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UNITED STATES PATENT OFFICE.

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PROCESS FOR DRYING AND EXTRACTING GASES FROM METALLIC POWDERS.

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There is a great demand in industry for very finely powdered metals or metal alloys or mixtures which can be produced in very different ways. Either sheet metal is rubbed through a sieve by means of stiff brushes, or the metals are broken up in stamp mills by making use of their brittleness at certain temperatures. They can also be ground or precipitated from solutions of their salts, as well as distilled or deposited in the form of a fine powder from the vapours by cooling the same, or be produced by other methods. The metallic powders obtained by mechanical means are not pure; they contain for instance fats, oils or the like, which had to be added in order as far as possible to prevent oxidation, as impurities or remains of the abrasives if they were prepared by grinding, as well as metallic oxides etc.

The products produced by precipitation are certainly pure at the outset, but by their further treatment during washing and drying they acquire large amounts of oxides. It is often wholly impossible to obtain certain metals such as for instance copper in a pure form, as the moist metallic powders, owing to their fine state of division, oxidize during drying already at an ordinary temperature and even in a vacuum, being therefore useless for any further purposes.

It is possible according to the invention to produce pure metallic powders. The oxidation of the metallic powders during washing and drying is completely avoided according to the invention if the water is displaced from the moist metallic powders by alcohols or by volatile substances having a similar action and only thereupon are the alcohols or volatile substances removed from the metallic powders by drying.

For carrying out the process use is made of the socalled displacing apparatus of any desired form and type, as known and used for displacing water from moist nitrocellulose and the same methods are adopted with the moist metallic powders as with moist nitrocellulose, the water of which, as is well known in displacing processes is displaced by the alcohol added thereto, so that at first pure water is separated from the nitrocellulose and flows away as such and thereupon at first dilute alcohol and then alcohol of the same strength as that used at the outset, drains off, whereupon the displacing process is ended. The moist metallic powders are poured into the displacer and pressed down, whereupon alcohol under pressure is forced, centrifuged or sucked through the moist metallic powders, all the water being removed from the moist powders and replaced by alcohol, which can be easily removed from the metallic powders wholly or partially as desired by drying in drying apparatus, without any chemical change occurring in the powders, and the alcohol may be recovered by one of the known methods.

If it is desired to work up pure dry metallic powder as such or mixed with other metals or substances, by pressing to form articles, or to treat it according to the methods described in German Patents 405,880 (Serial No. U.6991 VI/40b) and 409,734 (Serial U.7841 VI/40b) it is advisable not to remove the remaining alcohol completely from the metallic powders or their mixtures or alloys by drying, for the following reasons:—

All finished bodies, and also metals or metallic powders have adsorbed large quantities of air or other gases on their surface, so that when pressed they can result in only comparatively loose structures, as the adsorbed gases do not escape then and the various metal parts therefore remain elastic.

It has been found that the said adsorbed gases readily escape from the metal particles, if the same are treated with alcohols.

What I claim is:—

1. The process of drying finely pulverized wet metallic powders without promoting oxidation thereof which comprises pressing the finely pulverized powder into a block, allowing alcohol to permeate through the block until the water associated with said powders is displaced by alcohol and thereafter allowing the alcohol to volatilize.

2. The process of drying finely pulverized wet metallic powders without promoting oxidation thereof which comprises pressing the finely pulverized powder into a block, allowing alcohol to permeate through the block until the water associated with said powders is displaced by alcohol and thereafter removing the alcohol.

3. The process of drying finely pulverized wet metallic powders without promot-

ing oxidation thereof which comprises pressing the finely pulverized powder into a block, allowing ethyl alcohol to permeate through the block until the water associated with said powders is displaced by alcohol and thereafter removing the alcohol.

4. The process of drying finely pulverized wet metallic powders without promoting oxidation thereof which comprises pressing the finely pulverized powder into a block, allowing ethyl alcohol to permeate through the block until the water associated with said powders is displaced by alcohol and thereafter allowing the alcohol to volatilize.

5. The process of drying finely pulverized wet metallic powders without promoting oxidation thereof which comprises pressing the finely pulverized powder into a block, allowing alcohol to permeate through the block until the water associated with said powders is displaced by alcohol, pressing the said powders, and thereafter allowing the alcohol to volatilize.

6. The process of drying finely pulverized wet metallic powders without promoting oxidation thereof which comprises pressing the finely pulverized powder into a block, allowing alcohol to permeate through the block until the water associated with said powders is displaced by alcohol, pressing the said powders, and thereafter removing the alcohol.

In testimony whereof I have signed my name to this specification.

EUGENE SEYFFERTH,
Doctor of Philosophy.