

A. J. OEHRING.

DRIVING MECHANISM FOR MULTIPLE DRILLS.

No. 544,068.

Patented Aug. 6, 1895.

Fig. 1.

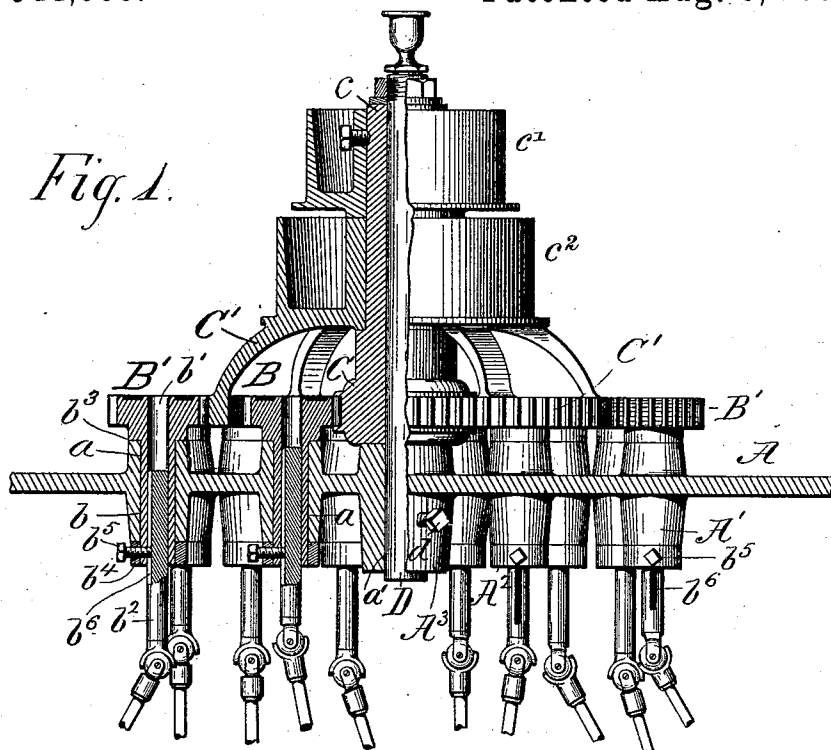
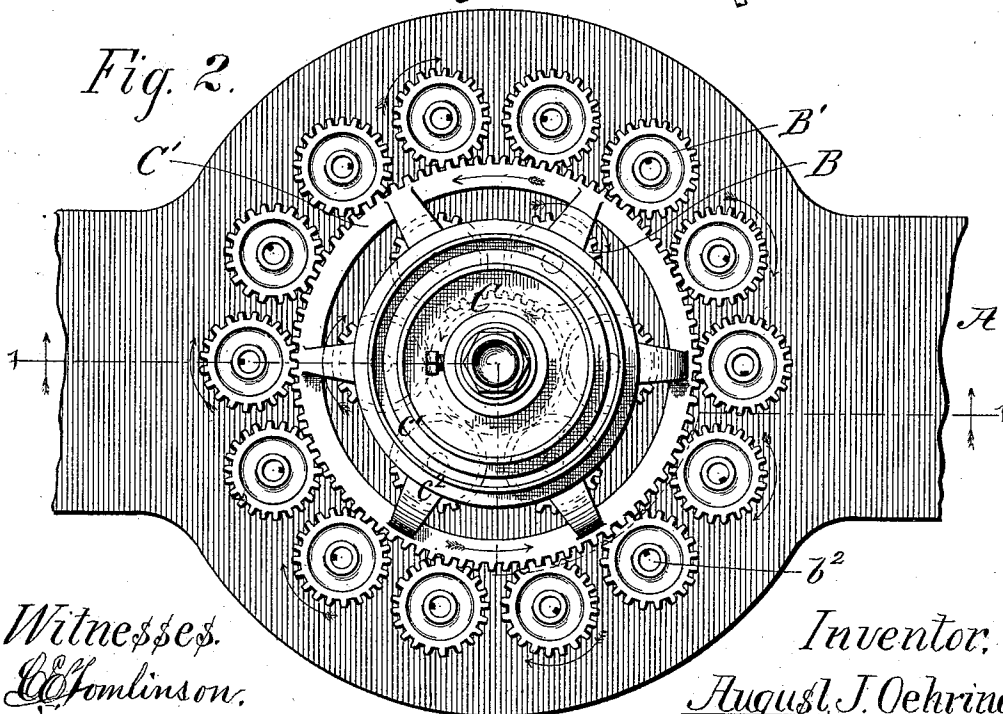


Fig. 2.



