July 5, 1927. 1,634,661

J. GRONEFELD

CONTRIVANCE FOR ROLLING ZINC AND OTHER SHEET METAL HOLLOW WARE

Filed Feb. 24, 1926 2 Sheets-Sheet 1

FIG. 1.

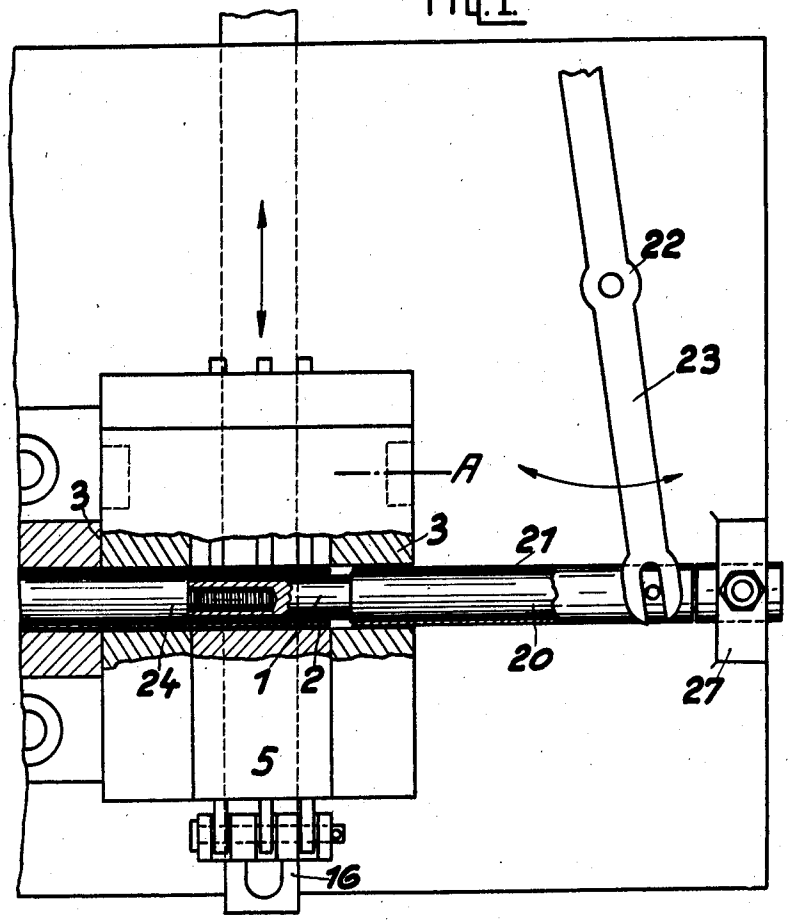
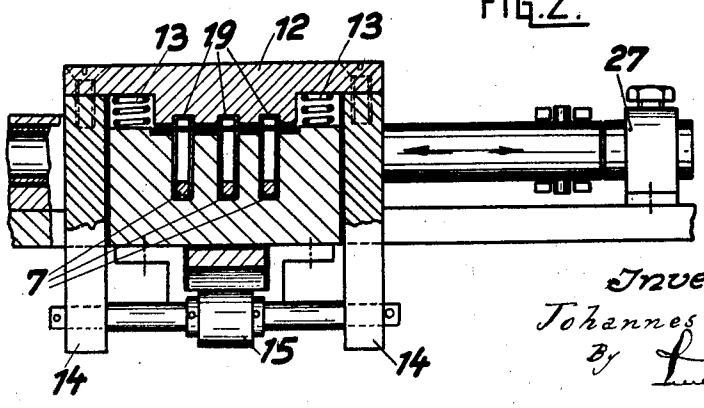


FIG. 2.



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FIG.3.

