No. 771,921. PATENTED OCT. 11, 1904.

B. McGOVERN.

COMPRESSING MACHINE.

APPLICATION FILED NOV. 12, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

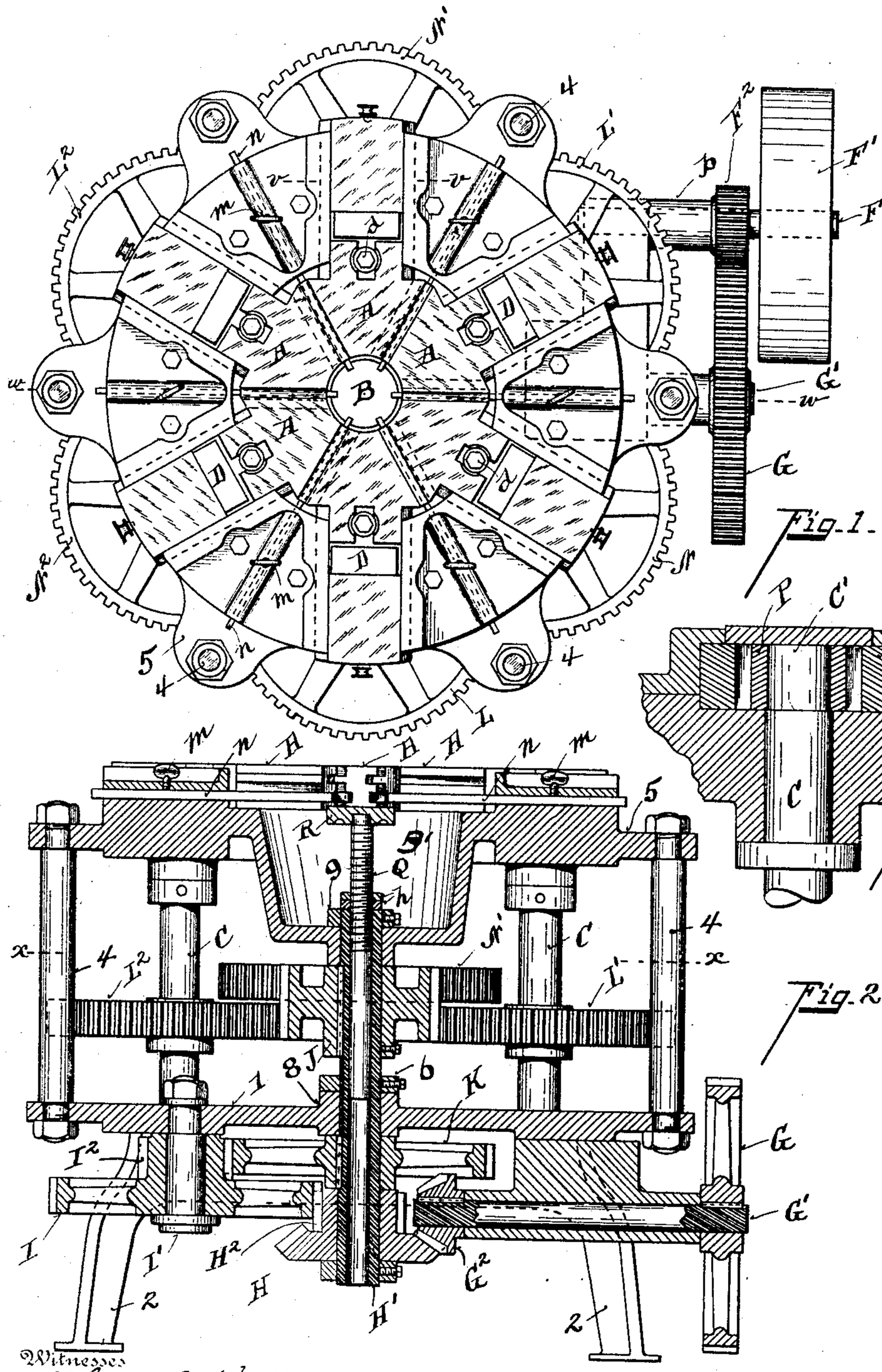

Fig. 1.

Fig. 7.

Fig. 2.

Witnesses
Olwin B. Kaiser
Louise Beck

Inventor
By Bernard McGovern
Wood & Wood
Attorneys

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NO MODEL. 2 SHEETS—SHEET 2.

