

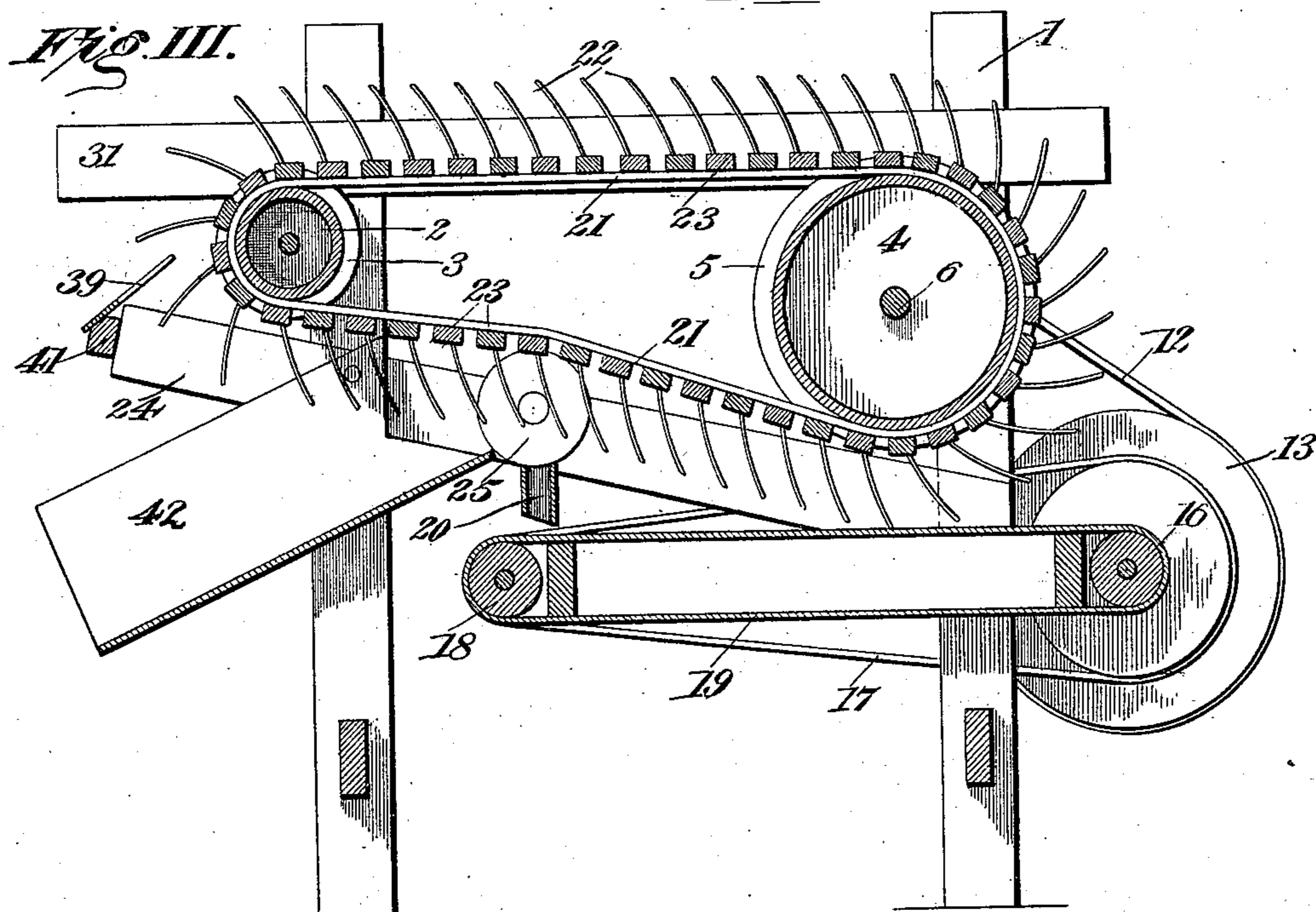
