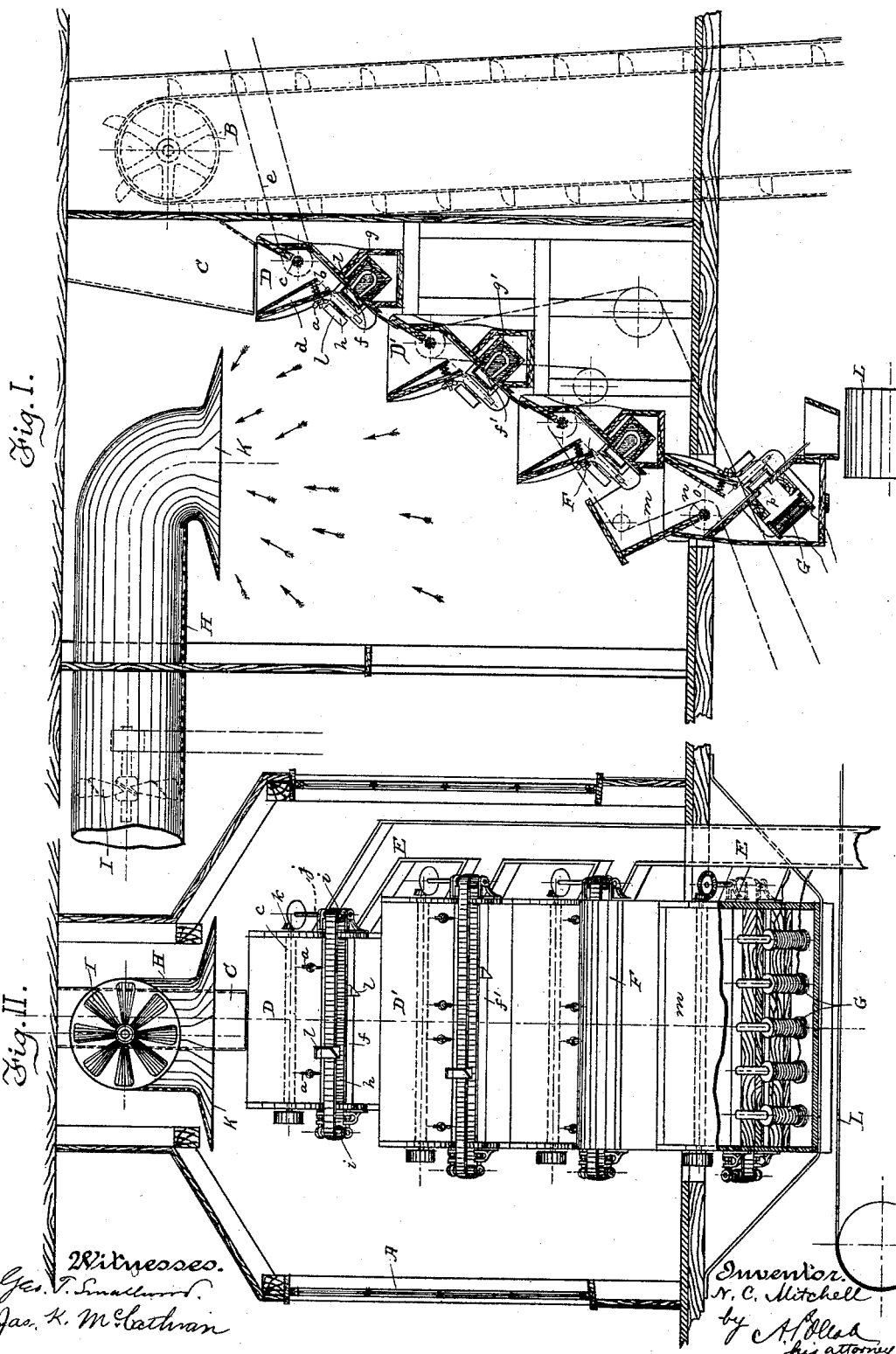


(No Model.)

N. C. MITCHELL.
MAGNETIC RUBBER STOCK CLEANER.

No. 418,041.

Patented Dec. 24, 1889.



UNITED STATES PATENT OFFICE.

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MAGNETIC RUBBER-STOCK CLEANER.

SPECIFICATION forming part of Letters Patent No. 418,041, dated December 24, 1889.

Application filed September 20, 1889. Serial No. 324,579. (No model.)

To all whom it may concern:

Be it known that I, NATHANIEL C. MITCHELL, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Treating Old Rubber Stock to Remove Magnetic Substances, which improvement is fully set forth in the following specification.

