Oct. 14, 1924. 1,511,447

A. E. DRISSNER

POSITIVE LOCKING MECHANISM FOR CYLINDERS OR THE LIKE

Filed Dec. 28, 1921 2 Sheets-Sheet 1

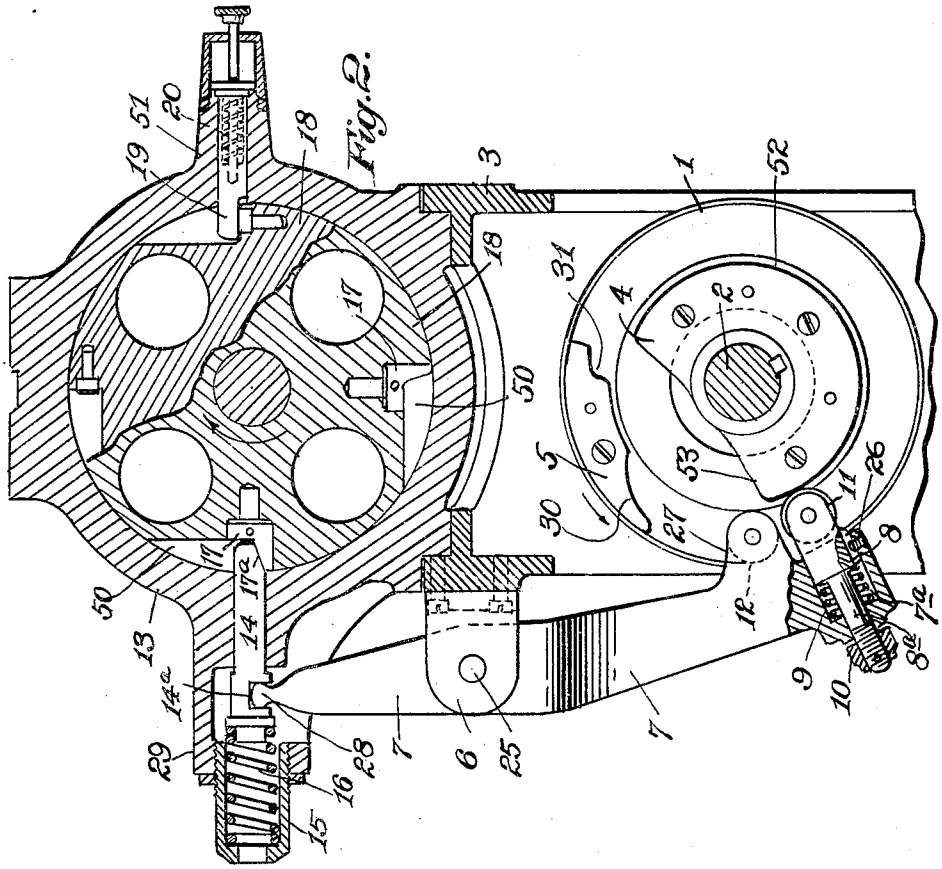


Fig. 2.

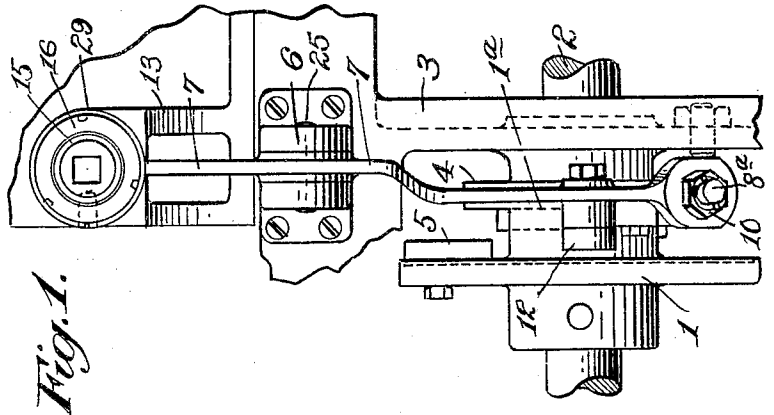


Fig. 1.

