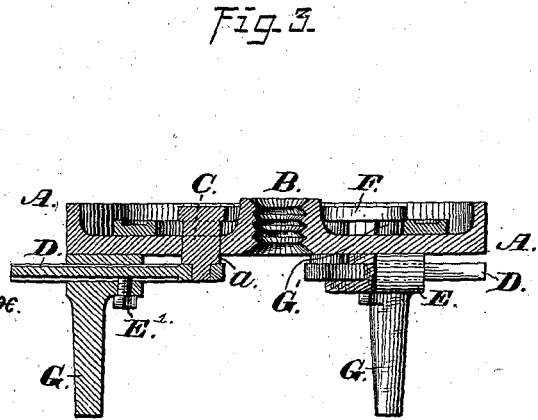
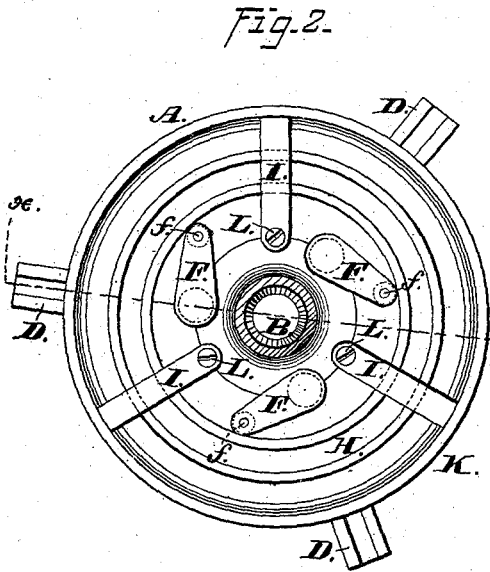
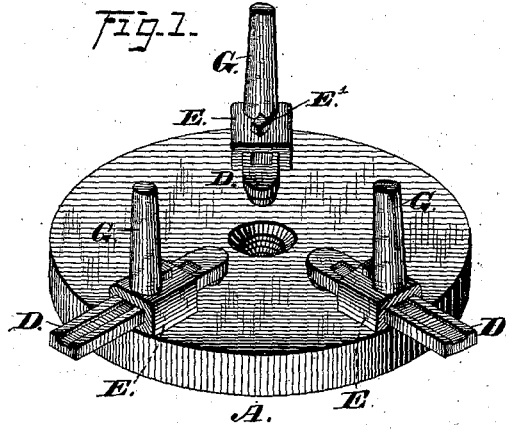


J. HILL.
Lathe Dog.

No. 229,131.

Patented June 22, 1880.



WITNESSES

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 J. A. Rutherford*

INVENTOR

John Hill,

*by James L. Norris.
 Atty.*

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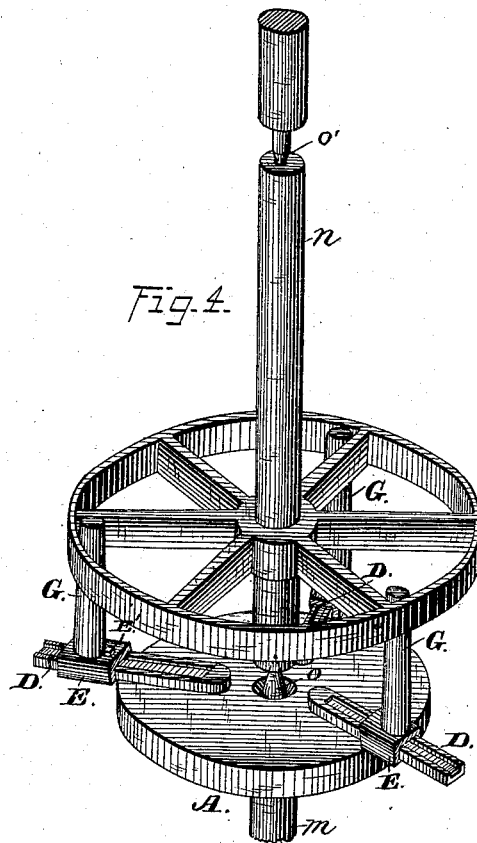


Fig. 4.

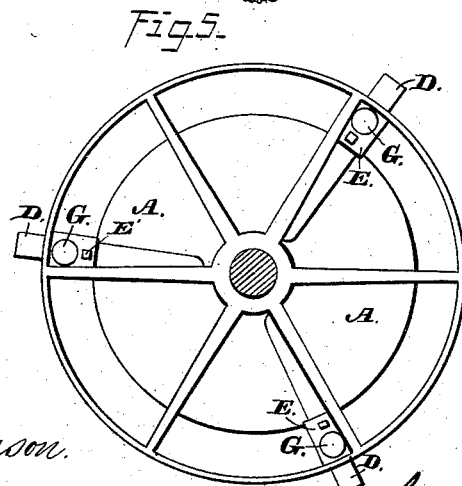


Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN HILL, OF COLUMBUS, GEORGIA.