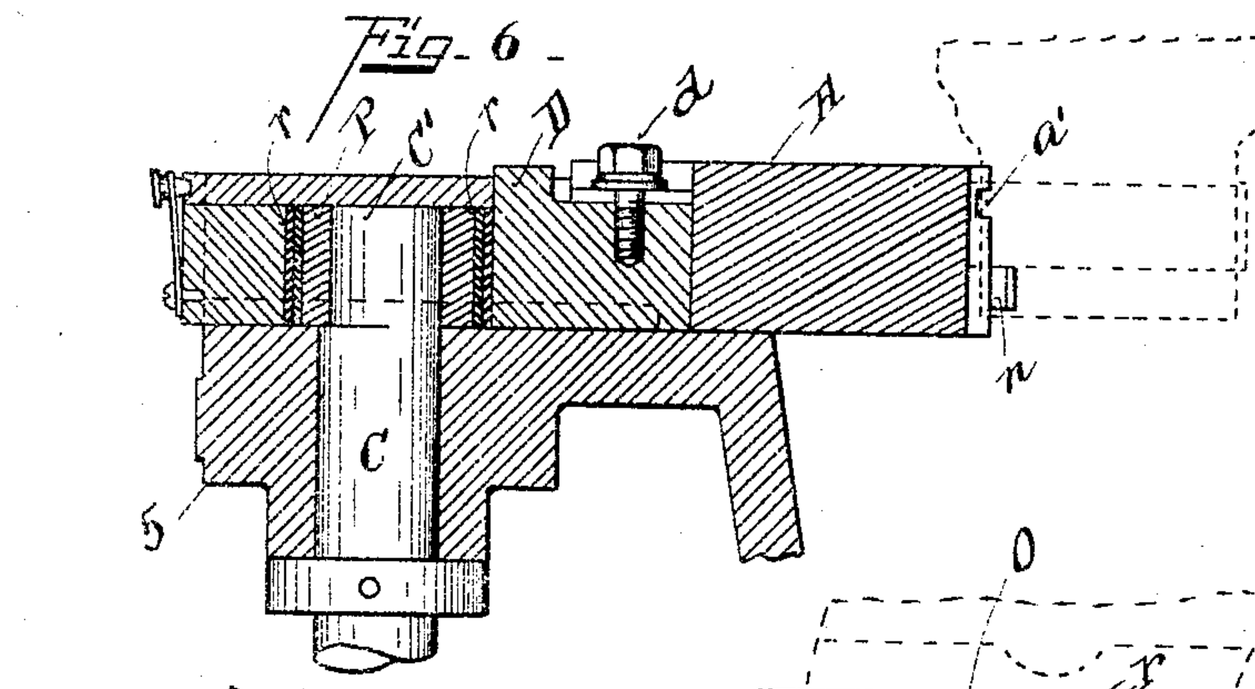

Fig. 6.

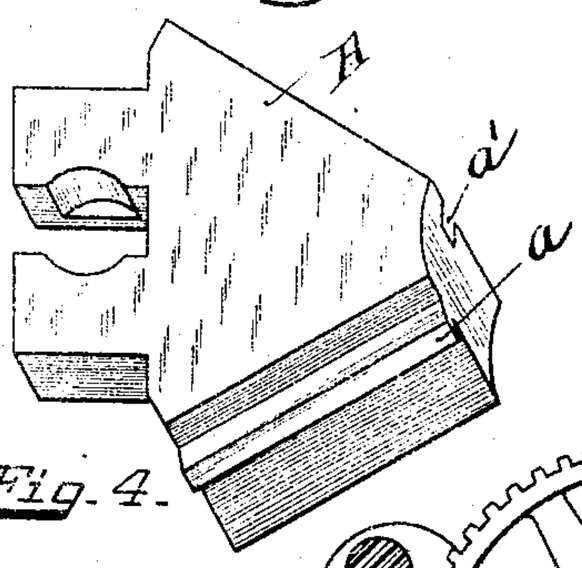

Fig. 4.

