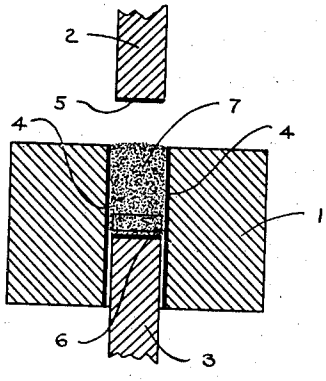
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PRODUCTION OF TABLETS

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PRODUCTION OF TABLETS

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4 Claims. (Cl. 107—17)

This invention relates to the production of tablets, particularly pharmaceutical tablets.

Tablets are ordinarily prepared by compressing tablet granulations between polished steel dies and punches. Practically all tablet granulations must be lubricated so that they will be delivered properly from the punches and dies. Thus it is common practice to incorporate a lubricant, such as talc, with the tablet granulation, to prevent binding and sticking, and to enable ejection of the tablet without breakage. In some cases, notably that of hypodermic tablets, lubricants are contraindicated because the tablets must give clear solutions, whereas the conventional lubricants are insoluble materials; and the tablets must accordingly be prepared by handmolding, an uneconomic procedure yielding tablets which are unlikely to be uniform in appearance and dosage. In other cases, notably that of citric acid tablets, sticking is not prevented by the addition of a lubricant, and the preparation of such tablets by compression is therefore impractical.

It is the object of this invention to provide means for producing tablets without including lubricants therein. It is a further object of this invention to provide means for compression-tableting non-lubricatable pharmaceuticals, i. e. pharmaceuticals for which lubricants are contraindicated, and pharmaceuticals with which the usual lubricants are partially or completely ineffective.

In the practice of this invention, the punches, and preferably also the dies, are so modified as to present a non-ferrous-metal surface to the granulation being compressed. Preferably, further, the non-ferrous surface is lubricated with mercury, i. e. coated with a thin film of mercury. The non-ferrous-metal surface may be composed, for example, of copper, a copper alloy (as brass or phosphorus bronze) or silver.

In the accompanying drawing there is shown in fragmentary cross-section the die-and-punch combination of a conventional pharmaceutical tableting machine modified in accordance with the invention. Within a die **1**, of suitable cylindrical aperture, there operates a pair of punches **2** and **3**. Lower punch **3** is adapted to be set at the desired position within the die (depending on the amount of granulation **7** to be compressed), and also acts to eject the compressed tablet from the die. Surfaces presented to the granulation are **4**, **5**, and **6** (shown in heavy lines). These surfaces, or at least **5** and **6**, are of a non-ferrous metal, and are preferably mercurized. In its simplest embodiment, the invention utilizes non-ferrous-metal dies and punches; but it is intended to embrace also use of ferrous dies and punches having non-ferrous jackets, liners, or other structures in which the surfaces presented to the granulation are non-ferrous.

The following examples are illustrative of the invention:

Example 1

A conventional tablet-compressing machine is equipped with phosphorus-bronze dies and punches. The phosphorus bronze may, for example, have a composition approximately as follows:

	Percent
Copper	92
Tin	4
Phosphorus	2.5

Mercurization of the punches is effected as follows: The surfaces presented to the granulation are rubbed with a mixture of chalk and mercury (e. g. 90% chalk and 10% mercury); if the surfaces will not mercurize readily, they are rubbed with a mixture of chalk and reduced silver (e. g. a mixture of 90% chalk and 10% reduced silver), the surfaces are then dipped into mercury, and finally rubbed with a mixture of chalk and mercury (e. g. 90% chalk and 10% mercury). The reduced silver may be prepared by alkalizing a 5% solution of silver nitrate with caustic soda, adding glucose, boiling the solution, filtering off the precipitated reduced silver, washing the precipitate with water, and drying. A morphine granulation is then placed in the die and compressed between the punches. The tablets are readily ejected, without sticking or breaking, are uniform in appearance, accurate in dosage, and yield clear aqueous solutions.

Compression of codeine and other alkaloids and alkaloid salts in the same manner yields similarly satisfactory results.

Example 2

A conventional tablet-compressing machine is equipped with a die and lower punch of brass, and an upper punch of phosphorus bronze. The brass may, for example, have a composition approximately as follows:

	Percent
Copper	61–64
Lead	1.5
Zinc	34.5–37.5

The brass surfaces presented to the granulation are moistened with water and rubbed with mer-

curic chloride powder; excess mercuric chloride is washed off, and the mercurized surface polished with a dry cloth. A citric acid granulation is placed in the die, compressed between the punches, and ejected; the ejection being readily effected without sticking or breaking of the tablets.

Example 3

A lubricant-containing granulation for effervescent bromide tablets (e. g. a mixture of ammonium, sodium, and potassium bromides) is compressed by mercurized phosphorus-bronze punches in a stainless-steel die. The tablets do not stick or require cleaning, as they do when steel punches are used.

The invention may be variously otherwise embodied, within the scope of the appended claims.

I claim:

1. In a tablet-compressing machine, punches having brass compression surfaces.

2. In a tablet-compressing machine, punches having phosphorus-bronze compression surfaces.

3. In a tablet-compressing machine, punches having compression surfaces of brass coated with a thin film of mercury.

4. In a tablet-compressing machine, punches having compression surfaces of phosphorus bronze coated with a thin film of mercury.

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