

G. CHRISTENSON.

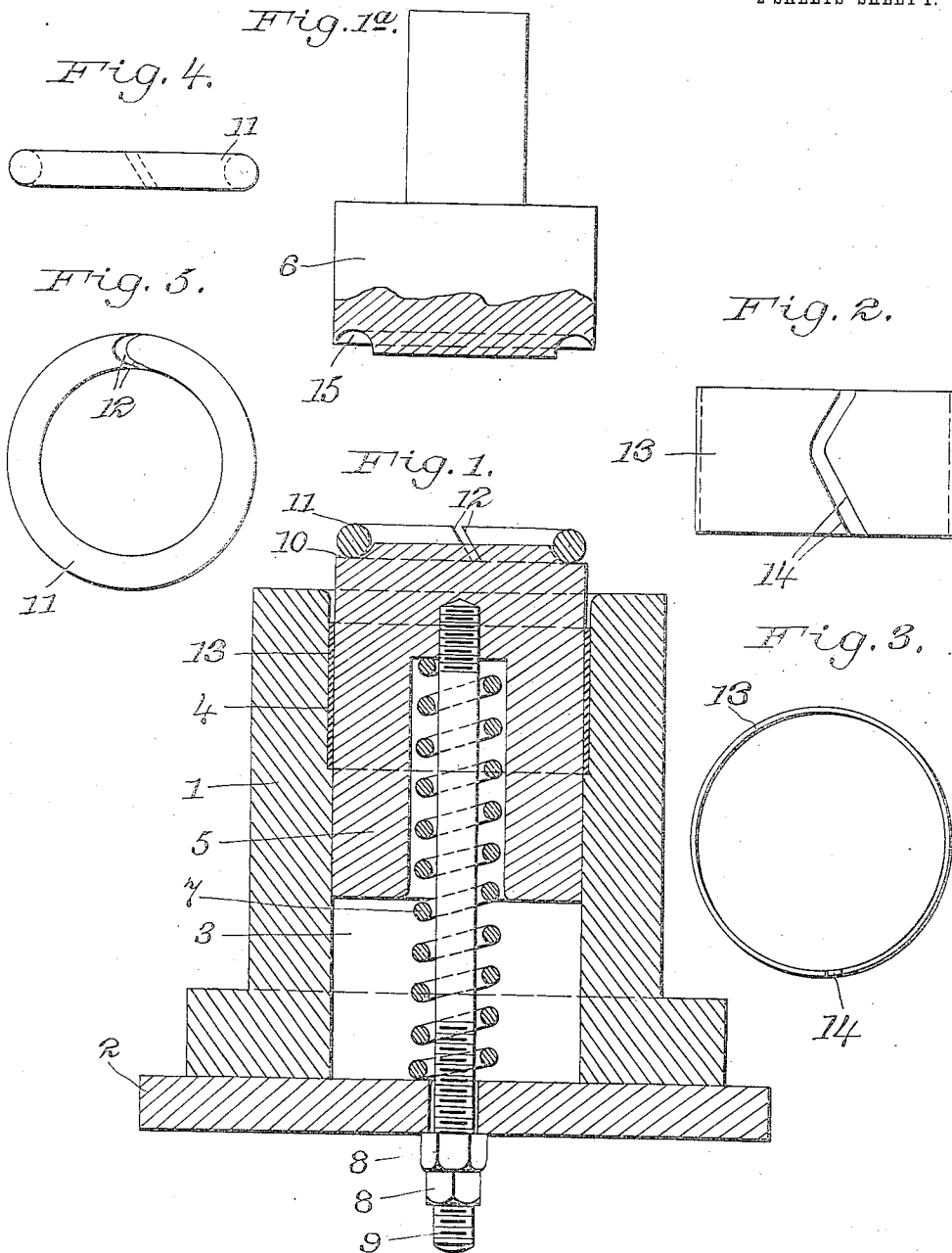
DIE.

APPLICATION FILED JUNE 14, 1911.

1,041,960.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 1.



Witnesses:
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2 SHEETS—SHEET 2.

Fig. 6.

