J. MILLER.

AUTOMATIC LATHE DOG.

APPLICATION FILED JUNE 26, 1911.

1,149,148.

Patented Aug. 3, 1915.

2 SHEETS—SHEET 1.

Fig. 2.

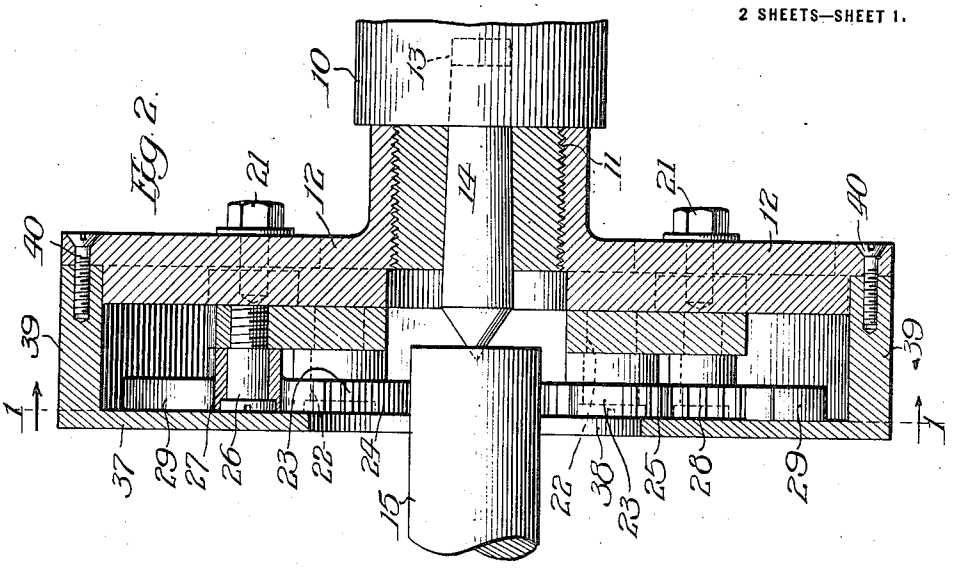
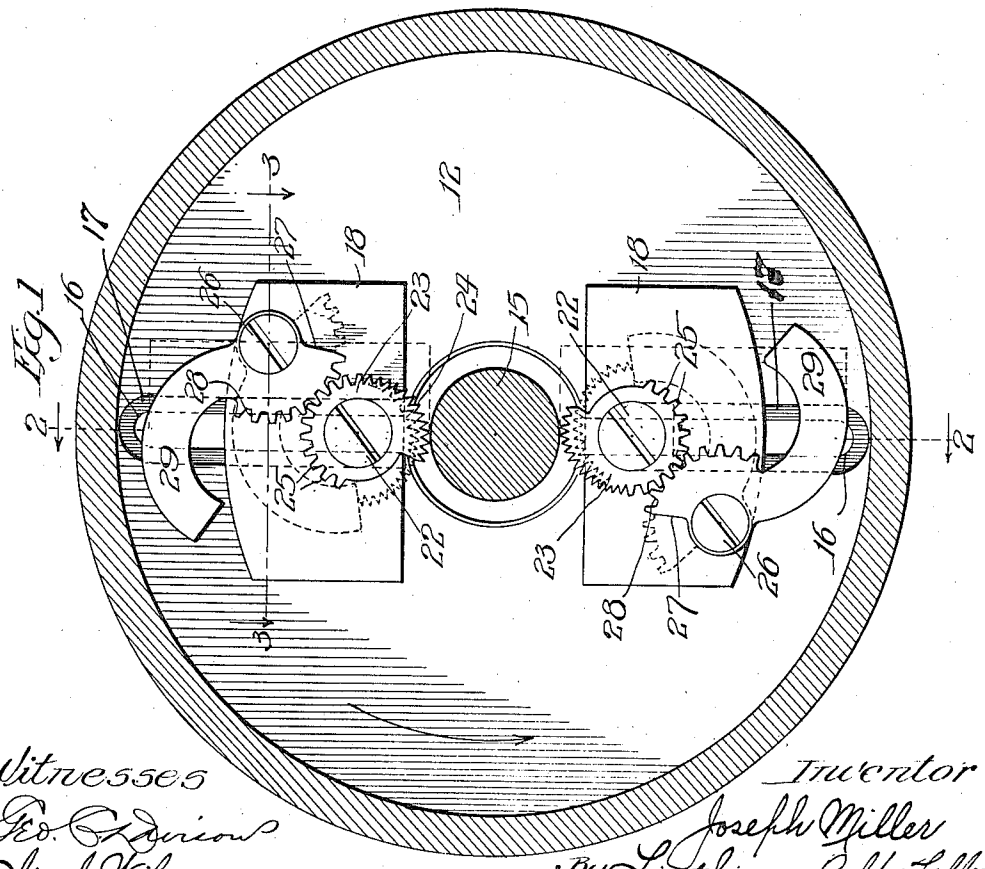


Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 4.

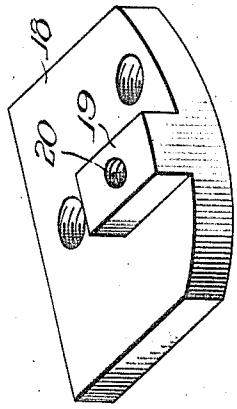


Fig. 6.

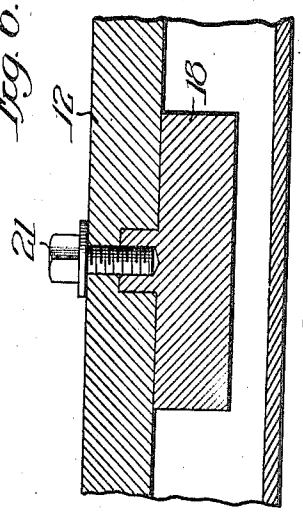


Fig. 7.

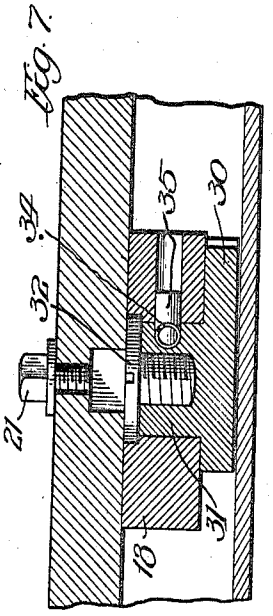


Fig. 3.

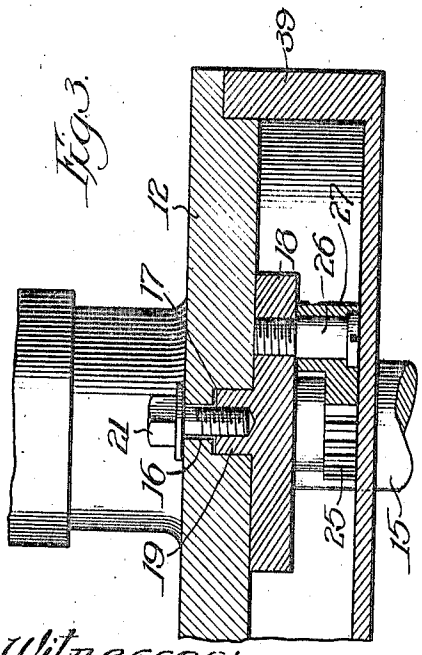
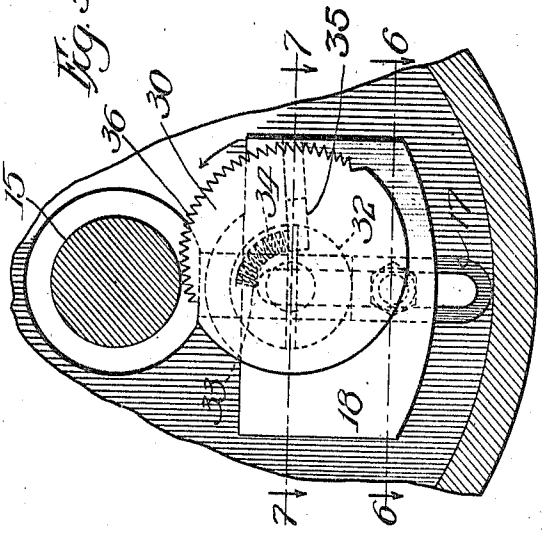


Fig. 5.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC LATHE-DOG.

