Feb. 26, 1957 I. PROPERZI 2,782,487

DEVICE FOR MAKING METAL PELLETS PARTICULARLY FOR SHOTGUNS

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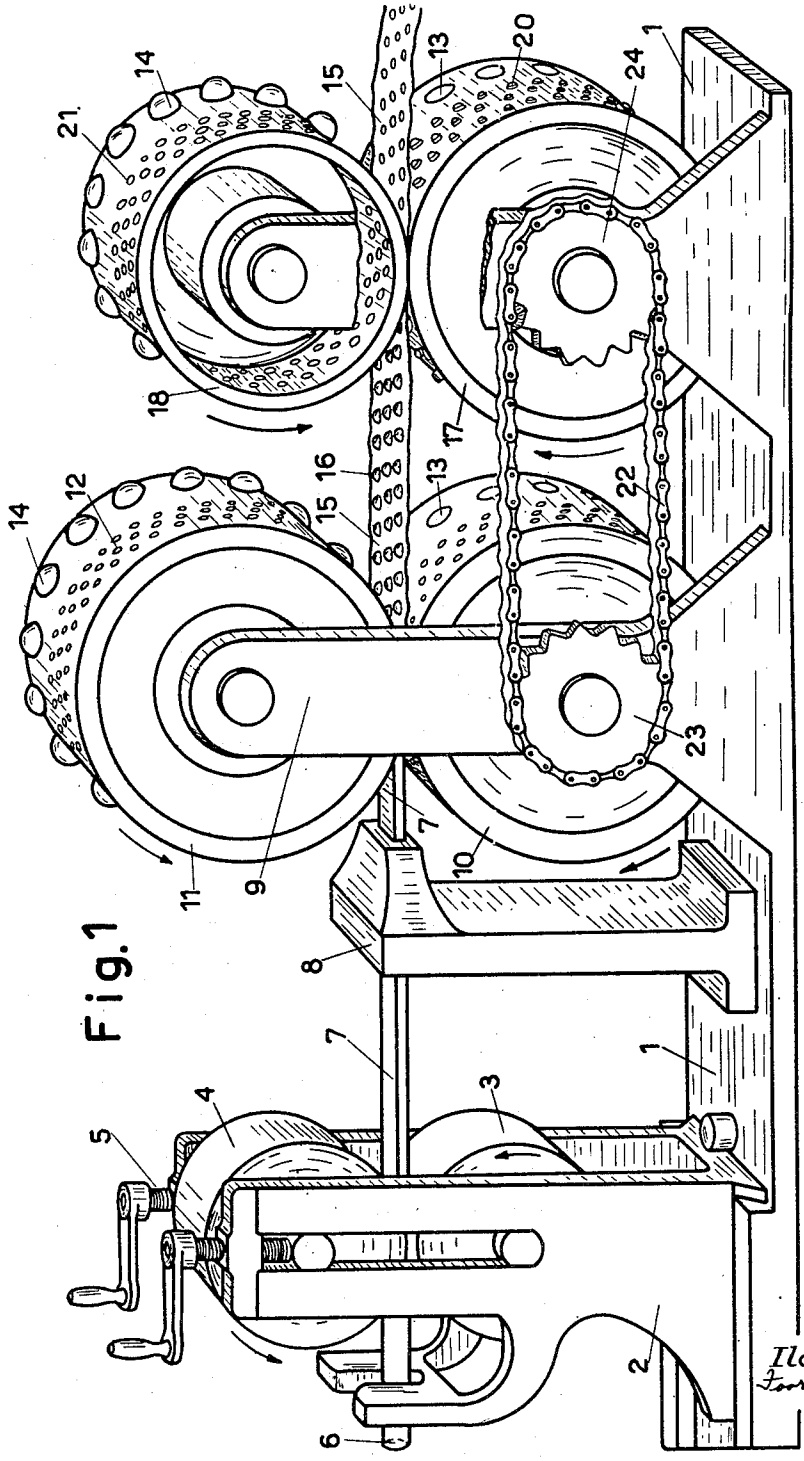