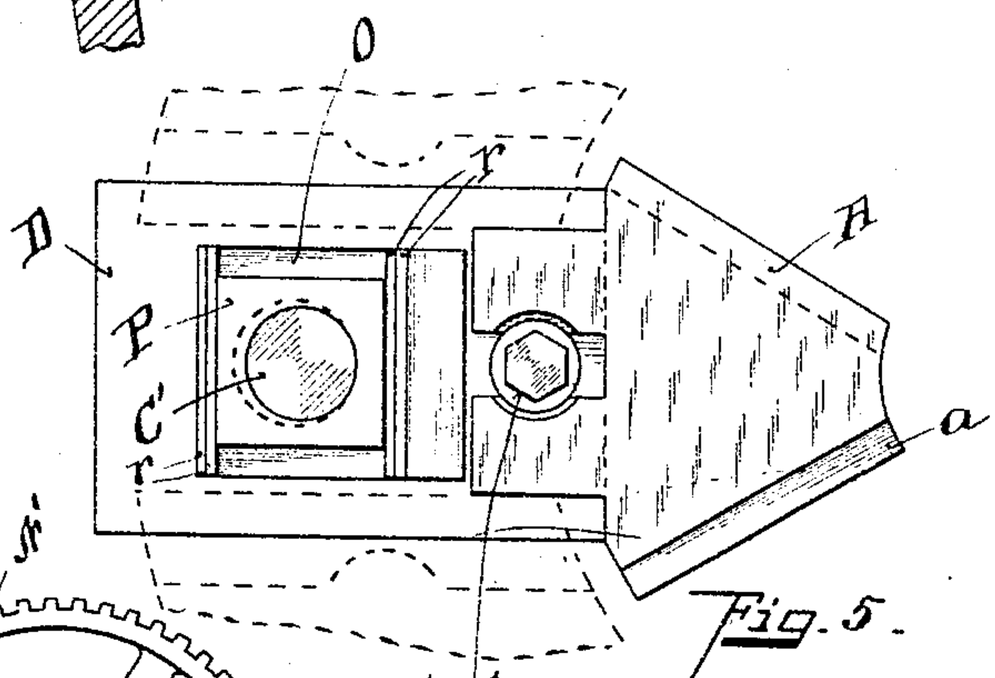

Fig. 5.