LATHE-DOG.

SPECIFICATION forming part of Letters Patent No. 229,131, dated June 22, 1880.

Application filed February 24, 1880.

To all whom it may concern :

Be it known that I, JOHN HILL, a citizen of the United States, residing at Columbus, in the county of Muscogee and State of Georgia, have invented new and useful Improvements in Compound Lathe-Dogs, of which the following is a specification.

The nature of my invention relates to lathe dogs or drivers, and it is especially designed for furnishing solid driving for pieces to be turned, such as the faces or edges of light-armed metal pulleys or other like articles, where the web or arms between the central hub and outer surfaces are light and of insufficient strength to afford the requisite steadiness when the tool comes in contact with the rim.

With the ordinary mandrel and lathe-dog such articles, in turning, vibrate and cause the tool to "chatter," so much so that, owing to the difficulty in turning off the outer surfaces, there is a limit to the reduction of the strength of the arms of such pulleys and the like, whereas the proportions of the same might otherwise be considerably reduced for all practical purposes.

To remedy this I propose compounding two or more lathe-dogs, in connection with a face-plate, in such manner that the pulley or other article to be turned is driven equally by each dog in the system, the bearings of the said dogs being at points near the rim of the pulley, thereby throwing the driving-strain from the pulley-arms on the compound dogs.

To this end my invention consists, first, in providing the pivoted radial arms of the lathe-dogs with sliding dogs adapted to be adjusted in pulleys or other like articles; second, in the radial dog-arms connected upon the face-plate by spindles with crank-arms which are set at angles to the radial dog-arms, so as to be in position for acting upon a movable annular band or ring; third, in the combination of the pivoted arms, having crank-arms, with a loose ring arranged to be shifted upon the face-plate until all of the dogs upon the radial arms are in contact with the arms of the article to be turned, at which period the ring will be held stationary and the crank-arms be fixed by their opposing forces against the ring; fourth, in the general combination and arrangement of parts, all as hereinafter fully set forth and claimed.

In the drawings, Figure 1 is a perspective view of my improved compound lathe-dog, showing the radial arms with their sliding and adjustable dogs. Fig. 2 is a top view of the reverse side of the face-plate, showing the crank-arms and the loose ring. Fig. 3 is a section taken on a central line through the device. Fig. 4 is a perspective view of the dog arranged in connection with a pulley to be turned. Fig. 5 is a front view, in elevation, of a pulley and the dog, the mandrel being shown in section.

In the compound lathe-dog illustrated in the drawings three dogs or drivers are shown. These dogs are applied to a face-plate, A, provided with an internally screw-threaded hub, B, by means of which it is screwed upon the live-spindle of an engine-lathe, as shown in Fig. 4, in which *m* designates the live-spindle. This face-plate may be of any proportionate diameter within the "swing."

When three dogs or drivers are to be used I lay off a circle upon the face-plate, taking the center of the spindle as its center, making this circle, for small face-plates, as near to the hub of the face-plate as practicable. The circle is then divided into three equal parts, and at each point of division I drill a hole, *a*, through the face-plate to receive a spindle, C.

When the face-plate is of insufficient thickness to furnish the requisite length of bearing for the spindle the plate may be formed with bosses or hubs, through which the spindles will also pass, and thus have the required bearing-surfaces.

To each spindle C is rigidly secured a radial arm, D, arranged parallel with the face of the plate. Upon each one of these radial arms is fitted a slide, E, from which projects to a considerable length a dog, G, preferably arranged to project out from one end of the slide, so that the slide may be detached from the arm D and reversed, in order that in again fitting it upon the radial arm the dog may be brought nearer to or farther away from the center of the face-plate, as required. These slides are also secured in position upon the radial arms with relation to the diameter of the wheel to be turned by means of set-screws E².

To the reverse end of each spindle which projects out from the other side of the face-plate I rigidly secure a crank-arm, F, which

is preferably set at an angle of about ninety degrees to that radial arm which is upon the same spindle.

To the outer end of each crank-arm is secured a stud, *f*, extending toward the face-plate, and to reduce friction each stud is provided with a friction-roll, *G'*, although a solid stud may be employed and the friction-roll dispensed with. Surrounding these three friction-rolls or studs is a loose metal ring, *H*, of such diameter that when each friction-roller or stud of the crank-arms is moved out from the hub to about one-third of a circle, as illustrated in Fig. 2, the ring and studs or friction-rollers will be in contact with each other. In some cases, where there is sufficient space, this ring may be arranged inside of the friction-rollers or studs, instead of outside, as herein shown. The ring is, by preference, made flat, and it is arranged loosely upon the face-plate, so that it may be shifted to a considerable extent without coming in contact with any stop other than the friction-rolls or studs. It is held upon the face-plate by metal strips or bars *I*, which are secured at their outer ends to the circumferential flange *K*, and at their inner ends to studs *L* upon the face-plate, space being left between the face-plate and these strips for the free movement of the ring.

