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-
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 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, relative extension, elasticity, capability of bearing worked and resistance to influences of the atmosphere are of importance. The subject-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 hitherto in use. It has been discovered that articles of the aforesaid properties can be produced from high percentage magnesium alloys which contain from 80% to 99.5% of magnesium and from 0.5 to 20% of foreign metal or metals apart from the magnesium. The high percentage magnesium alloys can readily be worked by means of any tool either by hand or by machine.

They can be soldered, welded and forged. Casts made from the said high percentage alloys of magnesium are perfect in every respect. With a fresh polish they have a beautiful color resembling that of the silver and a good luster. As to atmospheric influences 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 processes, such for example as pressing, rolling, drawing, etc., and also by thermic improving processes to which the metal is subjected, the properties, and particularly the tenacity, relative extension, and elasticity, are considerably improved, without materially increasing 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 described in Brant, 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 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 modified by the quality and the quantity of the metal or metals to be alloyed with the magnesium. For example, if great importance be attached to a low specific gravity, additions up to 20 per cent. of light metals such as calcium, or aluminium, can be used thereby improving the excellent physical properties of the magnesium. Thus, for instance, an alloy of 92 per cent. of magnesium and 8 per cent. of aluminium possesses a specific gravity of only 1.76, a strength and extensibility which are equal to those of the best gun-metal. Improvement in the physical properties of the magnesium is also obtained by the addition of heavier metals. 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 applications of the said high percentage magnesium alloys are very extensive on account of the aforesaid properties, especially their unusually small specific gravity, great density, tensile strength and toughness, giving great reduction in weight and cost.

They will be of great value for many purposes in the whole mechanical industry; especially for instance for automobiles, and apparatus used in aeronautics, and navigation, and for military and sporting purposes, and generally for machinery, instruments, mountings, electric apparatus and fine mechanical work and even for jewelry, and for bell making. The use of magnesium in the 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 very small proportion.

An application of magnesium in the mechanical industry has been in making "magnalium" which is an alloy of aluminium and magnesium containing at most 25 per cent. magnesium and is very different from the magnesium alloys made in accordance 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.