10 This invention relates to the recovery of rubber in a marketable form from old rubber stock, such as boots and shoes, and has special reference to the process of separating the rubber from certain foreign substances. The
15 old stock, after being passed through cracker-rolls, by which it is reduced to small pieces or scraps, usually contains particles of iron, as nails, stiffeners, bits of buckles, and the like. It is desirable that such substances be
20 removed before proceeding farther with the treatment of the stock to destroy and separate the fiber, whether this be done by treatment with acid or by the well-known alkaline process or by grinding and separating by
25 means of an air-blast. It has been attempted heretofore to effect such separation by means of ordinary magnetic separators; but such attempts have not been entirely successful, and have resulted only in the partial removal of
30 the magnetic particles. I have found that by the arrangement of magnets hereinafter described this separation can be effected in a thorough manner. According to this invention the mass to be treated is fed from a
35 chute across a series of three permanent magnets, and afterward through the field of an electro-magnet, the magnets being arranged one above another. By these means the metallic particles are arrested, and they are
40 removed and collected by wipers, which travel continuously across the faces of the magnets. The magnets are all inclosed in a casing which is practically air-tight, and at the upper part of this chamber is arranged a large
45 pipe having a flaring mouth, the pipe being provided with an exhaust-fan, by means of which the fine particles of dust in the rubber are sucked out. This device has an important effect upon the rubber, and greatly
50 diminishes the difficulty in the operation of treating the stock to disintegrate and separate

the fibrous matters. It also prevents accumulation of dust on the working parts of the apparatus.

In the drawings, Figure I is a central vertical section through the apparatus, and Fig. II a front elevation, partly in section.

A represents the casing, forming a chamber, in which the apparatus is set.

B is an elevator, by which the stock reduced to small fragments is fed into a chute C. From this it falls into a hopper D, provided with an inclined throat-plate *d*, adjustable by means of thumb-screws *a*, so as to regulate the size of the discharge-outlet of the hopper. Plate *d* is supported by a spring *b*, so that it is capable of yielding to the pressure of the mass passing through the outlet. In this outlet is arranged a fluted roller *c*, driven by a belt *e*, whereby a regular feed of the stock is maintained. The stock passes by gravity across the inclined plate *f*, of iron or steel, which is rendered magnetic by a series of permanent horseshoe-magnets *g*, and this plate will arrest a portion of the magnetic particles contained in the mass. Above plate *f*, and parallel therewith, is an endless belt *h*, mounted on rollers *i*. Motion is communicated to the shaft *j* of one of these rollers by means of bevel-gears *k* from the shaft of fluted roller *c*. Belt *h* carries wipers *l*, which travel across the magnetized plate *f* and carry off the particles that adhere thereto, dropping them into a chute E. The machine as thus far described is of known construction. The stock which passes plate *f* falls into another hopper D', similar in construction to hopper D, and a further elimination of magnetic particles is effected by a plate *f'*, magnetized by magnets *g'*. A third separator F, identical in construction with the first, and therefore requiring no particular description, is arranged beneath the others. Passing from this, the stock strikes against a plate *m*, inclined nearly at a right angle to the plane of motion of the stock through the first three separators. A fluted roller *n* at the lower end of this plate feeds the stock past a throat-plate *o*, similar to that above described, and the mass slides by gravity across a magnetic plate *p*. Plate *p* is magnetized by a series of electro-magnets G

in circuit with a dynamo or other source of electrical energy. This arrangement of permanent and electro-magnetic separators in series, as described, is found to act very efficiently in eliminating all magnetic particles from the stock, which particles are all collected by the wiper mechanism with which each separator is provided, and deposited in the chute E. In passing from one separator to another, and particularly in passing to the last of the series, the stock is somewhat shaken up and its particles are shifted among themselves, so that each separator of the series acts upon a different part of the mass from the next preceding. At the upper end of chamber A is arranged a large pipe H, provided with an exhaust-fan I, and having a flaring mouth K, which overhangs the series of separators. A gentle exhaust is maintained by fan I, which sucks out the fine dust, a great quantity of which is liberated from the mass under treatment as it falls from one separator into the next. The arrangement of the exhaust-pipe described and shown is found to be of great importance. If the suction apparatus were arranged to act directly upon the hopper of one of the separators, it would entail great loss of rubber particles, as experience has shown; but by inclosing the series of separators in a close chamber and placing the exhaust-pipe at the upper part thereof, with its mouth overhanging the several separators, a great quantity of dust and

dirt is carried away without removing any of the rubber. From the electro-magnetic separator the stock, now thoroughly freed from magnetic particles, falls upon the feed-belt L, which forms part of the apparatus described in my application filed September 20, 1889, No. 324,580.

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

1. In an apparatus of the character specified, the combination, with a series of inclined plates, one above the other, magnetized by permanent magnets, of a similar plate magnetized by an electro-magnet, the last-named plate being set at an angle oblique to the plane of the plate next above it, substantially as described.

2. The combination, with a series of magnetic separators arranged for successive action upon the stock, said separators being inclosed in a casing, of a pipe having its mouth overhanging the separators, and an air-exhausting device in said pipe, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

NATHANIEL C. MITCHELL.

Witnesses:

PHILIP MAURO,
C. W. CROASDILL.