Witnesses.
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(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

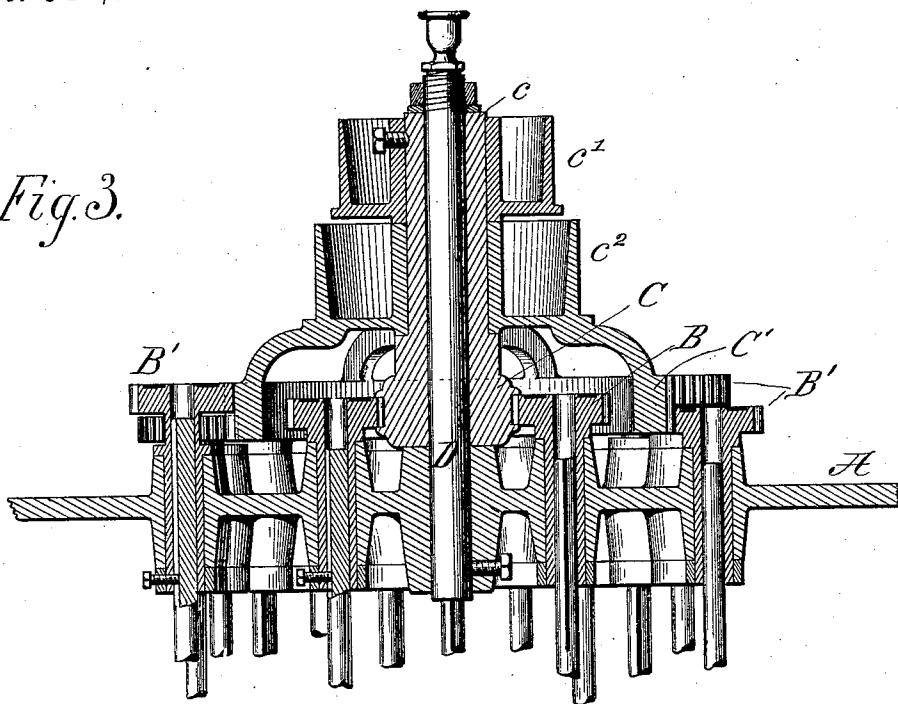
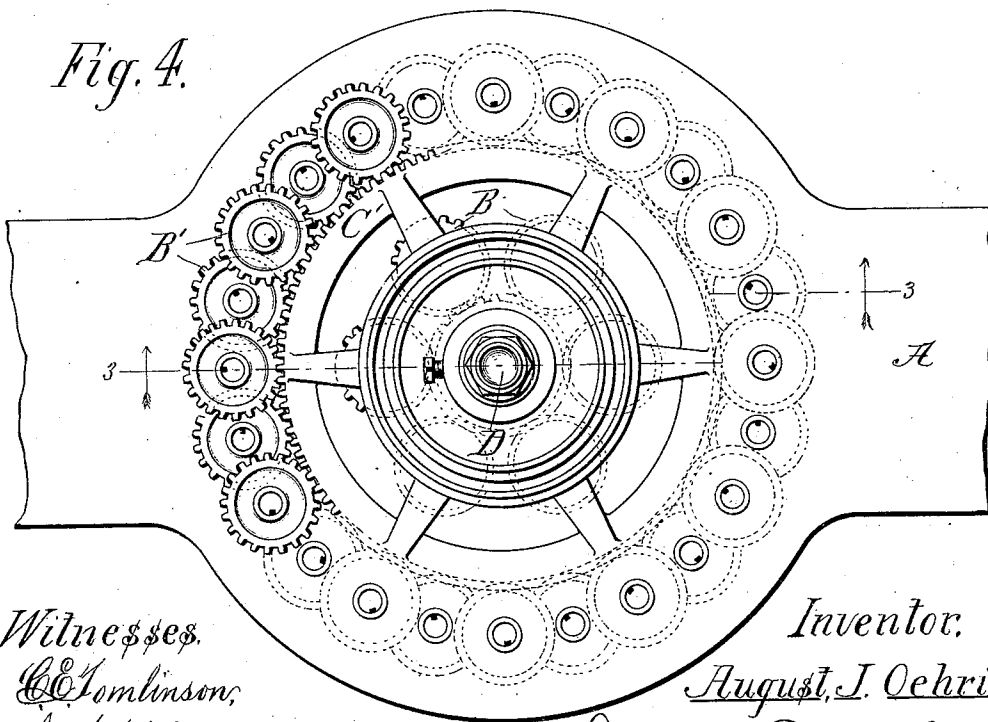


