

No. 827,662. PATENTED JULY 31, 1906.
W. B. PEARSON & C. E. ROBERTS.
MECHANISM FOR INTERMITTENTLY ROTATING AND STOPPING REVOLUBLE
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2 SHEETS—SHEET 1.



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UNITED STATES PATENT OFFICE.

WALTER B. PEARSON, OF DETROIT, MICHIGAN, AND CHARLES E. ROBERTS,
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OF DETROIT, MICHIGAN, A CORPORATION OF NEW JERSEY.

MECHANISM FOR INTERMITTENTLY ROTATING AND STOPPING REVOLUBLE MEMBERS.

No. 827,662.

Specification of Letters Patent.

Patented July 31, 1906.

Original application filed May 9, 1902, Serial No. 106,620. Divided and this application filed October 18, 1904. Renewed March 19, 1906. Serial No. 306,907.

To all whom it may concern:

Be it known that we, WALTER B. PEARSON, a resident of Detroit, Wayne county, Michigan, and CHARLES E. ROBERTS, a resident of Oak Park, Cook county, Illinois, citizens of the United States, have invented certain new and useful Improvements in Mechanism for Intermittently Rotating and Stopping Revoluble Members, of which the following is a specification.

This invention relates to means or mechanism for intermittently rotating and stopping a revoluble member.

This application is filed as a division of an application heretofore filed by us in the United States Patent Office on the 9th day of May, 1902, and numbered serially 106,620, in which a mechanism of our invention is shown and described as applied to the stock-spindle of a machine for making metal screws, but is not therein separately claimed.

The object of the invention is to provide means for rotating a revoluble member, preferably at relatively fast and slow speeds, and for intermittently stopping the same.

To this end our invention consists of the various features, combinations of features, and details of construction hereinafter described and claimed.

In the accompanying drawings, in which our invention is fully illustrated, Figure 1 is a partial plan section of the screw-machine which forms the subject-matter of our main application, Serial No. 106,620, showing a driving and stopping mechanism of our invention applied to the stock-spindle of said machine. Figs. 2 and 3 are partial vertical sectional elevations on the lines 2-2 and 3-3, respectively, of Fig. 1 looking in the directions indicated by the arrows; and Fig. 4 is a partial sectional elevation on the line 4-4 of Figs. 2 and 3.

In the drawings our improved driving and stopping mechanism is shown as applied to the stock-spindle of a machine for making metal screws, fully shown and described in application for United States Letters Patent, Serial No. 106,620, filed May 9, 1902, of which the present application is a division and to which reference is made as to features herein shown, but not fully described.

Referring now to the drawings, A designates the bed of the screw-machine, revolvably mounted in bridges M and N of which is a spindle F.

Rotation is imparted to the spindle F from a shaft B, revolvably mounted in suitable bearings in the machine-frame in the following manner: Revolvably mounted in the bridges M and N of the machine-frame is a shaft Q, which is driven directly from the shaft B by means of bevel-gears 1 and 2, rigidly secured to the shafts B and Q, respectively. Relatively large and small back gears or pinions 3 and 4 on the shaft Q respectively engage relatively small and large gears 5 and 6, loosely mounted on the spindle F and adapted to be secured thereto at desired predetermined intervals, preferably by means of suitable clutches. As shown, the gear 5 is adapted to be secured to said shaft by means of a friction-clutch, (indicated as a whole by R.) Any well-known form of clutch may be used for securing said gear 5 to the spindle F, and it is therefore deemed unnecessary to describe said clutch in detail. As shown, the clutch R is substantially identical in construction and operation with the clutch E, (fully described in our main application, Serial No. 106,620.) The gear 6 is adapted to be secured to said spindle F by means of clutch-teeth 7 thereon, which are adapted to be engaged by corresponding clutch-teeth 8 on a sleeve 9, splined to said spindle. As shown, the sleeve 9 is mounted between the gear 6 and the clutch R, and the wedge which controls said clutch R is formed on said sleeve, the relation and adjustment of parts being such that movement of said sleeve to lock the clutch R will disengage the clutch-teeth 7 and 8, and vice versa, and such also that during a portion of the travel of said sleeve both clutches will be disengaged from said spindle, thus entirely disengaging said spindle from the shaft Q. Movement longitudinally of the spindle F is imparted to the sleeve 9 to secure the gears 5 and 6 to said spindle and to release said gears therefrom by means of a lever 10, pivoted upon the machine-frame, a projection 11 on the upper end of which engages a groove 12, formed in said sleeve 9. Formed