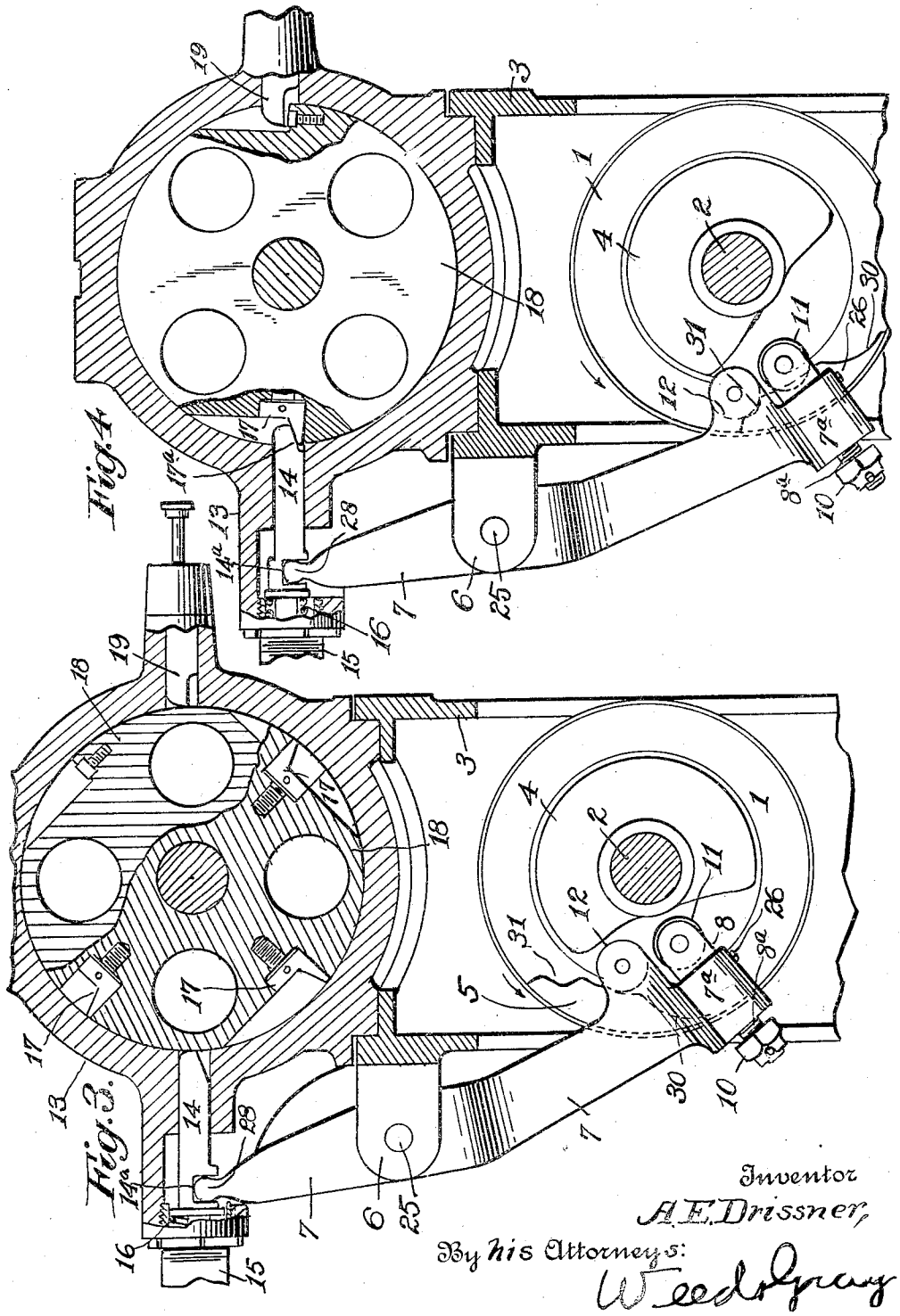
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POSITIVE LOCKING MECHANISM FOR CYLINDERS OR THE LIKE

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UNITED STATES PATENT OFFICE.