Fig. 1

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Fig. 2

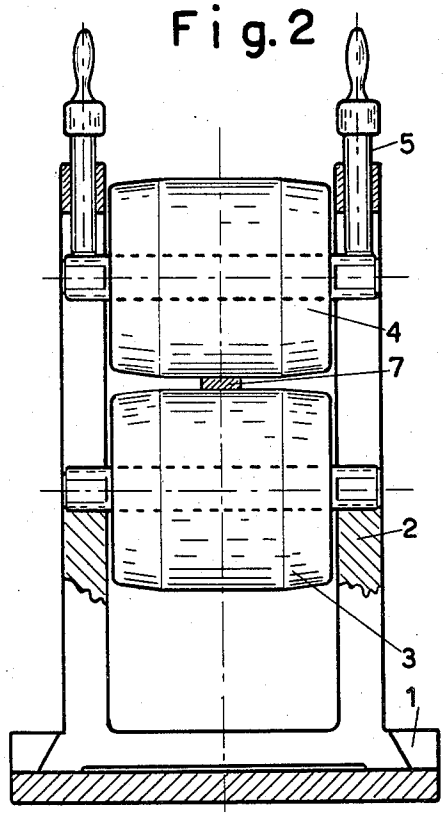
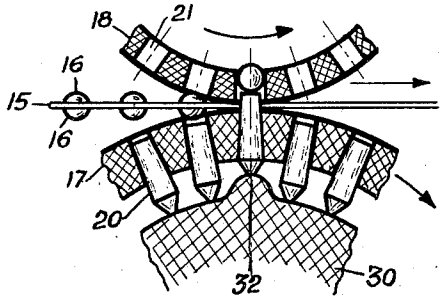


Fig. 3



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DEVICE FOR MAKING METAL PELLETS, PARTICULARLY FOR SHOTGUNS

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Application January 30, 1951, Serial No. 208,484

Claims priority, application Italy May 12, 1950

2 Claims. (Cl. 29—1.22)

The present invention relates to improved apparatus for making metal pellets or balls, and more particularly to improved apparatus for making such balls from metal wire or ribbon stock. This application is a continuation-in-part of copending application, Serial No. 766,409, filed August 5, 1947, in the name of the present inventor, and now abandoned.

A recent process or making metal pellets or balls, especially for use in connection with shotguns, consists of a process of rolling and punching pellets from wire (for instance more or less hardened lead wire).

This process (Italian Patent 420,101) affords a product which is better than that obtainable with the old dripping process (which necessarily gave rise to faults of spherical form, inner structure, size selection and so on) consists essentially of shaping by rolling pairs of semispheres (perfectly opposite to each other and slightly incomplete) in suitable wires or bands of lead or alloys (or other material) so that the incomplete shaping leaves a connection consisting of a residual continuous thin intermediary band from which the pellets are extracted in a further punching operation.

When small pellets are to be produced with such process, however, it is necessary to start from a thin wire, having a diameter about the same as that of the sphere to be produced, in order to prevent excessive scrap. Thin wire is much more expensive, for a given weight, than coarser wire, and, chiefly, when the metal is comparatively soft such as lead alloys, it is very difficult to handle it and it is very easy to break it.

It is an object of the present invention to provide improved apparatus for overcoming this difficulty by producing small pellets starting from a wire having a much greater diameter than that of the pellets to be obtained.

A feature of the invention is the provision of improved apparatus, in which the starting wire is rolled into a band, the band is successively rolled into a thinner band provided with a series of pairs of opposite projections forming two parts of a single sphere, the latter band is then drawn between a pair of rollers provided with punching means which detach said spheres from the band.

By this way it is possible to obtain a band with sufficiently small thickness and considerable uniform width so as to obtain thereon a considerable number of semispherical projections for producing the pellets with comparatively little scrap, and thus starting from a comparatively coarse wire with the result of lowering the production cost of small pellets almost to the same level as for coarser pellets.

Apparatus for carrying said process into practice is illustrated in the attached drawings, in which:

Fig. 1 is a perspective view of a device operating according to the present invention;

Fig. 2 is a cross section of the first rolling mill of Fig. 1;

Fig. 3 represents in cross-section a variation of the punching device.

With reference to Fig. 1, the common base 1 bears a

frame 2 of a first rolling mill, composed of two loose rollers 3 and 4; the journals of this second roller can slide vertically in the frame 2 and their position in the vertical direction can be adjusted through the screws 5. The wire 6 is passed between these two rollers and is reduced in the form of a band 7; this band passes then through the guide 8 which is also mounted on the base 1, in order to convey said band exactly into the second rolling mill which has the task of exerting the sufficient pulling action on the band for causing it to pass through the rollers 3 and 4 and the guide 8.