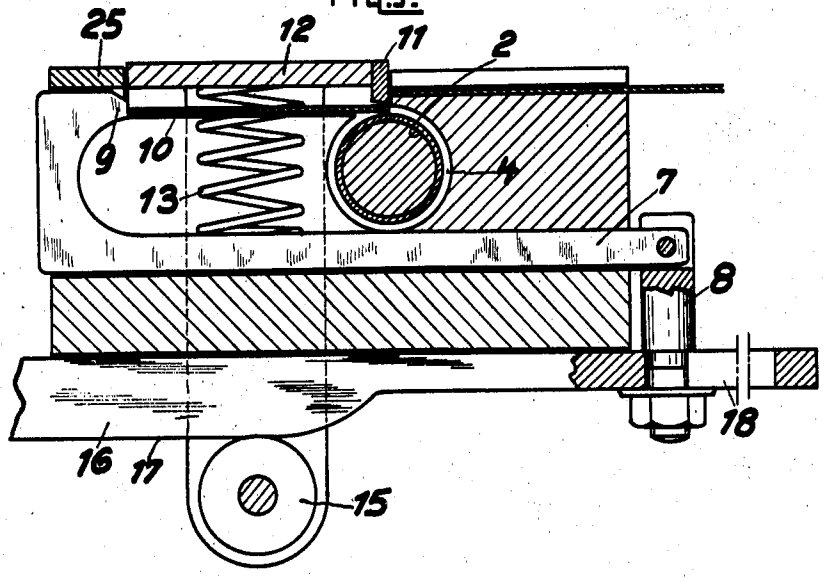
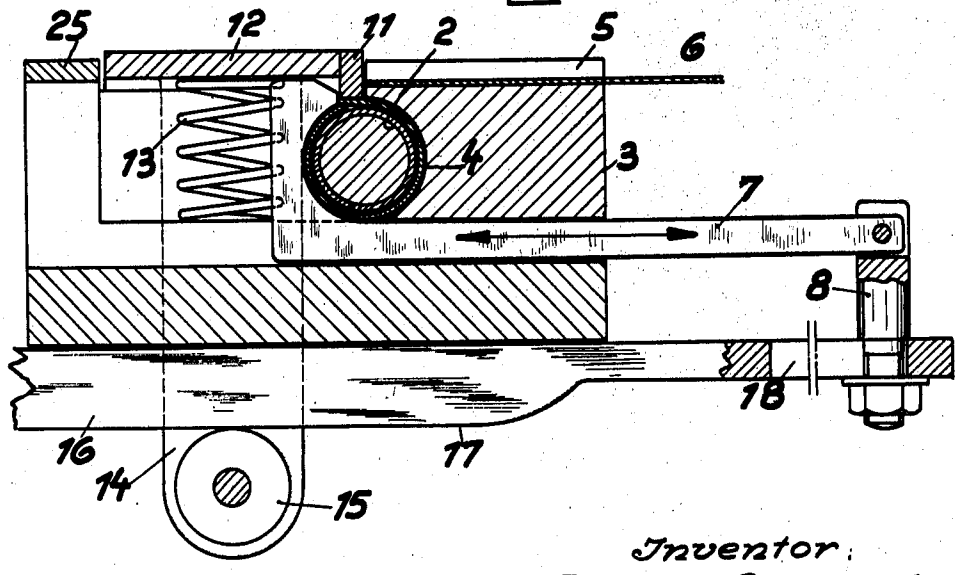


FIG.4.



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UNITED STATES PATENT OFFICE.

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CONTRIVANCE FOR ROLLING ZINC AND OTHER SHEET-METAL HOLLOW WARE.

Application filed February 24, 1926, Serial No. 90,394, and in Germany March 6, 1925.

This invention relates to a contrivance for rolling sheet metal for the purpose of producing the walls of metal hollow ware and the like, in particular the zinc casings of pocket electric battery cells.

The feature of the invention consists therein, that a core or mandrel, the external configuration of which corresponds with the desired internal profile of the hollow vessel to be formed, is surrounded by a channel or hollow space, the thickness of which corresponds with the thickness of the hollow vessel to be formed, and into such channel the correspondingly already cut sheet zinc or other sheet metal is thrust from a peripheral location, so that conforming to the channel it is forced to assume the desired configuration of wall.

The contrivance according to the invention is so arranged for mechanical operation, that a guide for the sheet metal to be rolled is provided behind the rolling mandrel at the top of the circumferential line of the rolling mandrel and claws, which are displaced by suitable links from the machine shaft, and engage at the rear border the sheet metal blank resting in the guide and will thrust it with its front border into the open channel at the top surrounding the rolling mandrel, so that when the entire blank is thrust as far as the rear border into the channel and rolled around the mandrel, the front and rear borders of the blank are slightly superposed. If then the thrusting members are returned to their initial position and the finished rolled casing thrust off the mandrel in the axial direction, the contrivance is ready for operation upon the next following sheet metal blank. The contrivance can be combined in a simple manner with a device for cutting the sheet metal blank from a strip of sheet metal, and on the other hand the knife can be combined with an upper guide cover for the forwardly sliding blank placed in the horizontal guide behind the rolling mandrel. If the sheet metal strip is inserted from the front until it strikes behind with the leading border, and if then the cover, until then situated above the blank and provided in front with a knife, is mechanically depressed a predetermined extent, the knife cuts off the necessary blank from the strip and the cover remains close above the blank, so that during the now following forward thrust of the blank the formation of creases therein is prevented. In order to reduce friction on rolling the blank, it is advisable to rotatably mount the mandrel.

