(No Model.) 2 Sheets—Sheet 1.

# J. P. CONKLING.

## MAGNETIC ORE SEPARATOR.

No. 451,370. Patented Apr. 28, 1891.

*Fig. 1.*

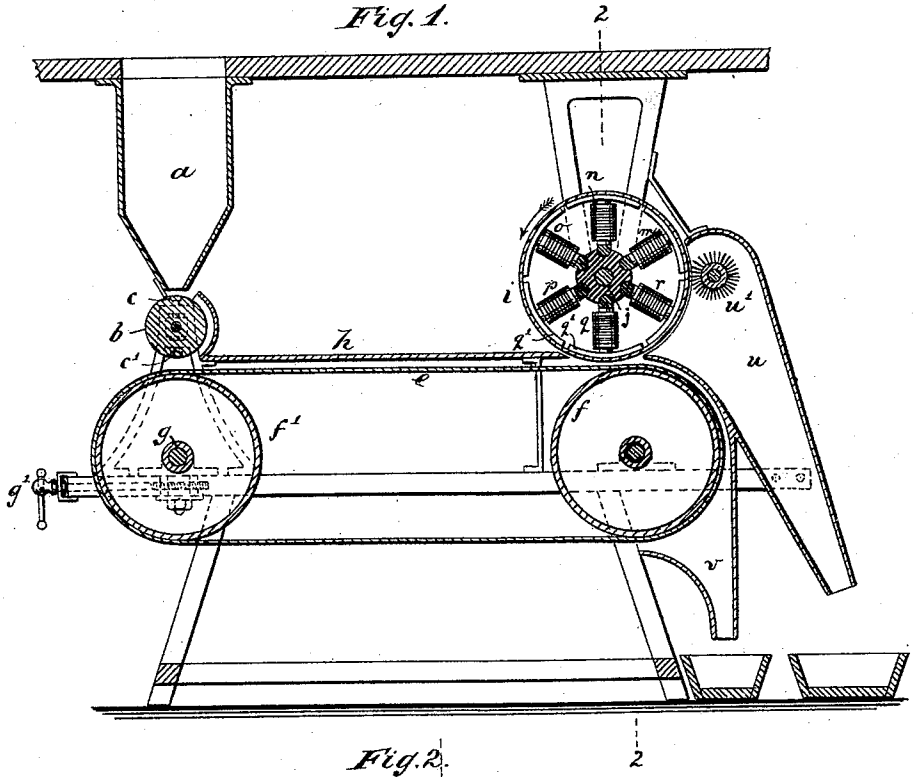



*Fig. 2.*

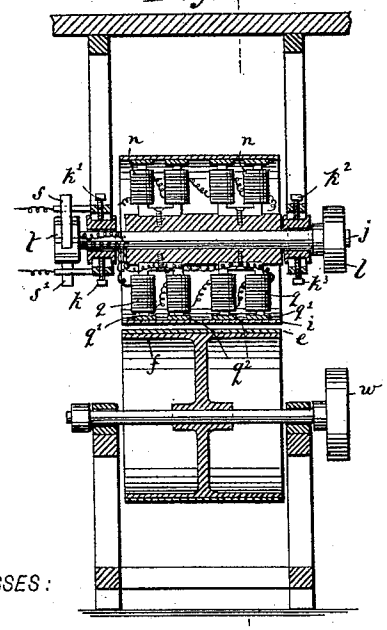
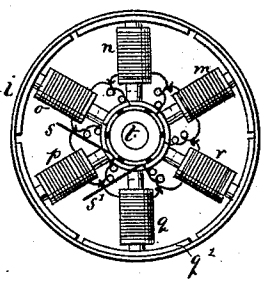



*Fig. 3.*

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William Keller

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ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