ALFRED E. DRISSNER, OF CLEVELAND, OHIO, ASSIGNOR TO THE NATIONAL ACME COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

POSITIVE LOCKING MECHANISM FOR CYLINDERS OR THE LIKE.

Application filed December 28, 1921. Serial No. 525,300.

To all whom it may concern:

Be it known that I, ALFRED E. DRISSNER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Positive Locking Mechanism for Cylinders or the like, of which the following is a specification.

This invention relates to locking mechanism for cylinders or spindle carriers, particularly adapted for use on machines, wherein the indexing of the cylinder, spindle carrier or turret is required, an object of the invention being to provide an improved mechanism of this character, which will be positive in operation and not dependent as heretofore, upon springs to hold the cylinder or spindle carrier in position.

A further object of this invention is to provide a positive locking mechanism for cylinders, spindle carriers or the like, which will be so operated or controlled, as by means of camming mechanism, as to rigidly secure the cylinder in position during the entire operation of the tools upon the work. Heretofore in locking mechanisms of this character, the lock bolt has had a tendency to vibrate when the tools are at work, thus resulting in reducing the accuracy in operation of the tools upon the work. As a result of the present improvement however, the tendency of the lock bolt to vibrate is eliminated by reason of the improved construction, wherein the locking mechanism is rigidly held in position, as by means of a cam, during the entire operation of the tools.

A further object of this invention is to provide a locking mechanism of this character for cylinders or the like, wherein the cylinder is secured in position during the operation of the tools by positive means, such as camming means, the operating parts being so cushioned as to result in the diminishing of vibration of the various parts, and also in the provision of a safety means for the locking mechanism.

Furthermore, by virtue of this improved construction, the locking mechanism and cooperating parts are rendered practically noiseless during the operation of the machine.

A further object of this invention is to provide a positive locking mechanism for cylinders, spindle carriers or the like, which will be simple in construction, durable, and efficient in use and operation, and constructed to perform more effectively than heretofore the various functions for which it is designed and adapted.

Other objects of this invention will appear in the following description thereof, reference being had to the accompanying drawings forming a part of this specification, wherein like reference characters indicate corresponding parts in the several views, and wherein Fig. 1 is a side elevation broken away, illustrating the improved locking mechanism as adapted to a multiple spindle automatic machine; Fig. 2 is a cross sectional elevation illustrating the improved mechanism as applied to the above machine; Fig. 3 is a similar view partly broken away illustrating the position of the locking mechanism during the indexing of the cylinder; and Fig. 4 is a similar view illustrating a position of the locking mechanism after the completion of the indexing of the cylinder.

The present improved locking mechanism is preferably adapted to be used in connection with metal working machines, such as multiple and single spindle automatic lathes, plain turret lathes or other machines manufactured by the National Acme Company, and the particular locking mechanism herein shown and described in its preferred form is an improvement in part on that described in Patent No. 1,320,609 for automatic multiple spindle screw machines.

Referring to the drawings, it will be seen that a cam disk 1 is mounted and secured in any suitable manner upon a cam shaft 2, rotatably mounted in suitable bearings in the bed or frame 3. The cam disk 1 is machined at 1^a so as to permit the cam 4 to be suitably located and bolted thereon. Pivotally mounted as at 25, on a bracket 6, rigidly secured to the bed 3, is a lock bolt lever 7. This lever at its lower end is drilled to receive a reduced end or stem 8^a of a roller support 8, and is also counterbored as indicated at 7^a to receive the enlarged end or portion of this roller support. The latter forms a shoulder between which and the base of the counterbore 7^a is located a spring 9, which acts as a cushioning means as well as a safety device for the locking mechanism. The reduced end or stem 8^a of the roller

support projects through or protrudes through the locking lever 7, and is threaded at its outer end for the reception of a nut 10, which is pinned thereon after being adjusted properly in position. It will be noted that by adjusting the nut in various positions on the stem 8ª, the tension of the spring 9 may be varied as desired. The roller support 8 may be suitably slotted to receive the inner end of a set screw 26, which is adapted to keep the support from turning. The inner end of the support is machined to receive a roller 11 suitably journaled therein, the roller being adapted to be acted upon by the cam 4 at predetermined times.