On the accompanying drawing:—

Fig. 1 is a plan of a constructional example of the contrivance partly in section.

Fig. 2 is a vertical longitudinal section.

Figs. 3 and 4 are transverse sections on a larger scale of the device for thrusting the blank, Fig. 3 showing the initial and Fig. 4 the end position.

In the constructional example illustrated, serving as a former around which the blank is rolled, is a stationary horizontally mounted cylindrical mandrel 1, which is surrounded by a close fitting rotatable sleeve 2. The mandrel 1 extends through a cylindrical bore of a base block 3, the diameter of which corresponds with that of the outer surface of the zinc casing or other metal casing to be produced. As the mandrel sleeve 2 is so proportioned as regards its external diameter as to correspond with the internal diameter of the zinc casing to be produced, there remains between such mandrel sleeve and the surface of the bore an annular channel of the thickness of the zinc casing to be produced. The cylindrical bore of the block 3 is open on top as a broad slot, so that the annular channel 4 between the mandrel sleeve and the surface of the bore on top from the rear (from the left in Figs. 3 and 4) has an open inlet. Above the bore for the rolling mandrel 1, 2, the block 3 has transversely to the bore an upwardly open guideway 5 for the strip of sheet metal 6, fed from the front, and the width of which like that of the guideway, corresponds with the height of the zinc casing to be produced. Beneath the longitudinal bore of the block 3 transverse slots are provided through which extend rods 7, which in front are connected to a crosshead 8, and curved upwards at the rear, terminate each in an abutment or pusher 9, the abutment surface of which extends deeper than the supporting surface of the guideway 5. The inserted strip of sheet metad 6 abuts against the opposing face of a bar 25. At the level of the open inlet to the annular channel 4 is situated a guide surface 10, which serves to receive the cut-off zinc blank and to guide

same forward to the mandrel. The cutting device is mounted on the front side of a cover 12, which is held by springs 13 above the guide 10 at such height as not to hinder the thrusting forward of the sheet metal strip 6 beneath the knife 11. After the leading border of the sheet metal strip 6 has encountered the bar 25 the cover 12 together with the knife 11 is drawn downwards by rollers 15 mounted on lugs 14 being depressed against the influence of the springs 13 by a rod 16, which is provided with a corresponding cam surface 17 and is forwardly displaced by means of an eccentric or the like driven by the machine shaft. On its descent the knife 11 cuts off the desired blank from the sheet metal strip 6, which falls on to the guide 10, and the cover 12 descends on to the cut-off blank, but without pressing same. During the forward displacement of the bar 16, this latter eventually, after a certain amount of lost motion, determined by a longitudinal slotway 18 therein, encounters the crosshead 8 and on further forward displacement carries same with it together with the rods 7 and the pushers 9. The latter in their motion engage the blank resting on the guide 10 and thrust same into the annular channel 4, until it reaches the position shown in Fig. 4, in which the entire blank has been introduced into the annular channel, and has accordingly become rolled around the mandrel sleeve 2. The front border of the blank in this position becomes located to a slight extent beneath the rear border which is the last to enter the channel and forms therewith the lap joint of the zinc casing which is later soldered by means of another contrivance. During the forward displacement of the blank by the pushers 9, the closely superlying cover 12 prevents buckling or creasing of the sheet metal. In order that the cover shall not impede the forward displacement of the pushers 9, it is provided on the under surface with corresponding grooves 19. After forming the cylinder, the rod 16 is withdrawn by the machine shaft, whereby the cover 12 with the knife 11 again assumes its initial level, and the pushers 9 are withdrawn to their initial position. The zinc casing rolled on the mandrel sleeve 2 is then stripped off the sleeve 2, in the opposite longitudinal direction to and by a sleeve 21 mounted on an enlarged portion 20 of the mandrel and displaced by a lever 23 pivoted at 22 and rocked by means of a cam disc or the like driven by the machine shaft, and such zinc casing is thereby transferred to an enlarged portion 24 of the mandrel, on which the seam may be immediately soldered by mechanical means, or from whence it can be removed from the contrivance. After the zinc casing has been thrust off the mandrel, the sleeve 21 recedes to its initial position, whereupon the entire contrivance is ready to receive another blank and repeat the cycle of operations.