on the lower end of the lever 10 is a cam-surface comprising sections 13 and 14, of which the section 13 is substantially concentric with the pivotal axis of said lever and the section 14 is upwardly inclined. Pivoted at one end upon the machine-frame is a lever 15, a pin or stud 16 on which is held yieldingly in engagement with the cam-surfaces 13 and 14 by means of a spring 17, applied to the free end of said lever 15. With this construction it is obvious that when the pin or stud 16 is in engagement with the cam-surface 13 the lever 10 will be unaffected thereby and when in engagement with the cam-surface 14 the tension of the spring 17 will tend to throw said lever to effect engagement of the clutch-teeth 7 and 8, and thus to secure the slow driving-gear 6 to the spindle F. The strength of the spring 17 is such that when the sleeve 9 is free to move under its influence it will throw said sleeve to effect engagement of said clutch-teeth 7 and 8. The relation of parts is such also that when the sleeve 9 is in position to lock the clutch R the pin or stud 16 will be in engagement with the cam-surface 13, and thus inoperative. The cam-surfaces 13 and 14 are preferably formed on a hardened-steel plate secured to the end of the lever 10.

Pivotal movement to effect engagement and disengagement of the clutch R at desired predetermined intervals is imparted to the lever 10 by means of suitable surfaces on a cam 18 on the shaft C, which are adapted to engage a pin or stud 19, secured in the lower end of said lever 10, said pin or projection being preferably provided with an antifriction-roller. Rotation is imparted to the shaft C by means of driving connection with a suitable source of power, as with the shaft B. As regards the present invention, however, any desired or approved form of driving connection may be employed, such as could readily be supplied by any skilled mechanic. Reference is made, however, to our main application, Serial No. 106,620, in which specific means for this purpose are fully shown and described.

The spindle F is designed to be stopped at predetermined intervals by suitable means. As shown, said means are as follows: Formed in the sleeve 9 are stop-slots 20, which are designed to be engaged by a pin 21, which projects inwardly from a lever 22, pivoted upon the machine-frame, the opposite end of which projects into the path of travel of a cam 23 on the shaft C. A spring 24, applied to said lever, operates to impart pivotal movement thereto to effect engagement of the pin 21 with a stop-slot 20, when said lever is free to move under the influence of said spring. As shown, the lever 22 has a hardened-steel shoe secured to its free end, which is provided with a tongue or projection 26, which engages the cam-surface on the cam

