

No. 709,982.

Patented Sept. 30, 1902.

J. W. R. T. HEBERLE.

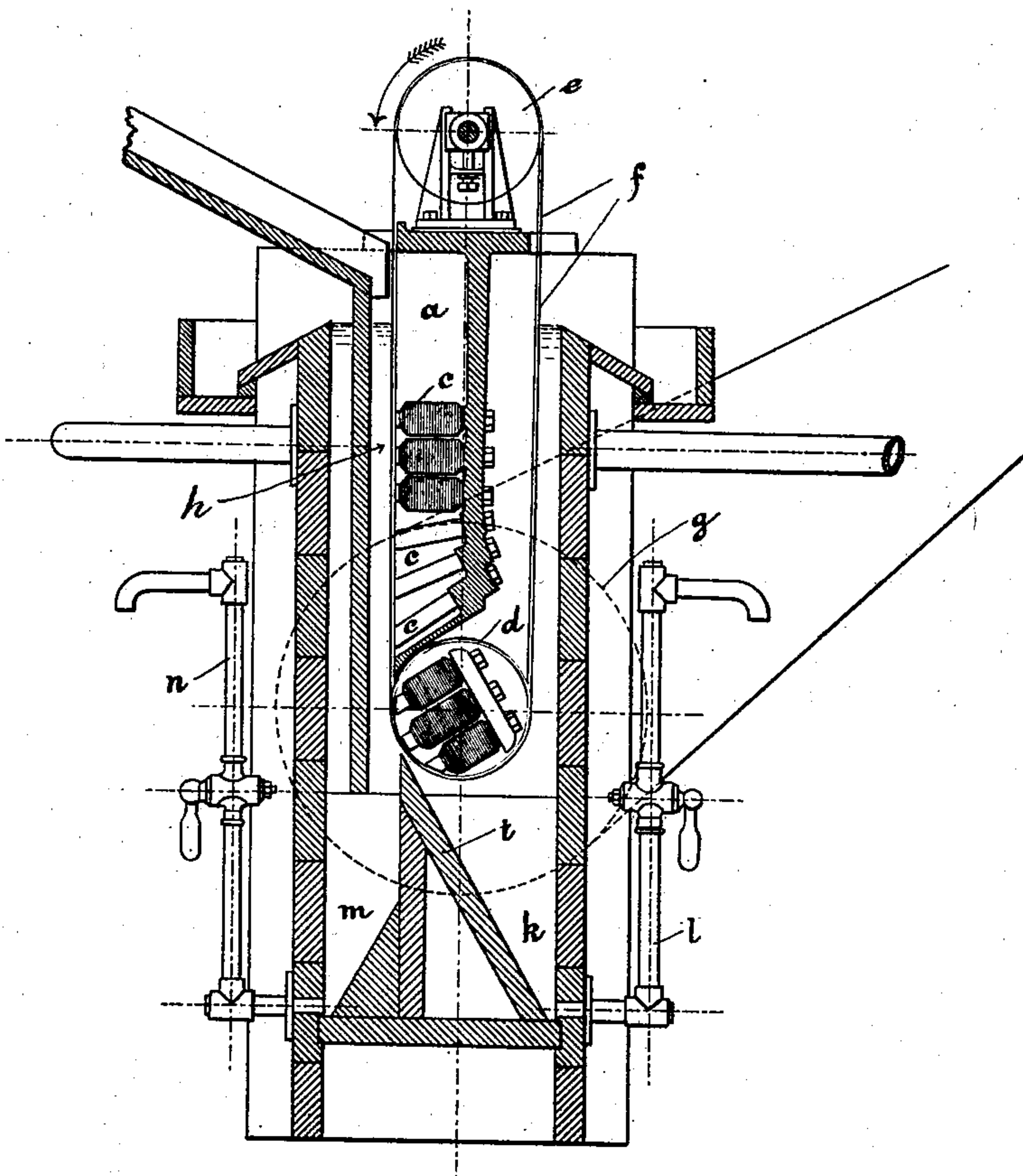
APPARATUS FOR SEPARATING MAGNETIC AND NON-MAGNETIC MATERIALS
FROM ONE ANOTHER.

(Application filed Dec. 28, 1897.)