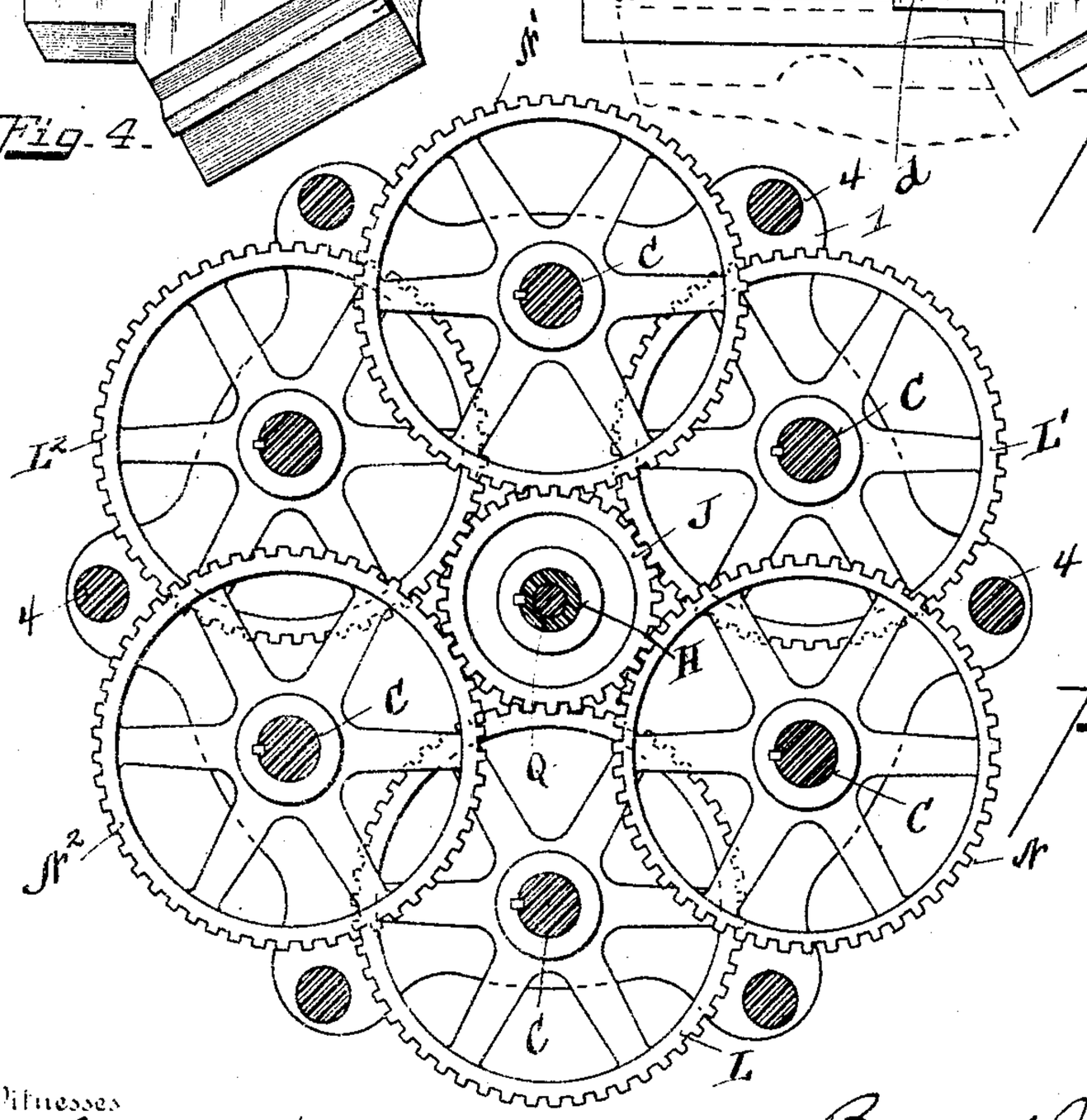

Fig. 3.

Witnesses
Olive B. Kaiser
Louise Beck

Inventor
By Bernard McGovern
Woods Hoyt
Attorneys

No. 771,921. Patented October 11, 1904.

UNITED STATES PATENT OFFICE.

BERNARD McGOVERN, OF CINCINNATI, OHIO, ASSIGNOR TO THE McGOVERN TIRE SETTER COMPANY, OF CINCINNATI, OHIO, A CORPORATION.

COMPRESSING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 771,921, dated October 11, 1904.

Application filed November 12, 1903. Serial No. 180,968. (No model.)

To all whom it may concern:

Be it known that I, BERNARD McGOVERN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Compressing-Machines, of which the following is a specification.

The primary object of my invention is to provide a machine for upsetting or compressing the bands on wheel-hubs.

Another object of my invention is to use the same mechanism for compressing the hubs with the band thereon.

The features of my invention are more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a top plan view of my machine. Fig. 2 is a central vertical section on line *w w*, Fig. 1. Fig. 3 is a section on line *x x*, Fig. 2. Fig. 4 is a perspective view of one of the segment-dies. Fig. 5 is a top view of the segment and driving mechanism. Fig. 6 is a central vertical section of Fig. 5. Fig. 7 is a section on line *v v*, Fig. 1.

A represents segment-dies arranged in series around the table or bed, their inner faces forming arcs of a circle concentric to a common axis.

B represents a recess in which the wheel-hub is supported and upon the surfaces of which the vertical concave faces of the dies are impressed to compress the band and hub. These dies are made to reciprocate to and from their axial center by powerful mechanism.

The construction of the machine is such that a single revolution of the actuating-eccentrics C′ performs the operation of compression of the hub or band and bringing the dies back in position for a second operation.

The machine is constructed in the following manner.

1 represents the base-frame of the machine, preferably upon legs 2, and upon which is supported by posts 4 the table or bed 5 and upon which bed are mounted the segment-dies A. The dies are preferably connected together laterally by the tongue *a*, engaging with the groove *a′* in the next adjacent segment so that the dies are free to move inwardly, but are firmly supported against vertical movement. Around the table are provided a series of ways in which are placed actuating-stocks D, which are rigidly secured to the segments by a set-bolt *d*. Each of these stocks and attached segments are actuated by an eccentric-shaft C, to which shaft is imparted a continuous slow motion upon which great power is obtained by compounding of the driving-gears. These driving-gears are constructed and operated as follows: The table is preferably formed with the central countersunk or cup portion B′, in the center of which is supported a hub-support and within which space the dies reciprocate to and from the central hub-support, as shown in Fig. 2. F represents the main driving-shaft driven by power-pulley F′. Said shaft is journaled in the bearing *b*. F^2 represents a driving-gear of small diameter fixed on shaft F, meshing with and driving a larger gear G, mounted upon the shaft G′ and journaled to the frame, as shown in Fig. 2. G^2 represents a bevel-gear on shaft G′, meshing and driving a larger bevel-gear H, loosely journaled upon an axial shaft H′, journaled in the base and in the center of the bottom of the countersunk portion B′ of the table 5, as shown in Fig. 2. Thus the table and base are rigidly secured together by the external peripheral posts 4 and the central driving-shaft H′, which has its bearings in the table and base at their respective centers. This shaft forms the axial center for the compressing-dies. Upon the hub of bevel-gear H is a spur-gear H^2, meshing with and driving the larger compounding gear I, which is loosely journaled upon a stub-shaft I′. I^2 represents a spur-gear on the hub of gear I, meshing with and driving a spur-wheel K, splined on the axial shaft H′, preferably of sleeve form, and rotates the same. In order to support said sleeve, I provide a collar 6, fixed thereon and resting on the hub 8 of the cross-plate. 9 represents a collar supporting the sleeve at the top. Fixed to sleeve-shaft H′ is an elongated gear J. The gear J drives the series of six gears mounted upon the eccentric-shafts C. In order that these gears may be of large size