Said second rolling mill, which is also supported by the base 1, through the frame 9, consists of two rollers 10 and 11, provided with substantially semispherical recesses 12 of equal number and equally arranged on the rims of said two rollers; the roller 10 is provided also with a series of recesses 13 having a form corresponding to the form of as many projections 14 on the roller 11, which have the aim of obtaining an accurate rolling movement, without slipping, of the two rollers 10 and 11 on each other.

The shape of these mating projections and recesses is rounded and two or more staggered rows of such projections and recesses may be conveniently provided on said rollers 10 and 11.

By this arrangement not only angular slip, but also axial slip between the two rollers is prevented.

The band 7 passing through this second rolling mill is reduced into an exceedingly thin strip 15 provided with opposite projections 16 approximately in the form of semispheres, which is dragged by a further pair of rollers 17 and 18 mounted on the frame 19 also supported by the common base 1.

The rollers 17 and 18 are provided with similar recesses and projections 13 and 14 respectively which make their peripheral velocity exactly equal.

The roller 17 is further provided with punching members 20 which penetrate at the proper moment into holes 21 provided in the roller 18 as described in the Italian Patent 420,101 and detach the spherical bodies from the strip 15 so that they can be discharged out of the apparatus.

The punching members 20 can be made freely slidable in the rim of the roller 17 and forced out for preforming the punching operation by means of a projection provided on a stationary cam located inside the roller 17, as shown in Fig. 3.

A chain 22 passing on the sprockets 23 and 24 mounted on the journals of rollers 10 and 18 ensures the synchronical movement of the last two pairs of rollers.

As it appears in Fig. 2, the end portions of the two rollers 3 and 4 of the first rolling mill are beveled in order to introduce the starting wire easily therebetween; this wire is freely introduced between said beveled end portions and is then guided toward the middle of the rollers where it gets flattened; difficult operations at the beginning of the working are thus eliminated.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. Apparatus for producing metal pellets from a metallic band including in combination, a first rolling unit for receiving the band and including a pair of rollers having respective peripheral rolling rims spaced apart a distance less than the thickness of the metallic band, each of said rolling rims having at least two transversely spaced series of recesses extending around the periphery thereof with said recesses on one of said rims being in precise correspondence with said recesses on the other of said rims, whereby said rolling unit produces a metallic strip having at least two transversely spaced longitudinal series of projections formed on each side thereof, a second unit

for receiving the metallic strip from said first unit and including a pair of rollers having respective rolling surfaces spaced apart a distance substantially equal to the spacing of said rolling rims of said first unit, one of said rolling surfaces of said second unit having at least two transversely spaced series of recessess extending around the periphery thereof, and the other of said rolling surfaces of said second unit having radially movable punching members in mating relation with said last-mentioned series of recesses, stationary cam means for moving said punching members outwardly from said last mentioned rolling surface to remove the projections from the metallic strip and produce the aforementioned metal pellets, and means for synchronizing the rotational movement of said rollers of the first and second rolling units.

2. Apparatus for producing metal pellets from a metallic band including in combination, a first rolling unit for receiving the band and including a pair of rollers having respective peripheral rolling rims spaced apart a distance less than the thickness of the metallic band, each of said rolling rims having at least two transversely spaced series of recesses extending around the periphery thereof with said recesses on one of said rims being in precise correspondence with said recesses on the other of said rims to form corresponding projections on the opposite sides of the metallic strip as the rollers rotate and the roller rims press on the band, a second unit for receiving the metallic strip from said first unit and including a pair of rollers having respective rolling surfaces thereon, one of said rolling surfaces of said second unit having recesses extending around the periphery thereof, and the other of said rolling surfaces of said second unit having movable punching members carried thereon in mating relation with the recesses of said one rolling surface in said second unit, and means adjacent the other of said rolling surfaces of said second unit for moving said punching members outwardly from said last mentioned rolling surface to remove the projections from the metallic strip and produce the aforementioned metal pellets, and means for synchronizing the rotational movement of said rollers of the first and second rolling units.

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