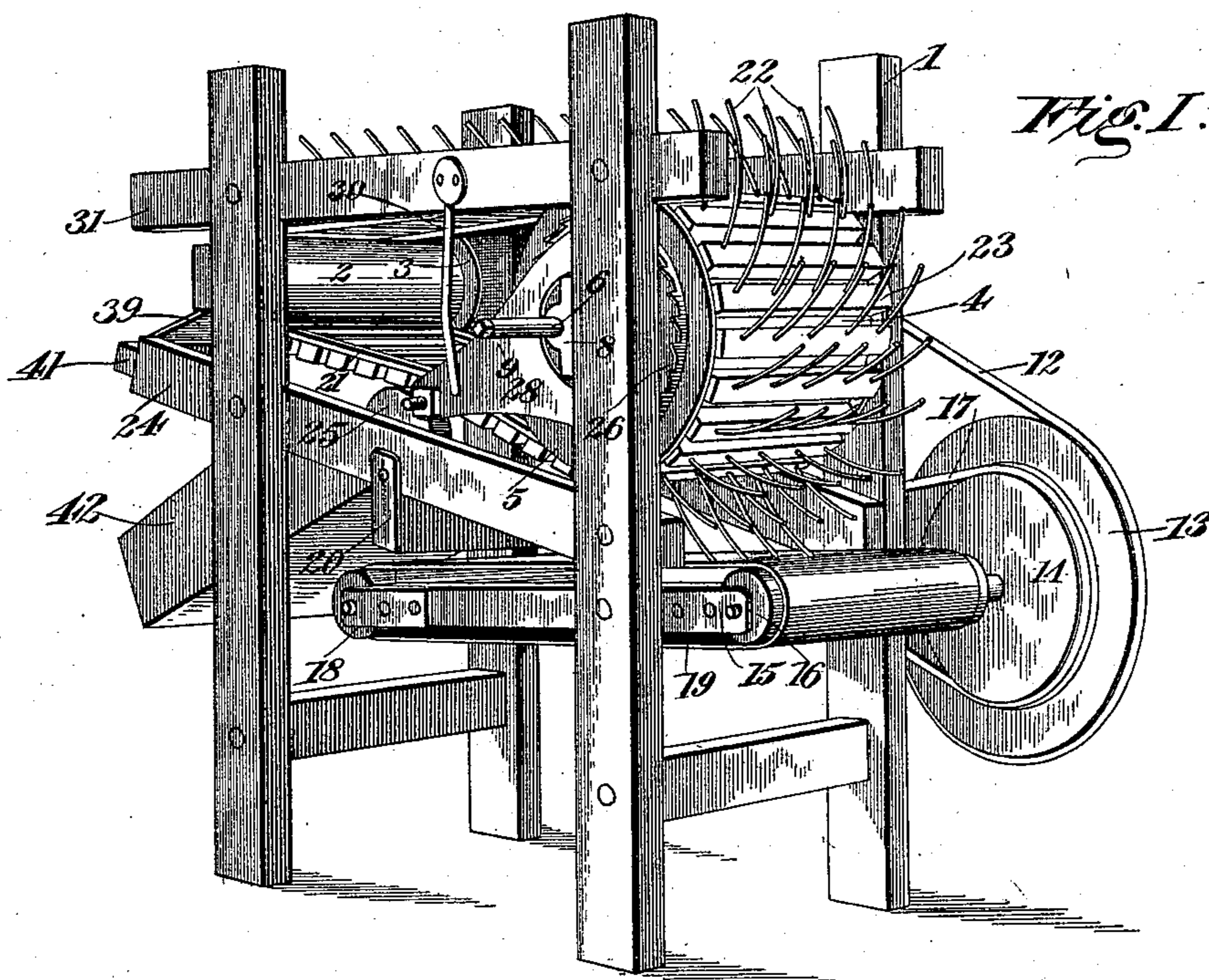
(No Model.)