to further compound the power, they are arranged to be driven in the following manner: Three of said gears L L′ L² are set on their respective shafts in a plane below the companion gears N N′ N² on the other eccentric-shaft E. Gear J being elongated meshes with each of these fixed gears, three on the upper and three on the lower plane. Gear J is thus an axial gear to each of the eccentric-shaft gears, and secures a positive uniform motion of the several eccentric-shafts C and a corresponding uniform motion of the compressing-dies.

Motion is imparted by the eccentric-shafts to the compressing-dies in the following manner: The construction of each being a duplicate of the others a description of one will suffice. The stock D is provided with a rectangular orifice O. P represents a block in which the eccentric end of shaft C journals. It is manifest that when the parts are in position shown in Fig. 5 the segment-die occupies the innermost position, and when said shaft is turned half around the die will occupy the outermost position, and that a half-revolution of the eccentric produces the compression and a full revolution moves the dies in a position for second operation.

In order that the throw of the die may be changed to a larger or smaller circle of compression, as desired, the following devices are provided: *r* represents a series of risers or plates interposed between the eccentric-block and the sides of the stock-orifice. When one or more of these are removed, the die can be adjusted in or out and the filler-strips placed in the appropriate position for such adjustment. It will be observed that the amount of radial movement of the die corresponds exactly to the eccentricity of the driving end of shaft C. Thus if the eccentricity be one-eighth of an inch the die on one side will be driven inwardly one-eighth of an inch, and as the diametrical opposite die is driven inwardly a corresponding distance the amount of circular compression of the work will be one-quarter of an inch.

At the top end of the axial shaft H′, which is shown of sleeve form, is threaded a step-shaft Q. Upon the top of this is swiveled a head R. This shaft can be raised or lowered by the adjusting-nut *h* to occupy any desired height relative to the dies. A series of supports *n* are likewise provided, so that they may be adjusted in and out, as is shown in Figs. 1 and 2. The supports *n* occupy the position relative to the tongue and groove, as shown in Fig. 6, the dies being recessed to form ways for the supports to move in, so that they may be used as centering as well as supporting devices. *m* represents set-screws for holding these rigidly-adjustable supports radial to any adjusted position. These supports *n* are convenient as when placing a ring on a hub, say, to band it in the middle. The ring is to be supported upon the parts *n* and the hub inserted through the ring and rests upon the head R. These supports are to be found convenient in many other ways.

The operation of the machine is very simple. The compression-dies are moved to exactly the outermost position. The object to be compressed or upset is placed upon the support between the faces of the compressing-dies. The machine is started and the revolution of the train of gears will impart a slow but continuous motion to the eccentrics C′, which will continuously and gradually drive the series of dies inwardly converging to a common center until their innermost point of travel is reached, when the compression will be imparted. Motion is continued until the eccentrics C′ have made a complete revolution, when the machine is stopped, the work removed, and the second piece is inserted ready for a second operation.

It will be observed that when the segment-dies occupy their outermost position there is a space or opening between their adjacent sides, so as to allow of their being driven inwardly without coming in contact, which would prevent their inward movement. It is very desirable that the dies be maintained in a parallel horizontal plane, so that their impinging or circular faces will be maintained on the work. This position is maintained by means of the tongue-and-groove system shown in the drawings, which is deemed the best mode of having a locking system against moving of the dies; but I do not wish to limit myself to this form, as other means of maintaining of the parallelism of the dies horizontally by projections from one die engaging against the other die might be provided and still maintain lateral locking mechanism preventing any vertical displacement of the dies.