(No Model.)

2 Sheets—Sheet 1

Fig. 1.



Witnesses:

Aug. L. L. L.
Berthel Brander

Inventor
Josef Wilhelm Rudolf Theodor Heberle
by O. J. J.
his att'y

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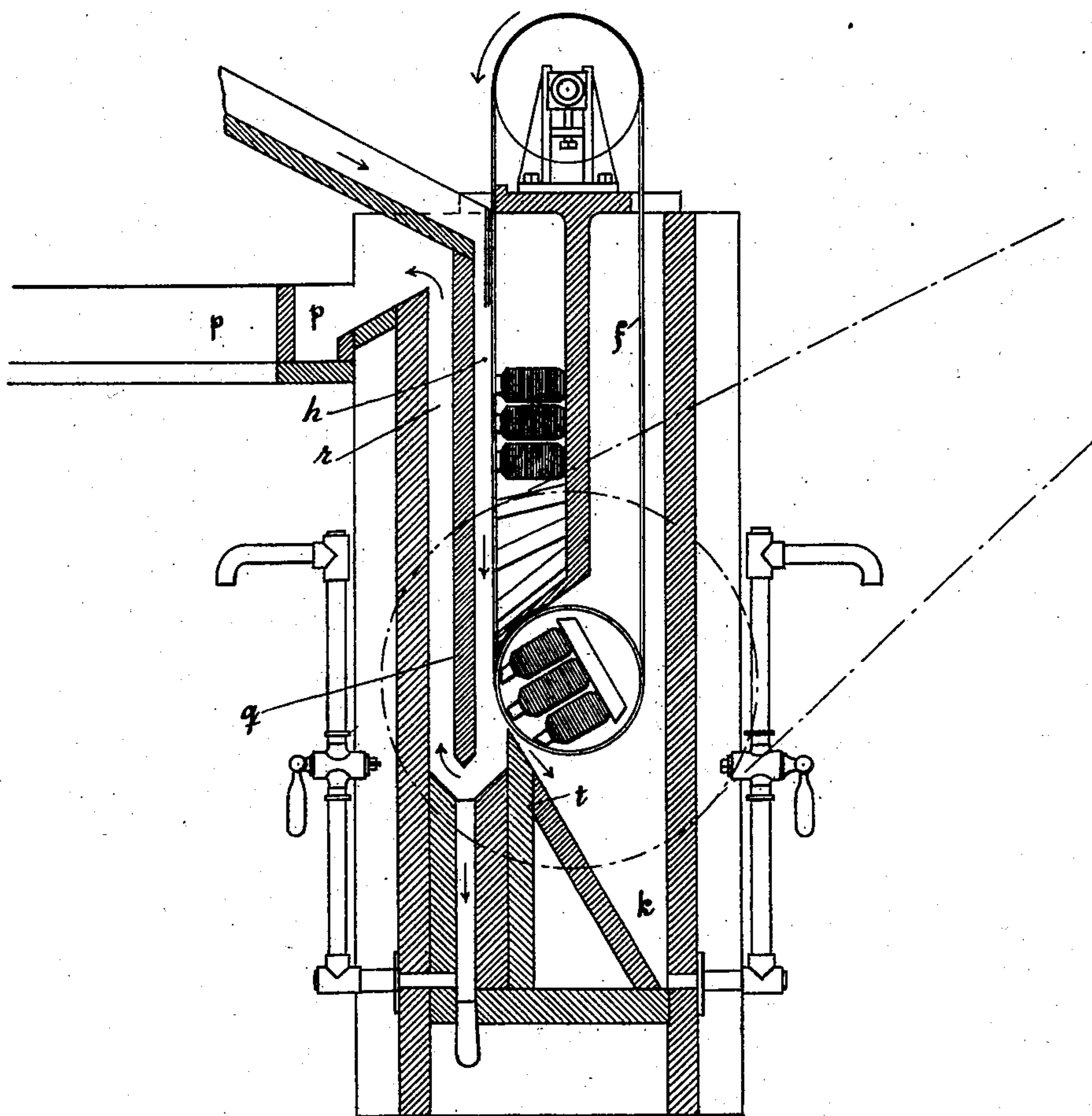
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(Application filed Dec. 28, 1897.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEF WILHELM RUDOLF THEODOR HEBERLE, OF SALA, SWEDEN.