Fig. 4.



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Fig. 5.

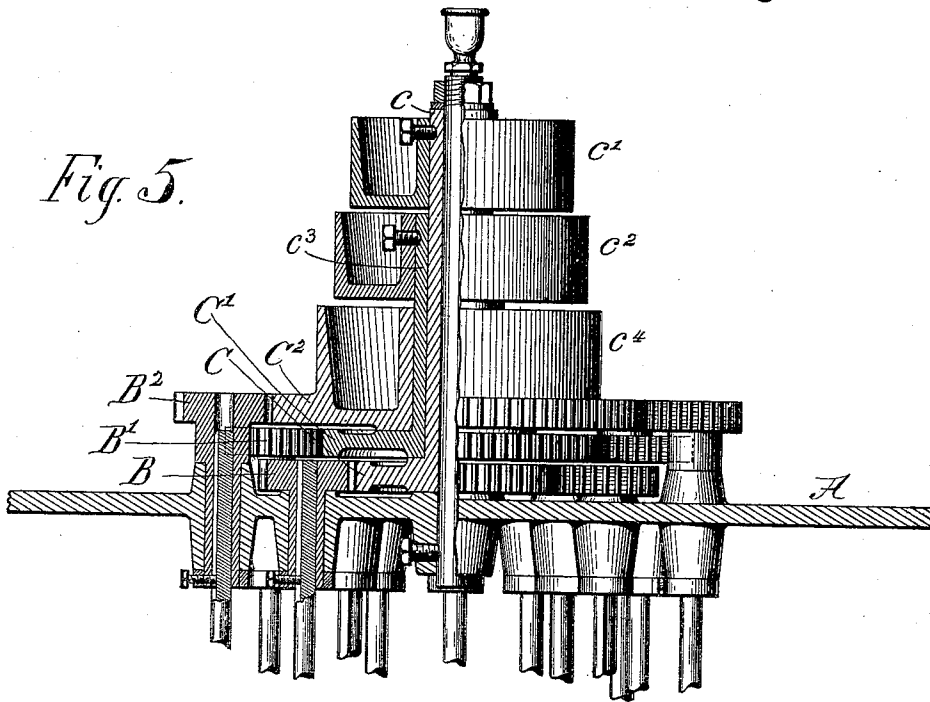
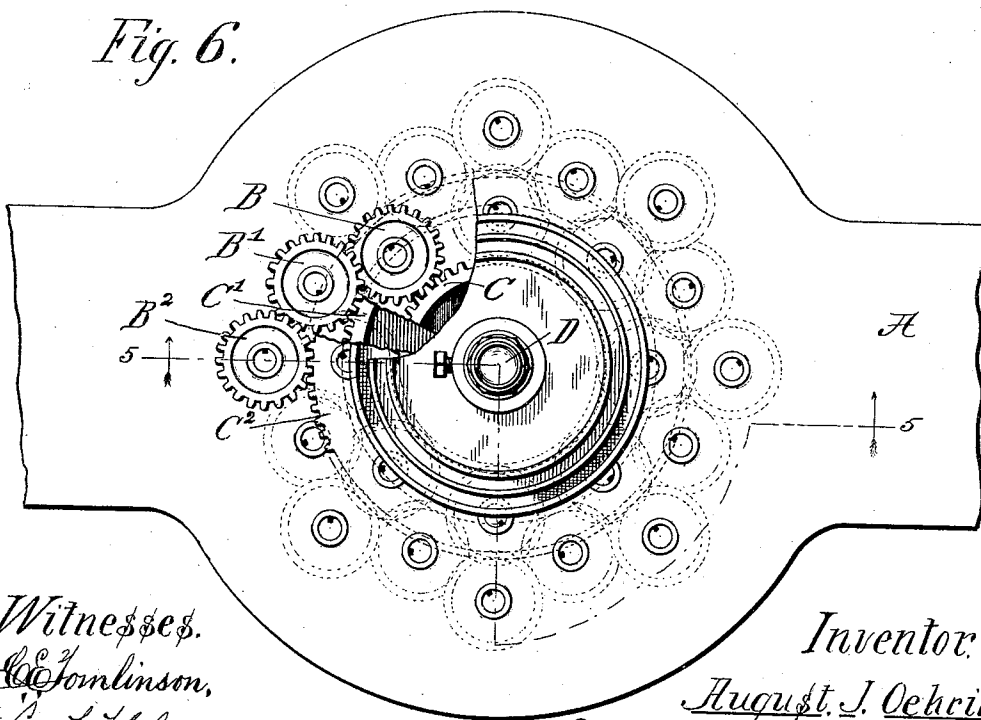