The ring, in the present example, is shown as being made of a circular form, with plain inner and outer edges, although in place of such there may be substituted a cam-ring having several irregular curved surfaces, which would answer substantially the same purpose; or, if desired, a toggle having as many links as there are radial arms might be employed.

The operation is as follows: The pulley or like article to be turned is first bored out as usual and fitted to a mandrel near one end thereof, as shown in Fig. 4, in which *n* indicates the mandrel, and *o o'* the lathe-centers. The mandrel, with the pulley, is placed between the lathe-centers in such position that each dog will be out from the hub of the face-plate about one-third of a circle and back of the arms of the pulley to be driven. When the lathe is started and the lathe-tool acts upon the surface to be turned it prevents the pulley from revolving until one arm of the pulley is engaged by one of the dogs. The lathe-power causes the radial arm of the dog to move backward, and this moves its crank-arm, which in turn acts upon the ring, so as to move it to one side of the center of the face-plate. The ring, during such movement, bears upon the friction-rolls or studs of the remaining crank-arms and causes a second dog to move in an opposite direction to the one just described until said second dog engages with the next arm of the pulley. The two dogs now in engagement with the two pulley-arms will both be moved backward, thus moving the ring in a direction to act upon the friction-roll or stud of the crank-arm of the third dog, which will then be caused to move in a direction opposite to the movement of the first two dogs until said third

dog likewise engages an arm of the pulley. The ring, being now acted upon by three forces equally, as illustrated in Fig. 5, where the dogs *G* are shown in contact with the arms of a pulley to be turned, will remain in a fixed position and the driving become positive relative to any forward movement of the lathe and pulley against the lathe-tool.

From the above it will be seen that the number of dogs is not necessarily limited to three. If two arms, with their attachments, and one ring are employed, the relative angle of the radial arm to the crank-arm can be changed from ninety to one hundred and eighty degrees. If four sets are employed, ninety degrees may be allotted to each, and if five radial arms are used, then seventy-two degrees will be about the proper angle.

In very light work it will sometimes be necessary to change the form of the plain ring to a ring having cam shapes, so as to cause the thrust of the cranks to adjust the prongs of the radial dog-arms more delicately against the arms of the pulley, though for the heavier class of work, especially in compound dogs of from two to four arms, the round ring herein shown is preferable, both for simplicity and for facility in changing its bearings upon the friction-rollers or studs of the crank-arm.

In the compound lathe-dog herein shown the cranks are arranged upon the rear side of the face-plate. It is evident, however, that they might be arranged upon its front face, whereon the sliding dogs are located, and thus operate in conjunction therewith. Also, for a certain class of work, the slides and their dogs could be replaced by dogs secured directly to the radial arms.

The device can be attached to the live-spindle of the lathe, as before mentioned, or it can be attached directly to the mandrel, the central hole being in the latter case of sufficient size to pass over the mandrel, bushings and set-screws being usually employed to secure it in place.

Having thus described my invention, what I claim is—

1. In a compound lathe-dog, the combination of the face-plate with the sliding dogs, adjustably connected to pivoted radial arms, and a common automatically-adjustable stop acted upon by all the arms, substantially as and for the purpose specified.

2. In a compound lathe-dog, the combination of the face-plate with a series of radial arms connected by spindles with crank-arms which are set at angles to the radial arms, and a ring held loosely upon the face-plate and arranged to be acted upon by all of said arms, substantially as set forth.

3. In a compound lathe-dog, the combination, with a face-plate, of a series of pivoted arms having crank-arms, and a loose ring arranged to be shifted upon the face-plate in the manner set forth, and to hold the dogs in a fixed position, so as to insure a positive driving after their adjustment, as specified.

4. The combination of a loose ring such as described, held upon the face-plate of a lathe, with the spindles C, having their bearings in the face-plate, the radial arms D and the crank-arms F, secured to the spindles, the dogs G, connected with the radial arms, and the studs *f*, with anti-friction rollers secured to the crank-arms, substantially as specified.

5. The combination of a loose ring such as described, held upon the face-plate of a lathe, with the spindles C, having their bearings in the face-plate, the radial arms D and the crank-arms F, secured to the spindles, the dogs G, connected with the radial arms, and the studs *f*, secured to the crank-arms, substantially as described.

6. The combination of the face-plate with the radial arms D and the crank-arms F, secured to spindles C, the dogs G, secured to slides fitted upon the radial arms and provided with set-screws to hold them in place upon the said radial arms, and the loose ring H, acted upon by the crank-arms, as herein specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN HILL.

Witnesses:

G. GUNBY JORDAN,
E. P. BURNETT.