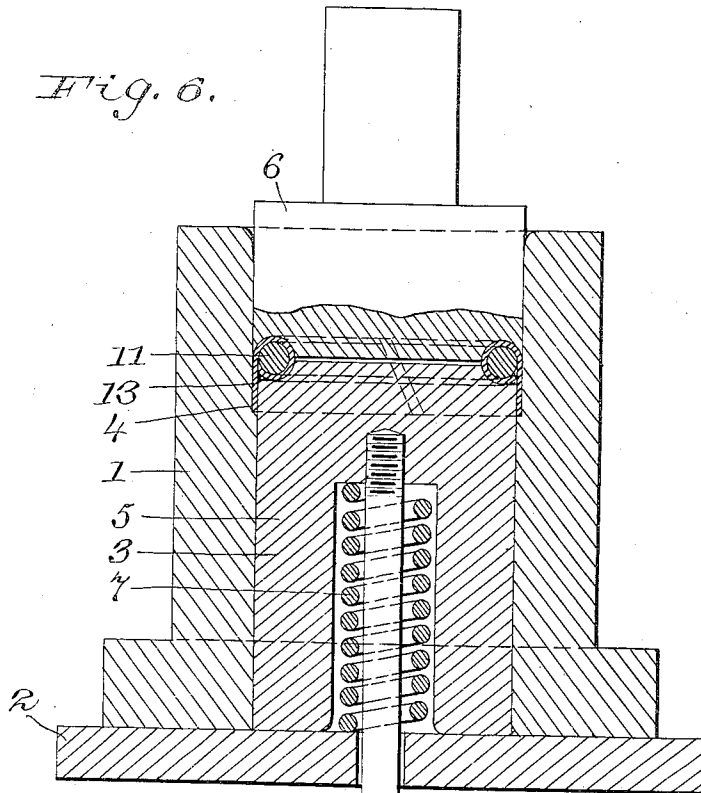


Fig. 7.

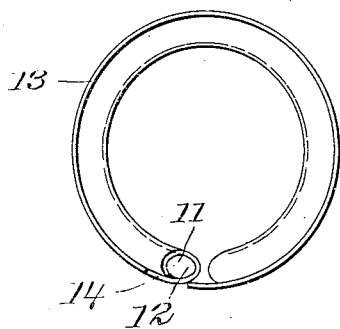
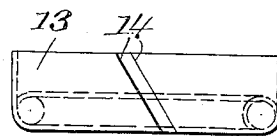


Fig. 8.



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UNITED STATES PATENT OFFICE.

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DIE.

1,041,960.

Specification of Letters Patent.

Patented Oct. 22, 1912.

Application filed June 14, 1911. Serial No. 633,078.

To all whom it may concern:

Be it known that I, GEORGE CHRISTENSON, a citizen of the United States of America, residing at Nevada, county of Vernon, State of Missouri, have invented certain new and useful Improvements in Dies, of which the following is a specification.

My invention relates to dies or formers for producing the special type of piston packing expander shown and described in my U. S. Patent No. 984,888 dated February 21, 1911.

The best form of apparatus embodying my invention at present known to me is illustrated in the accompanying two sheets of drawing, in which,

Figure 1 is a vertical central section of the cylindrical holder and movable core therein, and Fig. 1^a is a side elevation and partial section of the die cooperating therewith. Fig. 2 is a side view and Fig. 3 an end view of part of the materials employed forming the packing expander with said holder and die, and Fig. 4 is an edge view and Fig. 5 a plan view of another part of the materials so employed. Fig. 6 is a section similar to Figs. 1 and 1^a showing the parts of the former assembled in the act of producing the finished piston expander. Fig. 7 is a plan view and Fig. 8 a side view of the completed packing expander, produced by the operation of the former on suitable materials.

Throughout the drawings like reference numerals indicate like parts.

1 is a holder having an inner portion 3 and an outer portion 4 of slightly larger internal diameter. This holder rests upon a bed plate 2. A core 5 is mounted and movable in the smaller bore 3 and projects more or less into the larger bore 4 according to its position in the process of operation.

6 is a die which fits closely into the larger bore 4 when forced downward by hand or any convenient mechanism not shown.

Normally the core 5 is held up in the position shown in Fig. 1 by the spring 7 or other elastic means so that the upper end of the core is about on a level with or slightly above the upper end of the holder 1. This position of the core may be regulated by the stop nuts 8, 8, which are adjustable on the lower threaded end of the

rod 9, the upper end of which is screwed into the core 5, or otherwise fastened thereto. The upper end or face of the core 5 has an annular recess 10 formed therein, of arc shaped cross section.

11 is a rod of circular cross section curved to form a ring, as shown in Fig. 5, and having preferably diagonal faces 12 on its adjacent ends, as shown in Figs. 1, 4 and 5.

13 is a curved ribbon of sheet metal of a thickness equal to the difference in radii of bores 3 and 4 and fitting into the larger bore 4 around the core 5, as shown in Fig. 1. This ribbon 13 has diagonally cut ends as shown at 14 in Fig. 2.