Adjacent to its lower end, the lock lever 7 as indicated at 27, is provided with an abutment, which is machined so as to receive a roller 12 held in position as by means of a pivot screw. This roller, it will be noted, is so positioned as to be acted upon by the cam 5.

Suitably mounted on the bed frame 3, is a casing 13 which forms a housing for the indexing carrier or work spindle cylinder 18, the casing at its side being bored to receive the lock bolt 14. This lock bolt at 14ª is crotched so as to receive the rounded end 28 of the lock bolt lever 7, which, as will be seen, extends into a recess formed in the extended bearing 29 of the casing. The latter, at its outer end, is tapped and receives a cap 15, which is counterbored to receive a lock bolt spring 16, which by compression acts against the end of the lock bolt 14. The latter is machined so as to provide preferably a tapered face 17ª cooperating with the tapered face of a lock bolt seat 17, it being noted that the cylinder in the present instance, by way of example, is provided with four lock bolt seats located in suitable stations 50. The cylinder at its opposite side is provided with an extended bearing 51, into which is housed a beveled latch or adjusting bolt 19, controlled by means of a spring and screw 20, the construction of the latch bolt being substantially similar to that illustrated in the hereinbefore mentioned Patent No. 1,320,609, a further description thereof therefore, not being deemed necessary herein.

In the operation of this improved locking mechanism, when the cylinder 18 is ready to be indexed, the cam surface 30 of the cam 5, which revolves with the cam disk 1 and cam shaft 2, co-acts with the roller 12, and draws the lower end of the lock bolt lever 7 toward the cam shaft and at the same time forces the lock bolt away from the cylinder against the action of the spring 16. Thus, when the lock bolt 14 is in the position indicated in Fig. 3, the cylinder begins to index a quarter of a turn, whereupon the latch bolt 19 is forced out to the position shown in Fig. 3, upon the revolution of the cylinder, and rides on the periphery of the cylinder until the indexing is completed.

The cam 5 operates to hold the lock bolt withdrawn until the cylinder is approximately two-thirds indexed, whereupon by means of the cut-out surface 31 of the cam the spring 16 is permitted to force the lock bolt into a station to the position indicated in Fig. 4. By the time the lock bolt is in this position the cylinder is fully indexed a quarter of a turn, and because of its inertia would continue to turn, except for the fact that the lock bolt operates as a stop, the seat 17 striking the lock bolt and stopping the motion of the cylinder.

Immediately after the cylinder is stopped, the roller 12 leaves the cam 5 and the spring 16 tends to force the lock bolt into the position shown in Fig. 2. At this point the cam 4 acts upon the roller 11 and operates to force the lock bolt 14 positively and securely into its seat 17. It will be noted that the continuous cam surface 52 of the cam 4 operates to maintain the lock bolt in the above position during the entire time that the tools are operating upon the work in the cylinder, and hence the lock bolt is rigidly held in position and all tendency of vibration eliminated. When the cylinder is ready to index again the cam 4 at 53 rides off the roller 11 and permits the same to be free.

It will be noted particularly that spring 9 operates not only as a cushioning means for the locking mechanism, but also as a safety device to permit the accommodation or adjustment of the lock bolt to any variations in the lock bolt seats, or in any other manner to prevent the tendency of the parts to break under undue strain.