23. During all the time that the clutch R is locked and during most of the time that the clutch-teeth 7 and 8 are in engagement the tongue or projection 26 on the lever 22 rides on a substantially cylindrical section of the cam 23, in which position the pin 21 is held out of engagement with the slots 20 and the spindle F is free to rotate. When it is desired to stop said spindle, however, the tongue or projection 26 drops into a recess 27 in said cam 23, thus allowing the spring 24 to move the lever 22 pivotally to effect engagement of the pin 21 on said lever with one of the slots 20. Secured to the sides of the recess 27 are hardened-steel plates 28 and 29, which receive the wear due to the action of the tongue or projection 26. The relation of parts is such also that the spindle F will be stopped almost immediately after the sleeve 9 has been moved to disengage the clutch R and to effect engagement of the clutch-teeth 7 and 8, which forms an effective brake adapted to check the speed of said spindle, as each time the teeth 8 on the sleeve 9 "run over" the teeth 7 on the gear 6 it will operate to stretch the spring 17 through the medium of the projection 16 on the lever 15 acting on the cam 14. Before stopping said stock-spindle F it will thus be necessary to disengage the clutch-teeth 7 and 8. In the preferable construction shown this is done by forming the slots 20 on an incline toward said teeth and disposing the pin or stud 21 so that it will engage said slots adjacent to their forward ends, the relation being such that said pin or stud 21, acting on the inclined front side of the slot 20, which it engages, will move the sleeve 9 longitudinally of the spindle F a sufficient distance to disengage the clutch-teeth 7 and 8 before said pin or stud 21 reaches the end of said slot 20. A great advantage of throwing the clutch-teeth 7 and 8 into engagement when the clutch R is disengaged and before stopping the spindle F is that said spindle will be positively rotated thereby at a slower speed until it reaches the position in which it is designed to be stopped by the pin or stud 21 without relying on the momentum of said spindle, which might not always operate as intended. The relation and adjustment of parts are such also that during the time the spindle F is held stationary by the pin or stud 21 the stud or projection 16 on the lever 15 will bear on the inclined cam-surface 14 on the lever 10. Thus as soon as the pin or stud 21 is disengaged from said stop-slot 20 the spring 17 will at once throw the clutch-teeth 7 and 8 into engagement and rotate the stock-spindle positively at its slow speed and with great power.

In order to eliminate as much as possible the noise caused by the clutch-teeth 7 and 8 "running over" each other, we prefer to provide means independent of said clutch-teeth

for braking or checking the speed of the spindle F when the clutch R is disengaged. In the preferable construction shown said means consist of an arm 30 on the lever 22, which extends up on the rear side of the spindle F. Secured in said arm is a plug 31, of hard wood or other suitable material. Just before the clutch R is disengaged pivotal movement is imparted to the lever 22 to advance said plug 31 into engagement with the surface of the sleeve 9 with sufficient pressure to brake or check the spindle F. As shown, this is accomplished by providing a projection 32 on the surface of the cam 23, which will engage the projection 26 on the lever 22 just before said projection 26 drops into the recess 27, the height of said projection 32 being such that the lever 22 will be moved pivotally thereby sufficiently to depress the plug 31 into strong frictional engagement with the surface of said sleeve 9 in the desired manner. A convenient manner, as shown, for forming the projection 32 consists in extending the plate 28, secured to a side of the recess 27, above the cylindrical section of the cam 23. In the preferable construction shown also the plug 31 is outwardly adjustable by means of a screw 33, threaded into the lever-arm 30, which bears against the end of said plug.

We claim as our invention—

1. The combination with a revoluble member, of means for rotating said member, means to disengage said member from said means for rotating the same and means for stopping said revoluble member, said means comprising a stop or stops on said revoluble member, a pivoted stop-lever, a pin or projection thereon, a spring applied to said lever to move the same pivotally to effect engagement of the pin or projection thereon with a stop on said revoluble member, a driven shaft, a cam thereon for moving said stop-lever pivotally against the force of the spring applied thereto, said cam being provided with a recess to provide for pivotal movement of said lever under the influence of said spring.

2. The combination with a revoluble member, of means for rotating said member, means to effect engagement and disengagement of said member with the means for rotating the same, means to stop said member, comprising a stop or stops thereon, a pivoted stop-lever, a pin or projection thereon, a spring applied to said stop-lever for moving the same pivotally to effect engagement of the pin or projection thereon with a stop on said revoluble member, a driven shaft and a cam thereon for moving said stop-lever against the force of said spring, said cam being provided with a recess to provide for pivotal movement of said lever under the influence of said spring and means to brake said revoluble member, said means comprising an arm on said stop-lever, a brake-plug therein

and a projection on the stop-lever-operating cam for imparting pivotal movement to said lever to depress said brake-plug into frictional engagement with said revoluble member.