1,149,148. Specification of Letters Patent. Patented Aug. 3, 1915.

Application filed June 26, 1911. Serial No. 635,253.

To all whom it may concern:

Be it known that I, JOSEPH MILLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Lathe-Dogs, of which the following is a specification.

This invention relates in general to lathes and more particularly to devices for holding the stock against rotation relatively to the lathe head.

One of the objects of the present invention is the provision of mechanism which will automatically grip the stock and lock it against rotation relatively to the head as soon as the lathe is set in operation.

Another object of the invention is the provision of a device of this character which is entirely inclosed so that no portion thereof projects beyond the head of the lathe where it might catch the clothing of the operator and draw him into the machine, thereby obviating many accidents of this character which frequently occur with the old type of clamping dog commonly used prior to my invention.

Still another object of this invention is the provision of a set of dogs which will grip the stock close to the end so that the stock may be worked much nearer the end than is possible with the clamping dogs heretofore in use.

My invention will be best understood by reference to the following description when taken in connection with the accompanying drawings illustrating those embodiments which, at the present time, appear to be preferable.

Referring to the drawings—Figure 1 is an end elevation of a lathe head equipped with my invention, the covering being removed and the figure being virtually a sectional view taken on the line 1—1 of Fig. 2. Fig. 2 is a longitudinal sectional view taken on the line 2—2 of Fig. 1. Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2. Fig. 4 is a detail perspective view of one of the blocks upon which a lathe dog is mounted. Fig. 5 is a fragmentary elevation of another form of my invention. Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5; and Fig. 7 is a sectional view taken on the line 7—7 of Fig. 5.

My invention is capable of attachment to any of the well known types of lathes which are now in common use and I have, therefore, deemed it unnecessary to show in the drawings the general construction of any particular lathe.

The lathe shaft 10 which may be driven in any approved manner is shouldered and threaded at its inner end, as indicated at 11, to engage with the internally threaded lathe head 12. The shaft 10 is also provided with a tapered recess 13 to receive the ordinary stock-centering device 14. The stock 15 which is to be worked is engaged with the centering device and the lathe is then set into operation whereupon the stock will be automatically gripped by the lathe dogs embodied in the present invention and locked against rotation relatively to the head.

The head 12 is provided with radially disposed slots 16 which are expanded on the inner face of the head to form the grooves 17 as indicated in Fig. 3. A block 18 is equipped on its rear face with a projecting shoulder or lug 19 adapted to fit in the groove 17 and prevent turning of the block relatively to the head. The shoulder 19 is provided with a threaded opening 20 to receive a locking bolt 21 which projects through the slot 16 and serves to lock the block in position. It will be manifest that the block may be adjusted radially toward or from the center of the head by loosening the bolt 21 and sliding the block in or out the required distance. As shown in Fig. 1 the head 12 is provided with two grooves 17 and equipped with two blocks 18. It will be obvious, however, that more than two blocks may be provided, if desired, but since each of the blocks and the locking devices carried thereby are substantially identical in construction, it will be necessary to describe in detail only one block and dog.

Upon the inner face of the block 18 there is pivotally mounted upon a threaded stud 22 a locking dog 23 which is formed near its outer end in the shape of a cam, the surface of which is corrugated as indicated at 24 in Figs. 1, 2 and 3. This corrugated cam surface is adapted to engage with the stock 15 and when so engaged it will be evident that any tendency of the stock to turn relatively to the head in a counter-clockwise direction, viewing Fig. 1, will cause the dog to more firmly grip the stock and thereby prevent such relative movement. The dog 23 is provided opposite the cam surface 24 with teeth

25 and, adjacent the dog upon a threaded stud 26 is mounted a sector 27 provided with teeth 28 adapted to mesh with the teeth 25 of the dog. The sector is projected beyond the threaded stud 26 into the form of a weighted arm 29, as shown. Upon rotation of the head in a counter-clockwise direction, as indicated by the arrow in Fig. 1, the weighted arms will move outwardly under the influence of centrifugal force, thereby rotating the locking dogs so as to bring their corrugated cam surfaces into engagement with the stock which will thereupon be locked by the dogs to the head and held against rotation relatively thereto.