From the foregoing operation, it will be seen therefore that the lock bolt and cooperating parts operate to stop the cylinder or carrier after the indexing thereof, in an improved and more efficacious manner than heretofore. This is accomplished by forcing the lock bolt into the locking seat 17 in a step-by-step manner, so as to positively lock the cylinder and at the same time positively absorb the rebound or vibration thereof when the locking seat 17 strikes the lock bolt. Thus, by virtue of the cam surface 31, the lock bolt is forced into the position indicated in Fig. 4, and after the locking seat 17 strikes the lock bolt any rebound or vibration of the cylinder will be absorbed by the fact that the cam 4 then operates to force the lock bolt into the full locking position shown in Fig. 2, the wedge or tapered faces of the lock bolt and locking seat operating to absorb the rebound as will be noted by comparing the positions of the lock bolt seat 17 in Fig. 4 and Fig. 2.

Although I have described my invention

in its preferred form, it will be understood that I do not limit myself to the construction herein shown and described, except in so far as defined in the claims and embraced within the scope thereof.

I claim as my invention:

1. Locking mechanism for cylinders or the like comprising in combination a lock member adapted to cooperate with the cylinder, an operating member for shifting said lock member, a cushioned plunger carried by said operating member, a cam roll carried by said plunger, and cam means for operating said roll.

2. Locking mechanism for cylinders or the like comprising in combination a lock lever, a lock bolt controlled thereby, a pair of cam rollers carried by said lever, and a pair of camming means cooperating with said rollers at different times.

3. Locking mechanism for cylinders or the like comprising in combination a lock lever, a lock bolt controlled thereby, a pair of cam rollers carried by said lever, means for cushioning one of said rollers, and a pair of camming means cooperating with said rollers at different times.

4. Locking mechanism for spindle carriers or the like comprising in combination a lock bolt, a lock lever cooperating therewith, means for shifting the lock bolt out of locking position relatively to the carrier, and a pair of means for shifting the same into locking position and including each a spring.

5. Locking mechanism for spindle carriers or the like comprising in combination a lock bolt, a lock lever cooperating therewith, means for shifting the lock bolt out of locking position relatively to the carrier, and a pair of means for shifting the same into locking position, one thereof comprising cushioned camming mechanism.

6. Locking mechanism for spindle carriers or the like comprising in combination a lock bolt, a lock lever cooperating therewith, means for shifting the lock bolt out of locking position relatively to the carrier, and a pair of means for shifting the same into locking position, one thereof comprising camming mechanism, said camming mechanism having safety means.

7. Locking mechanism for spindle carriers or the like and comprising in combination a lock bolt, a lock lever cooperating therewith, means for shifting the lock bolt out of locking position relatively to the carrier and comprising a cam cooperating with said lever, and means for shifting the lock bolt into locking position and comprising a second cam operative to maintain the lock bolt in locking position during the operation of the tools on the work.

8. Locking mechanism for spindle carriers or the like comprising in combination a lock bolt, a lock lever cooperating therewith, means for shifting the lock bolt out of locking position relatively to the carrier, means for shifting the lock bolt into locking position and comprising a spring engaging the same, and camming mechanism, said mechanism including cushioned means.

9. Locking mechanism for spindle carriers or the like comprising in combination a lock bolt, a lock lever cooperating therewith, means for shifting the lock bolt out of locking position relatively to the carrier, means for shifting the lock bolt into locking position and comprising a spring engaging the same, and camming mechanism, said mechanism comprising a spring controlled roller carried by the lock lever.

10. Locking mechanism for spindle carriers or the like comprising in combination a lock bolt, a lock lever cooperating therewith, means for shifting the lock bolt out of locking position relatively to the carrier, means for shifting the lock bolt into locking position and comprising a spring engaging the same, and camming mechanism, said mechanism including safety means.

11. Locking mechanism for turrets or the like comprising the combination of a lock bolt and a pair of mechanisms successively operating independently of each other upon said lock bolt to force it progressively into locking position in the turret.

12. Locking mechanism for cylinders or the like comprising in combination a lock bolt, a lock lever cooperating therewith, camming means co-acting with the lock lever for shifting the bolt out of locking position relatively to the cylinder, and means for moving the bolt into locking position, said means comprising a spring engaging the bolt and cushioned camming mechanism operative while the lock bolt is in locked position.