In the described contrivance the longitudinal seam after the completion of the zinc casing, is located on top, which is best suited for the ordinary method of soldering. However some other type of soldering process may follow the rolling of the casing, in which it is necessary that the seam be located on the bottom beneath. In such case, the zinc casing after it has been rolled can be turned through 180°, or the rolling contrivance by suitable arrangement of the several members without basic alteration can be so constructed that the blank is fed to the rolling mandrel and annular channel from beneath so that the seam is then located at the lowest portion thereof.

I claim:

1. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore; a cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; and a plurality of rods slidably mounted in said block and adapted to feed the blanks of sheet metal into the bore and around the mandrel to form the cylinder.

2. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore; a cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; means mounted in said block for feeding the blanks of sheet metal into the bore and around the mandrel to form the cylinder; and means for stripping the cylinder from the mandrel.

3. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore; a sleeve rotatably mounted around the mandrel; a cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; and means mounted in said block for feeding the blanks of metal into the bore and around the sleeve of the mandrel to form the cylinder.

4. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore; a sleeve rotatably mounted around the mandrel; a cutting device mounted on the block and having a

knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; means mounted in said block for feeding the blanks of metal into the bore and around the sleeve of the mandrel to form the cylinder; and means for stripping the cylinder from the mandrel.

5. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore and consisting of a fixed core and a sleeve rotatably mounted on said core; a cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; and means mounted in said block for feeding the blanks of metal into the bore and around the sleeve of the mandrel to form the cylinder, the cutting device preventing buckling and creasing of the sheet metal while being formed.

6. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore; a cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; and means mounted in said block for feeding the blanks of sheet metal into the bore and around the mandrel to form the cylinder and for operating the cutting device.

7. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore; a cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; means mounted in said block for feeding the blanks of sheet metal into the bore and around the mandrel to form the cylinder and for operating the cutting device; and means for stripping the cylinder from the mandrel.

8. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore and consisting of a fixed core and a sleeve rotatably mounted on said core; a cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; and means mounted in said block for feeding the blanks of metal into the bore and around the sleeve of the mandrel to form the cylinder and for operating the cutting device.

9. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore; a spring-pressed cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; a pair of lugs secured to said cutting device; a roller mounted on the lugs; a rod having a cam surface adapted to cooperate with said roller to actuate the cutting device, said device being forced to its original position after the blank is coiled by means of the spring; and means for feeding the blanks of metal into the bore and around the mandrel to form the cylinder.

10. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore; a spring-pressed cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; a pair of lugs secured to said cutting device; a roller mounted on the lugs; a rod having a cam surface adapted to cooperate with said roller to actuate the cutting device, said device being forced to its original position after the blank is coiled by means of the spring; a crosshead mounted on said rod; and means connected to said crosshead for feeding the blanks of metal into the bore and around the mandrel to form the cylinder.

11. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore; a spring-pressed cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; a pair of lugs secured to said cutting device; a roller mounted on the lugs; a rod having a cam surface adapted to cooperate with said roller to actuate the cutting device, said device being forced to its original position after the blank is coiled by means of the spring; a crosshead mounted on said rod; and a plurality of rods connected to said crosshead for feeding the blanks of metal into the bore and around the mandrel to form the cylinder.

12. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore and consisting of a fixed core and a sleeve rotatably mounted on said core; a spring-pressed cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; a pair of lugs secured to said cutting device; a roller mounted on the lugs; a rod

having a cam surface adapted to cooperate with said roller to actuate the cutting device, said device being forced to its original position after the blank is coiled by means of the spring; a crosshead mounted on said rod; and a plurality of rods connected to said crosshead for feeding the blanks of metal into the bore and around the sleeve of the mandrel to form the cylinder.

13. A machine for producing cylinders from sheet metal strips comprising a base block having a cylindrical bore therein and a guideway for the sheet metal; a mandrel mounted in said bore; a spring-pressed cutting device mounted on the block and having a knife arranged adjacent the guideway for cutting off the blanks to be formed into cylinders; a pair of lugs secured to said cutting device; a roller mounted on the lugs; a rod having a cam surface adapted to cooperated with said roller to actuate the cutting device and having a slot therein; said device being forced to its original position after the blank is coiled by means of the spring; a cross head mounted in the slot in the rod; and means connected to said crosshead for feeding the blanks of metal into the bore and around the mandrel to form the cylinder, said means being actuated due to the actuation of the rod, and the cutting device operates to cut off the blank whereafter the feeding of the blank takes place, due to the slot in the rod.

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

JOHANNES GRONEFELD.