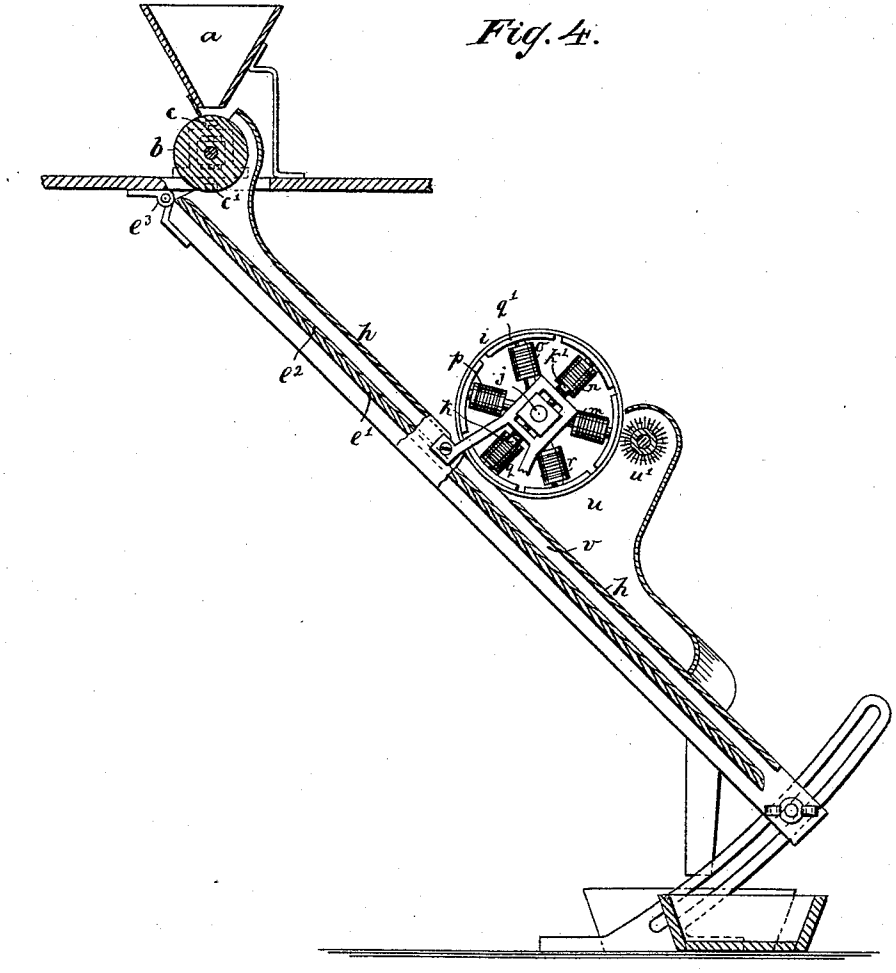
(No Model.) 2 Sheets—Sheet 2.

# J. P. CONKLING.

## MAGNETIC ORE SEPARATOR.

No. 451,370. Patented Apr. 28, 1891.

*Fig. 4.*

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# UNITED STATES PATENT OFFICE.

JOHN P. CONKLING, OF GLENS FALLS, NEW YORK, ASSIGNOR TO GURDON CONKLING, OF SAME PLACE.

## MAGNETIC-ORE SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 451,370, dated April 28, 1891.

Application filed September 13, 1890. Serial No. 364,879. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN P. CONKLING, a citizen of the United States, residing at Glens Falls, in the county of Warren and State of New York, have invented new and useful Improvements in Magnetic Separators, of which the following is a specification.

The object of my improvement is to provide a machine in which the magnetic ore will be thoroughly, economically, and conveniently separated from the gangue and tailings.

In the accompanying drawings I have shown an apparatus embodying my invention; but I do not wish to be understood as confining myself to the particular form of apparatus shown.

Figure 1 is a central longitudinal section of the machine. Fig. 2 is a cross-section of the same through the line 2 2, Fig. 1. Fig. 3 shows the connections between the magnets and the commutator. Fig. 4 is a modification.

*a* is the hopper, in which the original ore is deposited.

*b* is a revolving cylinder arranged below the oblong discharge-opening and having its bearings vertically adjustable by means of set-screws *c* and *c'*, so as to vary the available opening for the discharge of the ore from the hopper.

*e* is a conveyer-belt mounted upon the drums *f* and *f'*, one or both of which may have a sliding bearing *g*, controlled by a screw *g'*.