In the operation of my invention the blocks 18 may be set far enough from the center of the head to permit the stock to be introduced, it only being necessary, of course, to adjust these blocks when a stock considerably larger or smaller than that previously worked, is to be placed in the lathe. The stock may now be centered in the usual way and the lathe then set in motion. As soon as the head begins to rotate centrifugal force will cause the weighted arms 29 to move outwardly and the intermeshing teeth 28 and 25 will cause the locking dogs 23 to rotate on their pivotal studs 22 and urge the corrugated cam surfaces into engagement with the stock. The faster the head revolves the tighter the dogs will be urged into engagement with the stock and when the tool is applied to the stock the tendency of the stock to stop or to rotate relatively to the head will cause the dogs to grip the stock more tightly so that it will be held rigidly by the dogs against movement relatively to the head. When it is desired to remove the stock from the lathe a slight turn of the stock in the direction of the normal rotation of the lathe head will release it from engagement by the dogs and it may thereupon be readily removed.

In the form of my invention disclosed in Figs. 5, 6 and 7, the block 18 is adjustably secured to the head 12 by the bolt 21 as previously described. The locking dog 30, in this instance, however, is not provided with teeth and no weighted arm is employed to force the dog into locking engagement with the stock, but in lieu of the weighted arm, I have provided a device which constantly urges the dog into locking engagement. The block 18, as shown in Fig. 7, is recessed to form a bearing for the hub 31 of the locking dog 30 and the inner end of the bearing is enlarged to accommodate the flat head of a screw-bolt 32 which is threaded into the hub 31 and secures the dog on the block 18. The hub 31 is provided with a recess 33 extending partially around its periphery and in this recess there is disposed a coil expansion spring 34, one end of which bears against the end of the recess 33 and the other end of which bears against a pin 35 projecting inwardly from the block 18. The block 18 and the pin 35 are, of course, stationary and the dog 30 is rotatable, so that the normal tendency of the spring 34 is to rotate the dog 30 to bring its corrugated cam surface 36 into engagement with the stock 15, whereby the stock will be locked to the head. It will be apparent that in this modification the action of the locking dog is not dependent upon the rotation of the head and that the spring will normally urge the locking dogs into operation and, any tendency of the stock to turn under the influence of the tool will serve to more tightly lock the stock to the head. Should the dogs 30 be disposed across the opening so as to interfere with the introduction of the stock before the lathe is started, they may be readily pressed back by the finger of the operator so that the stock can be inserted in the head and centered.

In order that there may be no projections from the inner face of the head which might catch in the clothes of the operator and cause serious accidents, I have provided a covering 37 provided with a central stock-receiving opening 38, said covering having a spherical flange 39 tapped at intervals to receive the screw-bolts 40 by means of which the covering is secured to the head. This covering serves to effectually inclose the locking dogs and thereby insures against injury to the operator should his clothes or hands accidentally come in contact with the inner face of the lathe head. In this construction the stock need be inserted in the head only far enough to be engaged by the locking dogs and, if desired, the centering device may be extended so that only the extreme end of the stock will be engaged by the dogs. It has been found that the stock will be securely held if only a part of the width of the dogs lockingly engage therewith, and in actual operation it is possible to work the stock to within a quarter of an inch of the end which has not been possible with any form of locking dog which has been employed, to my knowledge, prior to my invention.

While I have shown and described those embodiments of my invention which appear at present to be most desirable, it will be obvious that various changes in the size, shape, proportion and arrangement of the various parts may be resorted to without departing from the spirit or sacrificing any of the material advantages of my invention.

I claim:

1. A chuck comprising a head, a plurality of coöperating dogs mounted on the head, and means carried by the head for moving said dogs into operative and firm engagement with stock carried in the chuck, said means being automatically actuated by rota-

tion of the head and under a force varying in accordance with the rate of rotation of the head.

2. In a device of the character described, the combination of a rotatable head, and a plurality of devices each adjustably mounted thereon to receive stock of various sizes therebetween, and means automatically actuated by rotation of the head to move said devices inwardly of the head into engagement with the stock.