APPARATUS FOR SEPARATING MAGNETIC AND NON-MAGNETIC MATERIALS FROM ONE ANOTHER.

SPECIFICATION forming part of Letters Patent No. 709,982, dated September 30, 1902.

Application filed December 28, 1897. Serial No. 664,097. (No model.)

To all whom it may concern:

Be it known that I, JOSEF WILHELM RUDOLF THEODOR HEBERLE, a subject of the King of Sweden and Norway, and a resident of Sala, Sweden, have invented a new and useful Improvement in Apparatus for Separating Magnetic and Non-Magnetic Materials from one Another, (for which I have obtained Letters Patent in Sweden, No. 7,227, dated May 15, 1895,) of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

The invention refers to an improvement in such apparatus where the mingled magnetic and non-magnetic materials are allowed to fall in water through one or more magnetic fields.

The object of the invention is to obtain a more effectual separation, especially when the mingled substance is very finely ground or contains particles, such as mica particles, which do not fall vertically. I attain this object by the apparatus hereinafter described and claimed.

In the accompanying drawings, in which similar letters of reference indicate corresponding parts in the figures, Figure 1 shows a vertical section of an apparatus suitable to be used for carrying out my invention, and Fig. 2 shows a modification thereof.

Referring to the drawings, the magnetic field consists of a number of magnets *c c c*, placed inside a water-tight casing *a* and a rotating drum *d*. Across the magnetic poles runs on the said drum *d* and a pulley *e* a suitable endless belt *f*, of rubber, canvas, or the like, in such a manner that it may be moved past the magnet-poles by power applied to the pulley *g*. From the feed-channel the ore falls down into the vertical channel *h*, which is filled with water or other suitable liquid. During the descent through the said channel the magnetic particles of the ore are attracted to the said belt *f* by the magnetic poles at the other side of the same. The magnetic particles are attracted to and accompany the belt below the lower drum or pulley *d* until they leave the magnet-poles and fall down into the receiver *k*. Said receiver *k* is provided with a rising-pipe *l*, through which the magnetic

particles are carried by the water fed with the crushed ore. The non-magnetic particles fall straight down into the receiver *m*, whence they are carried by the water through the rising-pipe *n*.

In order that the crushed ore may be exposed to the action of the magnetic field for long enough time to allow the magnetic particles to be attracted to the belt, the velocity of their fall may be regulated by changing the amount of water fed in, so that the water in the channel will have either a retarding or accelerating effect, as the case may be. For instance, when the grains of the ore are comparatively large the water should have an upward movement, so as to retard the fall of the ore. This can be accomplished by feeding in so much more water than is able to run out through the pipes *l* and *n* that what must run off at the upper end of the channel *h* will cause the necessary retardation. At the same time as the magnetic particles are separated from the non-magnetic the latter may be separated into a finer and coarser kind by feeding in more water with the ore than will run off through the outlets *l* and *n*. The finer non-magnetic particles will follow the water around the partition *g*, up the channel *r*, and run off at *p*, while the coarser particles will fall down at *m*.

The magnets inclosed in the drum may be dispensed with by extending the partition *t* so far up alongside the downward-traveling part of the belt *f* that the particles adhering to the belt will fall into the receptacle *k* when leaving the belt. In that case the upper part of the said partition may be adjustable, so as to be set more or less close to the belt, as may be desired.

I am aware that it is not new to cause the ore to fall in moving water in a magnetic field, and I do not claim this broadly.

What I claim as my invention is—

The combination, of an endless belt traveling over pulleys in such a manner that one of its free sides moves downward vertically, a system of magnets inside said belt, a tank in which said belts and magnets are immersed, a vertical partition between the downward-moving part of the belt and the wall of said

tank, another partition extending from the bottom of the tank and the lower pulley close to the same, and inlets and outlets for the water from said tank, substantially as and
5 for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in pres-

ence of two witnesses, this 10th day of December, 1897.

JOSEF WILHELM RUDOLF
THEODOR HEBERLE.

Witnesses:

H. ÖSTBERG,
A. DAHL.