2 Sheets—Sheet 1.

O. M. GRAVES.
MAGNETIC ORE SEPARATOR.

No. 557,121.

Patented Mar. 31, 1896.



WITNESSES

M. E. Fowler
L. M. Macken

INVENTOR

Oriel M. Graves
By Joseph H. Atkins
Attorney.

(No Model.)

2 Sheets—Sheet 2.

O. M. GRAVES.
MAGNETIC ORE SEPARATOR.

No. 557,121.

Patented Mar. 31, 1896.

Fig. II.

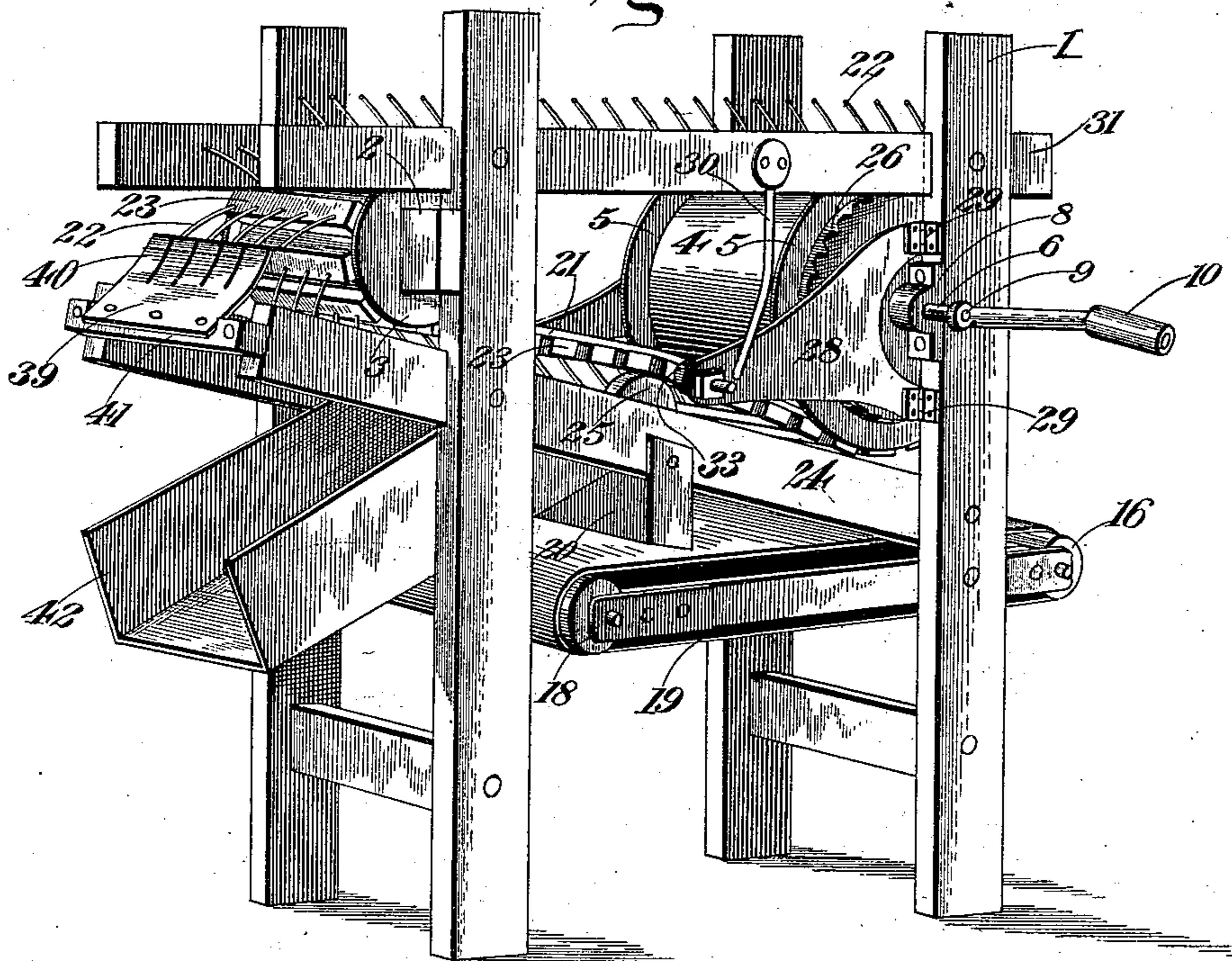
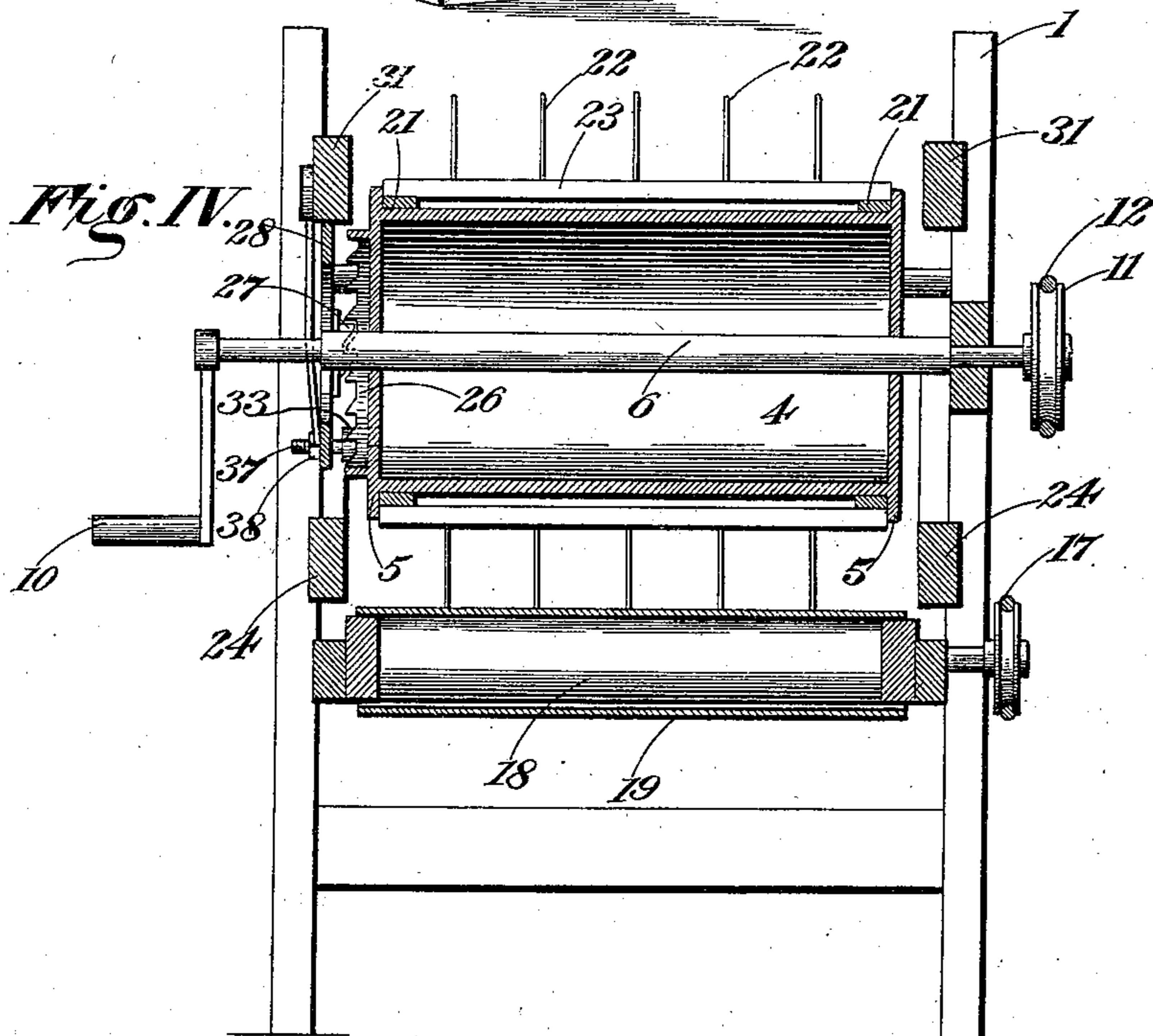


Fig. IV.