3. The combination with a revoluble member, of a driving-shaft, a pinion thereon, a gear loosely mounted on said revoluble member, means to effect engagement and disengagement of said gear with said revoluble member, and means for stopping said revoluble member, said means comprising a stop or stops on said revoluble member, a pivoted stop-lever, a pin or projection thereon, a spring applied to said lever for moving the same pivotally to effect engagement of the pin or projection thereon with a stop or stops on said revoluble member, a driven shaft, a cam thereon for moving said stop-lever pivotally against the force of the spring applied thereto, said cam being provided with a recess to permit pivotal movement of said lever under the influence of said spring.

4. The combination with a revoluble member, of a driving-shaft, a pinion thereon, a gear loosely mounted on said revoluble member, a clutch for effecting engagement and disengagement of said gear with said revoluble member, means to operate said clutch and means to stop said revoluble member, said means comprising a stop or stops on said revoluble member, a pivoted stop-lever, a pin or projection thereon, a spring applied to said stop-lever for imparting pivotal movement thereto to effect engagement of the pin or projection thereon with a stop on said revoluble member, a driven shaft, a cam thereon for moving said stop-lever pivotally against the force of the spring applied thereto, said cam being provided with a recess to permit pivotal movement of said stop-lever under the influence of said spring.

5. The combination with a revoluble member, of a driving-shaft, a pinion thereon, a gear loosely mounted on said revoluble member, a clutch for effecting engagement and disengagement of said gear with said revoluble member, means to operate said clutch, means for stopping said revoluble member, comprising a stop or stops thereon, a pivoted stop-lever, a pin or projection thereon, a spring applied to said stop-lever for imparting pivotal movement thereto to effect engagement of the pin or projection thereon with a stop on said revoluble member, a driven shaft, a cam thereon for moving said stop-lever pivotally against the force of the spring applied thereto, said cam being provided with a recess to permit pivotal movement of said stop-lever under the influence of the spring applied thereto, and means for braking said revoluble member, said means comprising an arm on said stop-lever, a brake-plug therein and a projection on said stop-lever-operating cam for imparting pivotal

movement to said stop-lever to depress said brake-plug into frictional engagement with said revoluble member.

6. The combination with a revoluble member, of a driving-shaft, a pinion thereon, a gear loosely mounted on said revoluble member provided with clutch-teeth, a sleeve splined to said revoluble member provided with clutch-teeth for engaging the clutch-teeth on said loose driving-gear, means for maintaining the clutch-teeth on said sleeve normally in engagement with the clutch-teeth on said loose gear and means for imparting movement to said sleeve to disengage the clutch-teeth thereon from the clutch-teeth on said loose gear and to stop said revoluble member, said means comprising an inclined stop or stops on said sleeve, a movably-supported stop-pin and means to impart movement to said stop-pin to effect engagement and disengagement thereof with a stop on said clutch-sleeve.

7. The combination with a revoluble member, of a driving-shaft, a pinion thereon, a gear loosely mounted on said revoluble member provided with clutch-teeth, a sleeve splined to said revoluble member provided with clutch-teeth for engaging the clutch-teeth on said loose driving-gear, a spring applied to said sleeve adapted to impart movement thereto to maintain the clutch-teeth thereon normally in engagement with the clutch-teeth on said loose driving-gear and means for imparting movement to said sleeve to disengage the clutch-teeth thereon from the clutch-teeth on said loose gear and to stop said revoluble member, said means comprising an inclined stop or stops on said sleeve, a movably-supported stop-pin and means to impart movement to said stop-pin to effect engagement and disengagement thereof with a stop on said clutch-sleeve.

8. The combination with a revoluble member, of means for imparting rotary movement thereto at relatively fast and slow speeds, said means comprising a driving-shaft, pinions thereon, gears loosely mounted on said revoluble member, a clutch for effecting engagement and disengagement of the fast driving-gear with said revoluble member, a sleeve for operating said clutch splined to said revoluble member between said clutch and the slow driving-gear, said sleeve and slow driving-gear being provided with clutch-teeth, means for imparting movement to said sleeve to effect engagement and disengagement of the clutch applied to the fast driving-gear, means for maintaining the clutch-teeth on said sleeve normally in engagement with the clutch-teeth on the slow driving-gear when the clutch applied to the fast driving-gear is disengaged and means for imparting movement to said sleeve to disengage the clutch-teeth thereon from the clutch-teeth on said slow driving-gear and to stop said revoluble member, said means comprising an inclined stop or stops on said sleeve, a movably-supported stop-pin and means to impart movement to said stop-pin to effect engagement and disengagement thereof with a stop on said clutch-sleeve.