*h* is a cover which continues from the point at which the ore is deposited on the conveyer until the cylinder *i* is reached. This cylinder *i* is composed of brass or other non-magnetic material, and is secured to a shaft *j*, which is mounted in bearings made vertically adjustable by means of the set-screws *k k' k² k³*. Provision is made for revolving the shaft *j* by means of the pulley *l*. Within the cylinder *i*, secured to the shaft *j*, so as to radiate from the center thereof, are a number of series of electro-magnets *m n o p q r*:

I have shown two horseshoe magnets in each series, although the number is not material, and I have shown the plane of each magnet as coinciding with the plane of the center of the shaft.

Each pole of each magnet is provided with a separate pole-piece, as *q' q²*, and each pole-piece forms the arc of a circle in contact with the inner surface of the cylinder *i*, and preferably extending until within a short distance of its neighboring pole-pieces, as shown in the drawings. The electricity for operating these magnets is supplied through the brushes *s s'* and the commutator *t*, the connections being such that each series of electro-magnets is thrown into and maintained in current so long as its pole-pieces are on the opposite side of the shell of cylinder *i* to the conveyer; but each series of electro-magnets are thrown out of current during the balance of their rotation. Such an arrangement of connections is illustrated in Fig. 3.

When the original ore has been conveyed to a point under the cylinder *i*, the series of electro-magnets through which the current is then passing (lettered *q* in Fig. 1) will attract the particles of magnetic ore and cause them to jump up and adhere to the surface of the cylinder *i*. As this cylinder and its contained magnets revolve, however, in the direction of the arrow, the particles of ore adhering to its surface will be quickly carried into the chute *u*, which point having been reached the current will be thrown out of the series of magnets *q* into the series *p*, and there being no magnetic force to hold them fast the particles will drop off into the chute *u* and be collected in a suitable receptacle below. Should any particles still adhere, they will be brushed off by the rotary brush *u'*. The tailings will remain upon the conveyer and pass off over the drum *f* into the chute *v*. *w* is the pulley by which the conveyer-belt is revolved.

In the modification shown in Fig. 4 an inclined table is substituted as conveyer in place of the conveyer-belt already described.

The original ore is discharged from the hopper *a*, over the cylinder *b*, upon the inclined table *e'*, which is faced with polished glass *e²*. It passes down this incline under cover *h* until it comes under the cylinder *i*, when the magnetic ore will be attracted by that cylinder and carried off into the chute *u*, as already described in connection with the other figures. The tailings will pass on down the

incline and be discharged at the bottom. The table is hinged at $e^3$ and provided with means of adjustment at the bottom, as shown, so that its angle of inclination can be varied.

I am aware of Letters Patent of the United States No. 383,863, granted to Gurdon Conkling June 5, 1888, in which is described a machine wherein a supplemental belt and a magnet are combined with a conveyer-belt, so that the magnet attracts the magnetic ore onto the surface of the supplemental belt which carries it off of the conveyer and drops it in a receptacle separate from the tailings. I make no claim to a machine constructed as shown in said patent.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the conveyer, the rotary shaft arranged transversely above the same, the non-magnetic cylinder attached to the shaft, the several sets of electro-magnets attached to and rotating with the shaft, and each pole of every magnet having an independent segmental pole-piece forming the arc of a circle and in superficial contact with the internal surface of the cylinder, and means for directing a current of electricity through each of the electro-magnets in a set when the latter is presented opposite the conveyer, substantially as described.

2. The combination of the conveyer, the feed-hopper, the rotary shaft, the non-magnetic cylinder secured to the shaft, the cover supported above the conveyer and extending from the point where the ore is deposited on the conveyer to a point in proximity to the periphery of the cylinder, the several sets of electro magnets attached to and rotating with the shaft, and means for directing a current of electricity through each of the electro-magnets in a set when the latter is presented opposite the conveyer, substantially as described.

3. A magnetic separator consisting of the conveyer, the feed-hopper, the transverse rotary shaft, the non-magnetic cylinder secured to the shaft, the cover supported above the conveyer and extending from the point where the ore is deposited on the conveyer to a point in proximity to the periphery of the cylinder, the several sets of electro-magnets attached to and rotating with the shaft and each pole of every magnet having an independent segmental pole-piece forming the arc of a circle and in superficial contact with the internal surface of the cylinder, and means for directing a current of electricity through each of the electro-magnets in a set when the latter is presented opposite the conveyer, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN P. CONKLING.

Witnesses:
WM. C. HAUFF,
E. F. KASTENHUBER.