WITNESSES

M. E. Fowler
S. M. McKee

INVENTOR

Oriel M. Graves
By Joseph H. Atkins
Attorney

UNITED STATES PATENT OFFICE.

ORIEL M. GRAVES, OF NORTH YAKIMA, WASHINGTON.

MAGNETIC ORE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 557,121, dated March 31, 1896.

Application filed June 17, 1895. Serial No. 553,064. (No model.)

To all whom it may concern:

Be it known that I, ORIEL M. GRAVES, of North Yakima, county of Yakima, State of Washington, have invented certain new and
5 useful Improvements in Magnetic Ore-Separators, of which the following is a specification, reference being had to the accompanying drawings.

The object of my invention is to produce
10 an improved device for separating gold from black sand or other material containing magnetic ore particles.

In the accompanying drawings, Figure I is a perspective view taken at one angle of my
15 machine. Fig. II is a similar view taken at another angle. Fig. III is a central vertical longitudinal section of my machine. Fig. IV is a transverse section thereof, designed to illustrate the details of the hammer and ham-
20 mer-actuating mechanism.

Referring to the figures on the drawings, 1 indicates a frame of suitable shape, size, and dimensions. It carries, preferably in its upper part, a roller 2, that is preferably provided
25 with terminal guide-flanges 3, and on its opposite side the frame carries a drum 4, that is preferably larger than the roller 2, the drum being also preferably provided with terminal retaining-flanges 5. The shaft 6 of the drum
30 is preferably prolonged at its ends through its boxings 8, so as to provide on one end a squared extremity 9, to which, for example, power may be applied as by a hand-crank 10. The other end carries a pulley 11, which, as by
35 a belt 12, is designed to communicate motion to a pulley 13, that is secured to the end of a shaft 14, working in bearings 15 and actuating a roller 16. The pulley 13 may be made double-faced, so as to drive, as by a belt 17, a
40 roller 18, that communicates with the roller 16 to drive an endless conveyer 19.

20 indicates a feed-chute that is adapted to deposit commingled sand and gold upon the top of the endless conveyer 19.

In the machine I provide a needle-carrier, which preferably consists of straps 21 passing
45 around the roller 2 and drum 4. To the straps are secured at regular narrow intervals parallel slats or ribs 23, the whole constituting
50 in effect an endless belt.

Upon cross-pieces 24 in the frame, wheels
25 support the slats of the belt in their move-

ment over them, so that they may clear the end of the chute 20. Each of the slats is provided with a series of steel spines or needles
55 22, which are of sufficient length, when the machine is in operation, to brush the surface of the endless conveyer 19. The end of the drum 4 is provided with a projecting annular ratchet-flange or boss 26, whose teeth work
60 against the rack-plate 27 of a hammer-plate 28, which is vertically hinged, as indicated at 29, to one of the frame-posts.

A spring 30, secured at its upper end to the cross-piece 31 of the frame and bearing at its
65 lower end against the hammer-plate, tends to keep the rack-plate in engagement with the teeth of the ratchet-flange. Therefore when the drum is rotated the hammer-plate is vibrated upon its hinges and by the aid of a
70 hammer-head 33, located opposite the ends of the ribs 23, imparts to each a slight tap, the teeth of the ratchet being adjusted to bring the stroke of the hammer opposite to each of the slats.
75

In order to regulate the stroke of the hammer-head upon the ends of the slats, I prefer to construct it with a bolt-shank 37 and nuts
38, by which its position may be adjusted to
80 or from the slats, as required.