9. The combination with a revoluble member, of a driving-shaft, a pinion thereon, a gear loosely mounted on said revoluble member, provided with clutch-teeth, a sleeve splined to said revoluble member, provided with clutch-teeth for engaging the clutch-teeth on said loose gear, a spring applied to said sleeve for effecting engagement of the clutch-teeth thereon with the clutch-teeth on said loose gear and means for imparting movement to said sleeve to disengage the clutch-teeth thereon from the clutch-teeth on said loose gear and to stop said revoluble member, said means comprising an inclined stop or stops on said sleeve, a pivoted stop-lever, a pin or projection thereon, a spring applied to said stop-lever for moving the same pivotally to effect engagement of the pin or projection thereon with a stop on said sleeve, a driven shaft, a cam thereon for imparting pivotal movement to said stop-lever against the force of the spring applied thereto, said cam being provided with a recess to permit pivotal movement of said stop-lever under the influence of said spring.

10. The combination with a revoluble member, of a driving-shaft, a pinion thereon, a gear loosely mounted on said revoluble member, provided with clutch-teeth, a sleeve splined to said revoluble member, provided with clutch-teeth for engaging the clutch-teeth on said loose gear, a spring applied to said sleeve for effecting engagement of the clutch-teeth thereon with the clutch-teeth on said loose gear, means for imparting movement to said sleeve to disengage the clutch-teeth thereon from the clutch-teeth on said loose gear and to stop said revoluble member, said means comprising an inclined stop or stops on said sleeve, a pivoted stop-lever, a pin or projection thereon, a spring applied to said stop-lever for imparting pivotal movement thereto to effect engagement of the pin or projection thereon with a stop on said sleeve, a driven shaft, a cam thereon for imparting movement to said lever against the force of the spring applied thereto, said cam being provided with a recess to permit pivotal movement of said stop-lever under the influence of said spring, and means for braking said shaft, said means comprising an arm on said stop-lever, a brake-plug therein, and a projection on the stop-lever-operating cam for imparting pivotal movement to said stop-lever to depress said brake-plug into frictional engagement with said revoluble member.

11. The combination with a revoluble member, of means for rotating the same at

relatively fast and slow speeds, said means comprising a driving-shaft, pinions thereon, gears loosely mounted on said revoluble member, means to effect engagement and disengagement of said gears with said revoluble member and means to stop said revoluble member, said means comprising a stop or stops thereon, a pivoted stop-lever, a pin or projection thereon, a spring applied to said lever for imparting pivotal movement thereto to effect engagement of the pin or projection thereon with a stop on said revoluble member, a driven shaft, a cam thereon for imparting pivotal movement to said stop-lever against the force of the spring applied thereto, said cam being provided with a recess to permit pivotal movement of said stop-lever under the influence of said spring.

12. The combination with a revoluble member, of means for rotating the same at relatively fast and slow speeds, said means comprising a driving-shaft, pinions thereon, gears loosely mounted on said revoluble member, means for effecting engagement and disengagement of said gears with said revoluble member, means for stopping said revoluble member, said means comprising a stop or stops on said member, a pivoted stop-lever, a pin or projection thereon, a spring applied to said stop-lever for imparting pivotal movement thereto to effect engagement of the pin or projection thereon with a stop on said revoluble member, a driven shaft, a cam thereon for imparting pivotal movement to said stop-lever against the force of the spring applied thereto, said cam being provided with a recess to permit pivotal movement of said stop-lever under the influence of said spring and means for braking said revoluble member, said means comprising an arm on said stop-lever, a brake-plug therein and a projection on the stop-lever-operating cam for imparting pivotal movement to said stop-lever to depress said plug into frictional engagement with said revoluble member.