3. In a device of the character described, the combination of a head and a plurality of normally inoperative devices rotatably mounted on the head, and means actuated by the rotation of the head to automatically move said devices into engagement with the periphery of the stock to be worked and hold the same against rotation relatively to the head.

4. In a device of the character described, the combination of a head, a plurality of cam devices mounted thereon in position to normally permit the insertion of the stock to be worked therebetween, and means operated by rotation of the head to urge said cam devices into engagement with the stock to lock the same against rotation relatively to the head.

5. In a device of the character described, the combination of a head, and a plurality of normally inoperative devices mounted on the head, and means actuated by the rotation of the head to automatically engage with the stock to lock the same against rotation relatively to the head, said devices being independently adjustable on the head whereby to accommodate stock of various sizes.

6. In a device of the character described, the combination of a head provided with radially disposed slots, a block adjustably mounted in each of said slots, a gripping dog mounted on each of said blocks, and means actuated by the rotation of the head for forcing said dogs toward the center of the head into engagement with the stock whereby the stock is held against rotation relatively to the head.

7. In a device of the character described, the combination of a head, a plurality of blocks carried by said head and adjustable radially thereof, a gripping dog mounted upon each of said blocks to engage with the periphery of the stock, and means associated with the dogs and the blocks for yieldingly forcing the dogs inwardly to grip the stock.

8. In a device of the character described, the combination of a head provided with radially disposed slots, a block adjustably mounted in each of said slots, a gripping dog rotatably mounted on each of said blocks in position to move parallel with the head and engage with the periphery of the stock and hold the same against rotation relatively to the head, and means mounted on the block and actuated by the rotation of the head for yieldingly urging said dog into engagement with the stock.

9. In a device of the character described, the combination of a head, a cover secured over the inner face of said head but spaced therefrom, said cover being provided with a central stock-receiving opening, and means mounted between said head and cover and adapted to automatically move within the perimeter of said cover opening into engagement with the stock to clamp said stock to the head said means being rendered operative by rotation of the head.

10. In a device of the character described, the combination of a head, a cover disposed over the inner face of said head and spaced therefrom, and means mounted between said head and said cover for automatically engaging the stock and holding the same against rotation relatively to the head.

11. In a device of the character described, the combination of a head, a locking dog comprising a cam and a toothed sector mounted thereon, and an actuating device comprising a weighted portion and a toothed sector adapted to mesh with the toothed sector of the locking dog whereby upon rotation of the head centrifugal force will cause said weighted portion to move outwardly and thereby urge the cam into engagement with the stock to prevent rotation of the stock relatively to the head.

12. In device of the character described, the combination of a head, a plurality of blocks carried by said head and adjustable radially thereof, a locking dog mounted on each of said blocks, said locking dogs comprising a corrugated cam portion and a toothed sector, and an actuating device mounted upon each of said blocks, said actuating device comprising a toothed sector adapted to mesh with the toothed sector of the locking dog and a weighted portion, said weighted portion being adapted to move outwardly upon rotation of the head whereby to cause the corrugated cams to engage with the stock and lock the same against rotation relatively to the head.

13. A chuck comprising a head, dogs pivoted on the head, and centrifugal means mounted on the head and associated with the dogs for swinging the latter into operative positions under the influence of the rotation of the head.

14. A chuck comprising a head, dogs thereon, and centrifugal means carried by the head and actuated by the rotation thereof, said means being associated with the dogs and operating continuously thereon during rotation of the head.

15. A chuck comprising a head, dogs

thereon, and means operating on the dogs and exerting pressure thereon and forcing them into gripping relation.

16. In a chuck, a rotary body, a plurality of cams mounted thereon in a circle about a central space to rotate in a plane parallel to the plane of rotation of the body, and centrifugally actuated means to rotate the cams in unison, substantially as described.

17. In a chuck, a rotary body, a plurality of cams mounted thereon in a circle and adapted to receive a work-piece therebetween, and eccentrically disposed members connected with the cams and angularly movable by centrifugal action whereby to rotate the cams to clamp the work piece therebetween, substantially as described.

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Witnesses:
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M. ROBERTSON.