39 indicates a cleaning-apron, which may be made of heavy rubber belting or the like and slitted, so that a finger 40 comes opposite
85 each of the needles. The apron is located on a transverse piece 41 at the end of the machine, and, as the needles pass against it, it cleans them of any particles of attractable ore which they hold and causes them to drop upon a discharge-chute 42.

In practice the needles are magnetized by
90 passing over them a magnet of suitable construction and in the well-known manner of producing a permanent magnet. The machine is then set in motion, the ore to be separated being deposited through the chute 20
95 upon the surface of the endless conveyer 19. As the needles pass over the surface of the conveyer, they take up the attractable matter and with it some gold. The hammer, tapping the
100 ends of the slats successively, dislodges the gold and causes it to drop back upon the endless conveyer. The attractable ore is, however, retained and is not separated from the needles until they come in contact with the

fingers of the apron 39, when they are dis-
lodged and deposited in the chute 42, the needles being thereby cleaned and ready for the repetition of their function when they return
5 into contact with the surface of the endless conveyer 19.

The needles by use become gradually demagnetized; but their energy may be restored as often as required by the application of the
10 magnetizer.

What I claim is—

1. In a magnetic ore-separator, the combination with a frame and ore-conveyer, of an endless needle-carrier above the ore-con-
15 veyer, magnetic needles projecting from the carrier, and a vertically-pivoted oscillating hammer in operative proximity to the edge of the needle-carrier, substantially as specified.

2. In a magnetic ore-separator, the combination with a frame and ore-conveyer, of a drum and roller journaled above the conveyer, an endless needle-carrier passing around the drum and roller and provided with magnetic needles, and a vertically-pivoted
25 oscillating hammer-plate provided with a hammer-head in operative proximity to the edge of the needle-carrier, and cooperating projections upon the hammer-plate and drum, substantially as specified.

3. In a magnetic ore-separator, the combination with a frame and ore-conveyer, of a drum and roller journaled above the conveyer, an endless needle-carrier passing around the drum and roller and provided with
35 magnetic needles designed by the actuation of the drum to brush the conveyer, an intermittently-actuated hammer so located as to strike against the edge of the carrier adjacent to the conveyer to impart a lateral vibratory
40 motion to the needles while traversing the conveyer, an annular ratchet-flange upon one end of the drum, a cooperating rack-plate carried by the hammer, and a hammer-head adjustable at right angles to the hammer-
45 plate, substantially as specified.

4. In a magnetic ore-separator, the combination

with a frame and ore-conveyer, of a drum and roller, an endless needle-carrier passing around the drum and roller, magnetic needles upon the needle-carrier, a spring-actuated pivoted hammer-plate in operative
50 proximity to the edge of the needle-carrier, and cooperating projections upon the drum and hammer-plate designed to actuate the latter in opposition to the spring, substantially
55 as specified.

5. In a magnetic ore-separator, the combination with a frame, ore-conveyer and discharge-chute, of a drum journaled above the conveyer, a roller journaled above the discharge-chute, an endless needle-carrier passing around the drum and roller, needles projecting from the needle-carrier and constituting permanent magnets, a cleaning-apron located above the discharge-chute and designed
65 to detach the particles carried from the ore-conveyer by the magnetic needles, an oscillating hammer-plate provided with an adjustable hammer-head and with a rack-plate, and a ratchet-flange upon the drum cooperating
70 with the rack-plate to impart oscillatory motion to the hammer laterally to detach the gold or other diamagnetic particles from the needles, substantially as specified.

6. In a magnetic ore-separator, the combination with a frame and ore-conveyer, of an endless needle-carrier composed of straps and transverse parallel slats provided with magnetic needles, and an oscillating hammer-plate provided with a hammer-head in operative
80 proximity to the ends of the slats and cooperating projections upon the hammer-plate and drum designed to actuate the hammer to strike the ends of the slats, substantially
85 as specified.

In testimony of all which I have hereunto subscribed my name.

ORIEL M. GRAVES.

Witnesses:

J. M. NEWMAN,
N. L. JONES.