13. The combination with a revoluble member, of means for imparting rotary movement thereto at relatively fast and slow speeds, said means comprising a driving-shaft, pinions thereon, gears loosely mounted on said revoluble member, a clutch for effecting engagement and disengagement of the fast driving-gear with said revoluble member, a sleeve for operating said clutch splined to said revoluble member between said clutch and the slow driving-gear, said sleeve and slow driving-gear being provided with clutch-teeth, means for imparting movement to said sleeve for effecting engagement and disengagement of the clutch applied to the fast driving-gear, said means comprising a pivoted lever, a driven shaft, a cam thereon, projections on said lever, one of which engages a groove in said sleeve and the other of which engages a cam on said driven shaft, a spring applied to

said clutch-operating sleeve for imparting movement thereto to effect engagement of the clutch-teeth thereon with the clutch-teeth on the slow driving-gear, means to impart movement to said sleeve to disengage the clutch-teeth thereon from the clutch-teeth on said slow driving-gear and to stop said revoluble member, said means comprising an inclined stop or stops on said sleeve, a pivoted stop-lever, a pin or projection thereon, a spring applied to said stop-lever for imparting pivotal movement thereto to effect engagement of the pin or projection thereon with a stop on said clutch-operating sleeve, a driven shaft, a cam thereon for imparting pivotal movement to said stop-lever against the force of said spring, said cam being provided with a recess to permit pivotal movement of said stop-lever under the influence of said spring.

14. The combination with a revoluble member, of means for rotating the same at relatively fast and slow speeds, said means comprising a driving-shaft, pinions thereon, gears loosely mounted on said revoluble member, a clutch applied to said fast driving-gear, a sleeve for operating said clutch splined to said revoluble member between said clutch and the slow driving-gear, means to impart movement to said sleeve to operate said clutch, said sleeve and slow driving-gear being provided with clutch-teeth, a pivoted lever, a driven shaft, a cam on said shaft, said pivoted lever being provided with projections one of which engages a groove in said sleeve and the other the cam on said driven shaft, said sleeve-actuating lever being also provided with a cam-surface, a lever pivoted adjacent thereto, provided with a projection and a spring applied to said lever for maintaining the projection thereon in engagement with the cam-surface on said sleeve-actuating lever, the relation of parts being such that engagement of said projection with said cam-surface will impart movement to said sleeve to effect engagement of the clutch-teeth thereon with the clutch-teeth on said slow driving-gear and means to disengage the clutch-teeth on said sleeve from the clutch-teeth on said slow driving-gear and to stop said revoluble member, said means comprising an inclined stop or stops on said sleeve, a pivoted stop-lever, a pin or projection thereon, a spring applied to said stop-lever for imparting pivotal movement thereto to effect engagement of the pin or projection thereon with a stop on said sleeve, a driven shaft and a cam thereon for imparting pivotal movement to said stop-lever against the force of said spring, said cam being provided with a recess to permit pivotal movement of said stop-lever under the influence of said spring.

15. The combination of a revoluble member, means for rotating same at relatively

fast and slow speeds, means for moving said member from engaging position with said fast-speed device to engaging position with said slow-speed device, stop mechanism, 5 means for operating said stop mechanism first to disengage positively said member from said slow-speed device and thereafter to hold said member against movement.

10 16. The combination of a revoluble member, means for rotating said member at relatively fast and slow speeds, means to effect engagement and disengagement of the driving connections, a stop mechanism, means to operate said stop mechanism, the relation 15 being such that said stop mechanism will be

actuated to stop said revoluble member while said revoluble member is rotating under the influence of one of said driving connections and means controlled by the operation of said stop mechanism for effecting dis- 20 engagement of said driving connections.

In testimony that we claim the foregoing as our invention we affix our signatures, in presence of two subscribing witnesses, this 6th day of October, A. D. 1904.

WALTER B. PEARSON.
CHARLES E. ROBERTS.

Witnesses:

E. M. KLATCHER,
K. A. COSTELLO.