The die 6 has an annular recess 15 cut in its circumference, the recesses 10 in the core face and 15 in the die face being of such cross section that when the core and die meet they form an annular recess of circular cross section, the radius of which cross section is equal to the radius of the curved rod 11 plus the thickness of the metal ribbon 13. When the die and core are forced down into the holder 1 in the position shown in Fig. 6, this annular recess has an outlet tangent to the circumference of the circular cross section and coincident with the wall of the larger bore of the holder and of course parallel to the common axis of bore and die and holder, as shown in Fig. 6. This annular recess and outlet are completely filled by the completed article shown in Fig. 8 when the materials are first placed in the holder and on the core, as shown in Fig. 1, and the die forced down into the position shown in Fig. 6.

The operation of my invention is clear from the foregoing. The ribbon blank 13 being placed in the holder 1, and the rod or wire blank 11 being placed in the recess on the face of core 5, as shown in Fig. 1, it follows that when the die 6 is forced down, the sharp outer edge or lip of the die will wedge itself between the wall of the holder 1 and the upper edge of the ribbon ring 13 bending said ring inward. Further travel of the die, the core 5 yielding before it, will force the upper edge of the ribbon 13 over and around the curved rod 11 until it enters the annular recess 10 in the core face and further travel of the die and core will force the ribbon around in

said annular recess 10 until the rod 11 is completely encircled, as shown in Figs. 6, 7 and 8.

In order to produce the article described and claimed in my above mentioned patent, the rod 11 would be of tempered steel or other highly elastic material while the ribbon 13 is of more ductile material.

A most important feature of the operation of my invention as above described is the manner in which the holder 1 and the movable core 5 support the metal ribbon 13 during the crimping over of its upper edge by the die 15 to bend it around curved rod 11. The lower uncrimped portion of the sheet metal ring 13, being held tightly between the holder and the upper portion of the gradually receding core 5, cannot buckle or be otherwise deformed.

While I have described my invention for use in making piston packing expanders, it could, with slight modifications, be used for making other articles.

Having, therefore, described my invention, I claim:

1. The combination of a holder having a cylindrical bore, a movable core therein provided with an annular groove at its outer end adapted to receive a curved rod, an annular recess on the inner face of the holder next to its outer end adapted to receive a curved ribbon of sheet metal, a die adapted to fit closely in said annular recess and having an annular groove which in combination with the groove in the end of the plunger forms an annular recess of a circular cross section, the radius of which cross section is approximately equal to the radius of the cross section of the curved rod plus the thickness of the metal ribbon.

2. The combination of a holder having a cylindrical bore, a movable core therein provided with an annular groove at its outer end adapted to receive a curved rod, an annular recess on the inner face of the holder next to its outer end adapted to receive a curved ribbon of sheet metal, a die adapted to fit closely in said annular recess and having an annular groove which in combination with the groove in the end of the plunger forms an annular recess of a circular cross section, the radius of which cross section is approximately equal to the radius of the cross section of the curved rod plus the thickness of the metal ribbon, together with elastic means for normally projecting the core part way out of the holder.

3. The combination of a holder having a cylindrical bore, a core centered therein, and

a die adapted to fit into said holder and meet the core, the parts being cut away to form an annular recess at the meeting point of holder, core and die, the cross section of which recess shall be circular with a tangential outlet parallel to the common axis of holder, core and die.

4. The combination of a cylindrical holder having an outer bore and an inner bore of slightly different radius, the inner bore having the smaller radius, a movable core fitting said smaller bore and projecting part way into the larger bore, and a die fitting said larger bore, the meeting faces of core and die being cut away so as to form an annular recess of circular cross section with an outlet tangent to the circumference of that cross section and coincident with the wall of the larger bore of the holder.

5. The combination of a cylindrical holder having an outer cylindrical bore and an inner cylindrical bore of slightly different radius, the inner bore having the smaller radius, a movable core fitting said smaller bore and projecting part way into the larger bore, and a cylindrical die fitting said larger bore and movable therein along the line of the common axis of holder and die.

6. The combination of a cylindrical holder having an outer cylindrical bore and an inner cylindrical bore of slightly different radius, the inner bore having the smaller radius, a movable core fitting said smaller bore and projecting part way into the larger bore, and a cylindrical die fitting said larger bore and movable therein along the line of the common axis of holder and die, together with elastic means for normally holding the core in a predetermined position in the holder but permitting it to be forced farther into said holder when pressed in by the die.

7. The combination of a cylindrical holder having an outer bore and an inner bore of slightly different radius, the inner bore having the smaller radius, a movable core fitting said smaller bore and projecting part way into the larger bore, and a die fitting said larger bore, together with elastic means for normally holding the core in a predetermined position in the holder but permitting it to be forced farther into said holder when pressed in by the die, said die having an annular lip on its outer circumference adapted to crimp in the edge of a sheet-metal ribbon held in the larger bore of the holder.

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