Fig. 6.



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UNITED STATES PATENT OFFICE.

AUGUST J. OEHRING, OF CHICAGO, ILLINOIS.

DRIVING MECHANISM FOR MULTIPLE DRILLS.

SPECIFICATION forming part of Letters Patent No. 544,068, dated August 6, 1895.

Application filed June 11, 1892. Serial No. 436,307. (No model.)

To all whom it may concern:

Be it known that I, AUGUST J. OEHRING, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Driving Mechanism for Multiple Drills and Similar Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to the driving mechanism of multiple drills and similar machines in which a number of shafts or spindles are desired to be simultaneously rotated, the object of said invention being to provide a construction in which such number of driven shafts or spindles may be arranged in a small space about a central point.

To this end the invention consists in the construction substantially as hereinafter set forth and shown in the accompanying drawings.

In said drawings, Figure 1 is a side elevation, in partial section, of one form of my improved mechanism. Fig. 2 is a top view of the arrangement shown in Fig. 1. Figs. 3 and 5 are sections showing modifications of the arrangement shown in Fig. 1, and Figs. 4 and 6 are plan views of the arrangements illustrated in Figs. 3 and 5, respectively.

First describing Figs. 1 and 2, A represents a plate belonging to the frame of the machine, and A' A² two circular concentric series of bosses, through each of which an aperture *a* is provided to serve as a bearing for a hollow pinion journal or hub, in which is inserted a shaft or spindle to be driven. In the center of the two circular series of bosses A' A² is located a boss A³, in or through which an aperture *a'* is formed to receive the end of a shaft intended to serve as an axis on which driving-wheels are to be rotatably mounted for the actuation of the shaft-pinions.

B B' represent the shaft-pinions, and C C' the driving-wheels, B indicating the pinions of the inner or smaller circular series and B' those of the outer series, C the driving-wheel for the inner series of pinions and C' that for the outer series. As illustrated in Figs. 1 and 2, the two series of shaft-pinions B B' are arranged in the same plane; but manifestly they

may be situated in different planes, and particularly the outer series of pinions B' may be more elevated than the inner series B.

D represents the axial shaft for the driving-wheels, secured in the central opening *a'* of the frame and preferably held from rotation therein by means of a set-screw *d* or its equivalent. The shaft D projects above the frame A a suitable distance to receive the central driving-wheel C and its prolonged hollow hub *c*, the said hub *c* being finished externally to serve as a journal on which the driving-wheel C' is rotatively mounted. Said hub *c* is also prolonged above the driving-wheel C' far enough to receive the detachable belt-pulley *c'* or its equivalent for giving rotation to the wheel C, while the driving-wheel C' is provided with a separate belt-pulley *c*² for its independent rotation. When the two series of shaft-pinions B B' are arranged in the same plane, as shown, the driving-wheel C', which is engaged with the outer series of such pinions, is concaved or dish-formed, as illustrated, so as to embrace the inner series of shaft-pinions B, as plainly indicated in Fig. 1 of the drawings.

