

UNITED STATES PATENT OFFICE.

GUSTAV PISTOR AND PAUL RAKOWICZ, OF GRIESHEIM, GERMANY, ASSIGNORS TO
CHEMISCHE FABRIK GRIESHEIM ELECTRON, OF FRANKFORT-ON-THE-MAIN, GER-
MANY, A CORPORATION OF GERMANY.

ARTICLE OF MANUFACTURE.

965,485.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that we, GUSTAV PISTOR and PAUL RAKOWICZ, subjects of the German Emperor, and residing at Griesheim-on-the-
5 Main, Germany, have invented certain new and useful Improvements in Articles of Manufacture, of which the following is a specification.

This invention relates to improvements
10 in metal articles designed for use in the manufacture of machines and apparatus, in constructions, and broadly in the mechanical industry, in which lightness, tenacity, rela-
tive extension, elasticity, capability of be-
15 ing worked and resistance to influences of the atmosphere are of importance. The sub-
ject-matter of the invention combines the aforesaid properties which are of importance in the mechanical industries in a degree
which was not attained in articles of any
character heretofore in use. It has been dis-
covered that articles of the aforesaid prop-
erties can be produced from high percentage
magnesium alloys which contain from 80%
25 to 99.5% of magnesium and from 0.5 to 20%
of foreign metal or metals apart from the magnesium. The high percentage magne-
sium alloys can readily be worked by means
of any tool either by hand or by machine.
30 They can be soldered, welded and forged. Casts made from the said high percentage
alloys of magnesium are perfect in every re-
spect. With a fresh polish they have a
beautiful color resembling that of the silver
35 and a good luster. As to atmospheric influ-
ences they have about the same resistance as tin or copper. A thin layer of magnesium
oxid thoroughly protects the metal against
any deeper attack. By condensing proc-
40 esses, such for example as pressing, rolling,
drawing, etc., and also by thermic improv-
ing processes to which the metal is subjected,
the properties, and particularly the tenacity,
relative extension, and elasticity, are con-
siderably improved, without materially in-
creasing the specific gravity of the same.

Heretofore high percentage alloys of magnesium with lead, zinc and thallium have been used in pyrotechnics, as has been de-
scribed in Brannt, *Metallic Alloys*, Henry
Garey Baird & Co., Pennsylvania, 1896, page
35, lines 1 to 6. This however is immaterial
as far as the present invention is concerned,
which relates to articles of the mechanical

industry, which have nothing to do with 55
pyrotechnical purposes, and which involve
an important progress in the art by reason
of their newly discovered properties.

The properties of the articles which form
the subject-matter of this invention can be 60
modified by the quality and the quantity of
the metal or metals to be alloyed with the
magnesium. For example, if great impor-
tance be attached to a low specific gravity,
additions up to 20 per cent. of light metals 65
such as calcium, or aluminium, can be used
thereby improving the excellent physical
properties of the magnesium. Thus, for in-
stance, an alloy of 92 per cent. of magne-
sium and 8 per cent. of aluminium possesses 70
a specific gravity of only 1.75, a strength and
extensibility which are equal to those of the
best gun-metal. Improvement in the phys-
ical properties of the magnesium is also ob-
tained by the addition of heavier metals. 75
Thus alloys of magnesium and zinc, and
magnesium and copper, produced with due
regard to the aforesaid percentage limits are
greatly superior in their physical properties
to the usual aluminium or its alloys. The 80
applications of the said high percentage mag-
nesium alloys are very extensive on account
of the aforesaid properties, especially
their unusually small specific gravity, great
density, tensile strength and toughness, giv- 85
ing great reduction in weight and cost.
They will be of great value for many pur-
poses in the whole mechanical industry;
especially for instance for automobiles, and
apparatus used in aeronautics, and naviga- 90
tion, and for military and sporting purposes,
and generally for machinery, instruments,
mountings, electric apparatus and fine me-
chanical work and even for jewelry, and for
bell making. The use of magnesium in the 95
metal industry has hitherto been limited to
its application as de-oxidizing agent and as
a metal purifying agent in foundries. In
the latter cases the magnesium remains in
the resulting metals, or alloys, only in a 100
very small proportion.

An application of magnesium in the me-
chanical industry has been in making
"magnalium" which is an alloy of alu-
minium and magnesium containing at most 105
25 per cent. magnesium and is very different
from the magnesium alloys made in accord-
ance with the present invention.

We claim:

1. An article of manufacture capable of resisting mechanical stresses and suitable to be used in the mechanical industry, consisting of an alloy containing not less than 80% and not more than 99.5% of magnesium.

2. An article of manufacture capable of resisting mechanical stresses and suitable to be used in the mechanical industry, consisting of an alloy containing not less than 80% and not more than 99.5% of magnesium, and

not more than 20% or less than 0.5% of aluminum.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GUSTAV PISTOR.
PAUL RAKOWICZ.

Witnesses:

FRANZ HAPSLACHER,
ERWIN DIPPEL.