Having described my invention, I claim—

1. In a device of the class described, a frame consisting of a parallel base and table secured together, a central power-shaft journaled in said base and table, a central hub-support, a series of driven shafts journaled in said base and table concentrically to said central power-shaft, means for driving said power-shaft, means for back-gearing from the center to the concentric shafts, a series of dies on the table movable radially to and from said hub-support, the driven shafts having eccentrics for positively reciprocating said dies, substantially as described.

2. In a device of the class described, a base and table, a central power-shaft and concentrically-arranged driven shafts journaled in said table and base, gears between said driving and driven shafts, a central hub-support, a series of stocks having radial guideway connection with the table, each stock having a slide-box, a slide-block eccentrically connected to each driven shaft mounted to reciprocate in each slide-box, filling-plates for said slide

boxes and blocks, a series of dies detachably connected to said stocks and having a mutual tongue-and-groove engagement insuring their converging in the plane of strain, and means for conveying power to the driving-shaft whereby said stocks and dies are positively reciprocated by power, substantially as described.

3. In a device of the class described, a table, a central hub-support, a series of concentrically-arranged eccentric-shafts, means for rotating said shafts, a series of stocks each having a gibbed connection with the table, radially relative to the hub-support, each stock having means engaging with an eccentric-shaft, for positively reciprocating the stock, each stock having a segment-die detachably secured on its inner end, and a tongue-and-groove connection between the series of segment-dies whereby different-sized dies may be readily interchanged relative to a common series of actuating-stocks, substantially as described.

4. In a machine of the class described, a frame consisting of a base and table secured together, the central portion of the table being open, a central driving-sleeve shaft having bearings in the frame, a parallel series of driven shafts journaled in the frame concentrically relative to said driving-shaft, means for driving said central shaft-gearing between said central driving-shaft and each of the driven shafts, a series of dies supported by the table and movable radially to and from the table center, eccentric driving connections between the driven shafts and dies adapted to reciprocate the dies, a hub-support having a stem engaging into the bore of said central driving-sleeve shaft, and means for vertically adjusting said stem in said sleeve-shaft, substantially as described.

5. In a machine of the class described, a frame, consisting of a base and table, the table being provided with a central countersunk portion, the table and base being secured together at their outer edges, a central driving-sleeve shaft having bearings in the base and in the center of the countersunk portion of the table, a series of driven shafts journaled in the frame concentrically relative to said central shaft, means for driving the central shaft, transmitting devices between the driving and driven shafts, a series of dies supported by the table and movable radially to and from the table center, eccentric driving connections between the driven shafts and dies respectively, adapted to reciprocate the dies, a hub-support having a stem engaging into the bore of the central driving-sleeve shaft, and means for vertically adjusting said stem in said sleeve, substantially as specified.

6. In a machine of the class described, a frame, consisting of a base and table secured together, the central portion of the table being open, a central driving-sleeve shaft having bearings in the frame, a series of driven shafts having bearings in the frame concentrically relative to said central shaft, a driving-wheel loosely journaled on the lower end of the sleeve-shaft, means for rotating said driving-wheel, a driven gear-wheel fixed to the central driving-shaft above said driving-wheel, a stud-shaft journaled in the frame having compound gears thereon, one member of which engages the driving, and the other the driven wheel on said central sleeve-shaft, gear-wheels connecting the driving-sleeve with each of the concentrically-disposed driven shafts, a series of dies supported by the table, radially movable thereon to and from the center of the table, eccentric driving connections between the said driven shafts and dies adapted to reciprocate the dies, a hub-support having a stem engaging into the bore of said driving-sleeve, and means for vertically adjusting said stem in said sleeve, substantially as described.

7. In a machine of the class described, a frame consisting of a base and table secured together, the table being provided with a central opening, a central vertical shaft, means for driving the same, a concentric series of vertical driven shafts, each of said shafts having bearings in the frame, transmitting devices between the said central shaft and each of the driven shafts, a hub-support centrally supported relative to the open portion of the table, a series of stocks each having a gibbed connection with the outer peripheral portion of the table in a direction radial relative to the hub-support, each of the driven shafts having an eccentric connection with its stock, whereby the stocks are simultaneously reciprocated on said table when the central shaft is rotated, each stock having supported on its inner end and within the open portion of the table a segmental die, the said dies having a mutual tongue-and-groove engagement, interlocking them in a horizontal plane of movement in the open portion of the table, and means for detaching said segment-dies from their respective stocks, substantially as described.

In testimony whereof I have hereunto set my hand.

BERNARD McGOVERN.

Witnesses:

OLIVER B. KAISER,

HARRY R. IRVIN.