Each of the pinions B B' is provided with a hub or journal *b*, which is inserted in one of the openings *a* of the frame, and each pinion and its journal is provided with an axial aperture *b'* to receive a spindle or shaft *b*². A shoulder *b*³ at the upper end of its journal *b* bears against the adjacent end of the boss A or A², and said journal projects through said boss far enough at its opposite end to receive the collar *b*⁴. This collar is held to the prolongation of the journal by means of a set-screw *b*⁵ which, as shown, projects into a longitudinal groove *b*⁶ in the shaft or spindle *b*² to insure rotation of said shaft or spindle with the pinion. These last mentioned features of construction are not in themselves new, nor is it new to provide shafts or spindles *b*² with jointed or flexible extensions connected with drill-carrying spindles or other devices which are sought to be actuated. In Fig. 1 the upper joints of the flexible shafts are shown, but the lower portions of said shafts, including the lower joints and the tool-carrying parts, with their supports, are omitted.

Next describing Figs. 3 and 4 it will be ob-

served that the construction there shown differs from that indicated in Figs. 1 and 2 only in that alternate pinions of the outer series B' are situated in different but proximate 5 planes and in that the toothed rim of the driving-wheel C' is made of sufficiently greater width to engage with all the pinions of said outer series so placed. The object of this arrangement is to provide for a greater number 10 of pinions in said outer series B' than could otherwise be employed without enlarging the circle occupied by them, and this object is manifestly attained by extending the hubs or shafts of alternate pinions upward 15 between adjacent pinions, as shown, separating the lower pinions of the series only far enough to afford room for these shafts or hubs and allowing the more elevated pinions to overlap the subjacent ones of the same 20 series.

In the modification shown in Figs. 4 and 5 three concentric series of driven pinions, B, B', and B² are shown, the series being in different planes and the pinions of each series being 25 shown in the same plane. Each series of pinions is driven by a separate driving-wheel, as in the preceding figures, making necessary three driving-wheels, C, C', and C². To provide for the third driving-wheel C² the hub c³ of the second wheel C' (which drives the middle series of pinions B') is prolonged through 30 and forms a journal for the third driving-wheel C², or that which drives the third or outermost series of pinions, the hub of the driving-wheel C being correspondingly prolonged 35 through the elongated hub of the driving-wheel C'. The construction and arrangement shown in Figs. 5 and 6 are manifestly susceptible of being further modified 40 to embrace other features, (shown in Figs. 3 and 4,) if desired, and obviously the number of series of shaft-pinions may be indefinitely increased by pursuing the suggestion afforded by Fig. 5 concerning the driving-pulleys c', 45 c², and c⁴.

I claim as my invention—

1. The combination with a supporting plate of a shaft mounted in and projecting at right angles from said plate, concentric circular series 50 of pinions mounted on said plate about the shaft in a plane parallel with the plate, independently revoluble driving gears mount-

ed on said shaft and intermeshing with said pinions and jointed drill spindles projecting from the pinions. 55

2. The combination, with two concentric, circular series of shaft pinions, one external to the other, of two independently rotatable driving wheels engaged one with the inner and the other with the outer of said series of 60 pinions, the driving wheel having engagement with the inner series of pinions being provided with a hub which forms a journal on which rotates the driving wheel for the outer series of pinions. 65

3. The combination with two concentric, circular series of shaft pinions arranged one within the other, in the same plane, of two independently rotatable driving wheels of which 70 that engaging the outer series of pinions is dish-shaped to embrace the inner series of pinions and of which that engaged with the said inner series of pinions is provided with a hub that forms the journal on which the other of said driving wheels rotates. 75

4. The combination with a frame supporting two concentric, circular series of shaft pinions, of a shaft in the common axis of said series of pinions, a driving wheel for the inner series of pinions, mounted on said shaft and 80 provided with an elongated hub, a driving wheel for the outer series of shaft pinions, mounted to rotate on said hub as a journal, and a pulley removably secured to the said hub externally to the last mentioned driving 85 wheel.

5. In combination with a frame supporting two or more circular, concentric series of shaft pinions and a shaft in the common axis of said series of pinions, a driving wheel for an 90 inner series of pinions having a hollow hub surrounding said central shaft, a belt pulley removably secured to said hub, and a driving wheel for the next outer series of pinions journaled on said hollow hub, between the 95 belt pulley and the driving wheel having said hollow hub.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

AUGUST J. OEHRING.

Witnesses:

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C. CLARENCE POOLE.