13. Locking mechanism for cylinders or the like comprising in combination a shaft, a lock lever, a lock bolt controlled thereby, a plurality of camming elements carried by said lever at the same side of said shaft, and cam mechanism cooperating with said elements for shifting the lever in opposite directions.

14. Locking mechanism for cylinders or the like comprising in combination a shaft, a lock member adapted to cooperate with the cylinder, an operating member for shifting said lock member, a plurality of cam rolls carried by said operating member at the same side of said shaft, one thereof being yieldable, and cam mechanism carried by said shaft and cooperating with said rolls for shifting said operating member in opposite directions.

15. Locking mechanism for turrets or the like comprising the combination of a lock bolt, means for shifting said bolt partially

into locking position, and means successively operating independently of said first means for shifting said bolt into locking position.

16. Locking mechanism for turrets or the like comprising the combination of a lock bolt, means for shifting said bolt partially into locking position, and cushioned camming means succesively operating for shifting said bolt into full locking position.

17. The combination of an indexing cylinder or carrier, a lock bolt co-acting therewith, a pair of means for shifting the lock bolt into locking position relatively to the cylinder or carrier, and means for shifting the lock bolt out of locking position, said pair of means co-operating to shift said bolt step by step into locking position.

18. The combination of an indexing cylinder or carrier, a lock bolt co-acting therewith, a pair of successively operating means for shifting the lock bolt into locking position relatively to the cylinder or carrier, and means for shifting the lock bolt out of locking position, said last means being constructed to permit the successive operation of said pair of means.

19. The combination of an indexing cylinder or carrier, a lock bolt co-acting therewith, a pair of successively operating means for shifting the lock bolt into locking position relatively to the cylinder or carrier, and camming means for shifting the lock bolt out of locking position, said last means having a pair thereof constructed to permit the successive operation of said pair of means.

20. The combination of an indexing cylinder or carrier, a lock bolt co-acting therewith, a pair of successively operating means for shifting the lock bolt into locking position relatively to the cylinder or carrier, camming means for shifting the lock bolt out of locking position, said last means having means for permitting the successive operation of said pair of means, and means for maintaining the same in locked position during the operation of the tools.

21. The combination of indexing means, locking mechanism cooperating therewith, means for forcing said locking mechanism into partial locking position, and cushioned means for forcing the same into full locking position.

22. The combination of an indexing cylinder or carrier, locking mechanism cooperating therewith, camming means for releasing the locking mechanism, and a pair of means for forcing said locking mechanism successively into locking position, said camming means having means for permitting one of the pair of means to operate upon the locking mechanism prior to the other of the pair of means.

23. The combination of indexing means, locking mechanism co-acting therewith, camming means for operating said locking mechanism, and safety mechanism located between said last means and locking mechanism and comprising a cushioned reciprocatory plunger, and a cam engaging element carried thereby.

24. The combination of an indexing cylinder or carrier having a plurality of indexing stations, a latch bolt adapted to cooperate with certain of said stations at predetermined times, a lock bolt also adapted to cooperate with certain of said stations at predetermined times for locking the cylinder or carrier, a lock lever co-acting with said lock bolt and having a plurality of camming elements, camming means engaging one of said elements for shifting the lock bolt out of locking position relatively to the cylinder or carrier, a compression spring engaging said lock bolt for shifting the same step by step into locking position, camming means engaging said other camming element for maintaining the lock bolt in locking position during the operation of the tools, and safety mechanism between said last camming means and the locking mechanism and comprising cushioning means cooperating with said last camming element.

25. The combination of indexing means, locking mechanism cooperating therewith, resilient means for forcing said locking mechanism into partial locking position, and cushioned camming means for forcing the same into full locking position.

26. The combination of an indexing cylinder or carrier, locking mechanism cooperating therewith, camming means for releasing said locking mechanism, and a pair of successively operating means for forcing said locking mechanism into locking position, said camming means having a stepped formation thereby permitting the successive operation of said pair of means.

Signed at Cleveland, Ohio, this 23rd day of December 1921.

ALFRED E. DRISSNER.