of the drum and the belt being broken away to show the detailed construction of several of the parts. Fig. 3 is a view from the opposite end of the machine.

Referring to the drawings A represents a suitable support or frame of non-magnetic material, preferably of wood, having bearings secured thereto in which is journaled the shaft H of a magnetic wheel or drum C. This wheel C is magnetized in any suitable manner, but in the present case I have shown it constructed of two sections, F and G, rigidly secured together, their adjacent edges being separated by some suitable insulating or non-magnetic material b^3 . The spokes of the wheel, or drum C, are wrapped with suitable wires, f, g , and where joined to the sections F, G, are carried around for quite a distance on the under surface thereof for the purpose of strongly magnetizing said sections. The shaft H to which the said wheel or drum is secured is fitted in non-magnetic bearing and has a collar or sleeve f^{10} , surrounding or incasing the same to within a short distance of its outer end for the purpose of, preventing as far as possible the magnetization of the shaft H. Inside of the frame and on the shaft

H are located two small commutators $h h'$, which are insulated from said shaft by hard rubber, vulcanized fiber, or other suitable material. Attached to the frame is a piece of vulcanized fiber f^2 to which are secured two brushes which are pressed against the commutator to convey to the wire around the spokes of the wheel the necessary electrical current to magnetize said wheel to a sufficient degree as will hereinafter be described, the current being transmitted from a battery or dynamo Y by means of wires $f' g'$. To the shaft H is also secured a pulley I through which and the belt I', the motion is imparted to the wheel or drum C. To the frame A are also secured bearings in which are journaled the rollers or drums D, E, over which former and around which latter travels an endless belt or apron B, which belt also travels around the magnetized drum or wheel C, and is formed of some non-magnetic material such as canvas, leather, &c.; upon motion being imparted to the magnetic wheel C the endless belt or carrier B passes over the lower roller D and around the roller E as shown in Fig. 1 of the drawings. For the purpose of preventing this belt or carrier from slipping upon the drum or magnetized wheel C, I have formed on the latter the lugs or projections b , adapted to enter openings formed in the endless apron to receive the same, which openings if desired may receive eyelets or similar devices b' of non-magnetic metal for the purpose of preventing the tearing or enlargement thereof.

Above the belt or carrier B is located a hopper K, of sufficient size to contain a quantity of the substance or material to be treated, and in the bottom of which is formed an opening, the size of which may be regulated by any suitable means in order to control or regulate the feed of the pulverized substance to the apron B.

Below the roller E and attached to the frame is a striker J, pivoted at j and adapted to be so engaged by the lugs or projections e , formed upon the roller E as to be raised or lowered, thereby constantly striking the under portion or side of the apron B for the purpose of detaching or knocking off any small particles of metal that may adhere to the belt B.

Having thus described the construction of my improved device, I will now set forth its operation. The hopper K having been filled with the substance to be treated, and which is in a pulverized condition, the slot at the bottom thereof is regulated to permit of the proper feed or flow of the substance upon the moving belt or carrier B. This apron or belt traveling around the magnetized drum or wheel C, brings the substance under the magnetic influence thereof, the result being that the iron, steel or other magnetic particles are caught and held on to the belt by said magnetism and are carried around with the belt until the latter is so far separated from the wheel or drum C that said clinging particles no longer remain within or under the influence of said wheel or drum C and at which time they will fall or drop by gravity into a receptacle X provided for that purpose. It will of course be understood that when the wheel C carries the substance or material over the side thereof, the non-magnetic particles will fall of their own weight (aided by the momentum given them by the movement of the belt), into a bin or receptacle provided for that purpose, (not shown) as illustrated in Fig. 1 of the drawings, the magnetic particles, however, clinging to the belt as aforesaid, and completely and effectually separating therefrom. If any particles should adhere to the belt, they are dislodged therefrom by means of the striker J beating against the under side of the apron B as before described.

Another source of trouble and a very important one is that if the magnets are slightly overcharged, it enlarges the magnetic field through which the substance passes, and draws the magnetic particles to the magnets to which they cling and accumulate so rapidly that all the sand, iron and other materials are mixed together until it becomes so heavy that the whole mass falls into the receptacle for the non-magnetic particles, thus losing a very large percentage of the iron, or magnetic particles.

In my separator the holding of non-magnetic particles by the magnetized wheel or drum is simply impossible for the reason that as soon as the ore drops from the hopper onto the belt, it is shaken apart by the motion of the belt and by the time that it arrives at the wheel and before it becomes subjected to the influence thereof, the particles, magnetic or

non-magnetic, are separated or loosened and free to move, one upon or away from the other; the magnetic particles being held to the belt by the influence of the magnetized wheel or drum, are carried to a point where the belt is so far separated from the magnetized wheel C that they fall outside of the magnetic field, whereas, the foreign or non-magnetic particles are free and drop of their own weight as soon as the wheel or drum C revolves to a point where they will slide from the apron or carrier.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for separating magnetic from non-magnetic particles, a magnetized drum or wheel constructed in two sections separated by non-magnetic substance, and having a wire or wires coiled around the spoke or spokes of said wheel or drum, for the purpose of conducting the current of electricity to and thus magnetizing the same, in combination with a pulley, an endless apron passing around the drum and pulley, and a feeding hopper located over the belt near said pulley, substantially as described.

2. A machine constructed for the purpose of separating magnetic from non-magnetic substances and provided with a magnetized drum or wheel, constructed of two parts F, G, separated by insulating material and having a spoke or spokes thereof, wrapped with wire, said wheel being mounted upon an insulated shaft adapted and arranged to convey electricity to and magnetize said drum, in combination with a pulley, an endless apron passing around the drum and pulley, and a feeding hopper located over the belt near said pulley, substantially as described.

3. In a machine for separating magnetic from non-magnetic substances, the combination with a magnetized drum C, of rollers D, E an apron B and an arm or beater J, the several parts being constructed and arranged to operate in a manner and for the purpose substantially as described.

Signed at New York, in the county of New York and State of New York, this 25th day of November, A. D. 1891.

GEORGE GROSVENOR CROSBY.

Witnesses:

ROBERT DOUGLAS BUCHANAN,
RICHARD LIPS.