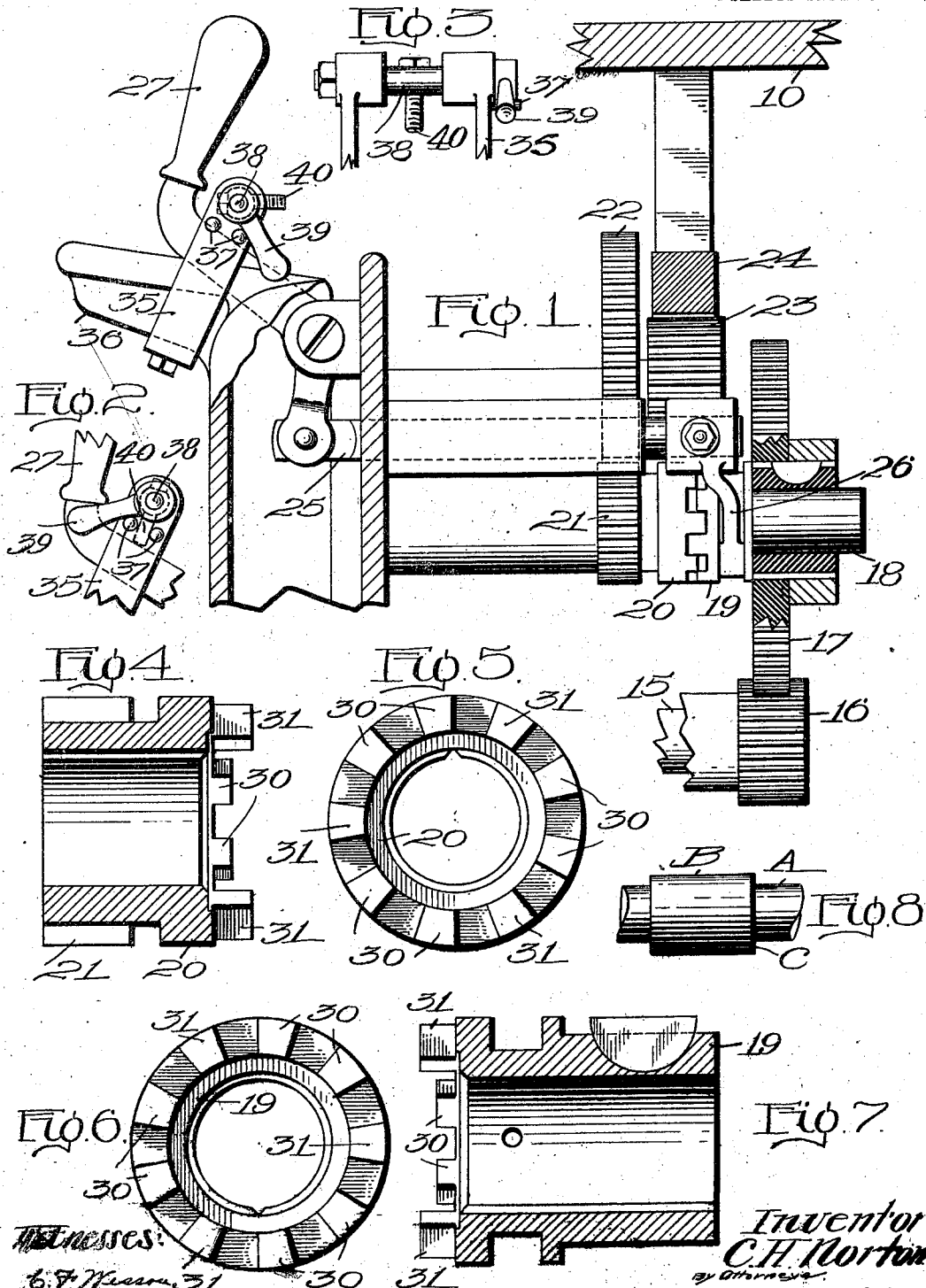


C. H. NORTON.
TABLE STOP CLUTCH.
APPLICATION FILED JUNE 19, 1909.

1,010,303.

Patented Nov. 28, 1911

2 SHEETS—SHEET 1.



Witnesses:

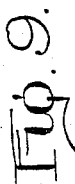
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APPLICATION FILED JUNE 19, 1909.

2 SHEETS—SHEET 2.

1,010,303.



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UNITED STATES PATENT OFFICE.

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TABLE-STOP CLUTCH.

1,010,303.

Specification of Letters Patent. Patented Nov. 28, 1911.

Application filed June 19, 1909. Serial No. 503,155.

To all whom it may concern:

Be it known that I, CHARLES H. NORTON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Table-Stop Clutch, of which the following is a specification.

This invention relates to a table stopping mechanism capable of general use, but especially adapted for cylinder grinding machines. Ordinarily, in those types of grinding machines in which the work is mounted on a reciprocating table, the table moves up to one limit, dwells, and then moves back. The object of this dwell of the table at the end of the stroke is to provide for the grinding of the entire circumference of the work directly at the end of the stroke, in cases where the work has a shoulder, or a portion larger than that portion being ground, the grinding wheel grinding the entire circumference, at this shoulder. Should there be no dwell of the table at the end of the stroke in case of slow revolution of the work and rapid traverse of the table, there would be left at the shoulder small portions of the circumference that would remain unground. This dwell of the table, therefore, is necessary when grinding work having shoulders.

The invention herein described is designed particularly for the purpose of providing practical, efficient means whereby, by simple manipulation, this dwell of the table may be omitted at will, and the table reversed and returned immediately; whereby no time may be lost by the dwell when work is ground not having shoulders, and not really requiring the dwell of the table. In such cases, the work is traversed a distance sufficient to pass beyond the corner of the grinding wheel. Therefore, all portions of the circumference of the work are ground, even though the table is reversed and returned without dwell.

This invention involves particularly simple and easily operated means whereby the table can be caused to start back at the end of the stroke without appreciable dwell, means whereby this is rendered automatic, and means for holding the table starting means in position to cause either action to take place.

Further objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawing in which—

Figure 1 is a transverse sectional view of a portion of a grinding machine showing a preferred embodiment of this invention applied thereto; Fig. 2 is a similar fragmentary view of a portion thereof showing a detail in a different position. Fig. 3 is a side view of a portion of the parts shown in Fig. 2; Fig. 4 is a longitudinal central sectional view of a clutch member constituting a part of the invention; Fig. 5 is a face view thereof; Fig. 6 is a corresponding face view of the opposite clutch member; Fig. 7 is a central longitudinal sectional view of the second clutch member; Fig. 8 is a view of a piece of work which is used to illustrate the utility of this invention; and Fig. 9 is a front elevation of a grinding machine showing how this invention can be applied thereto.

This invention is illustrated as applied to a grinding machine the construction of which is shown in Fig. 9 which involves a reciprocating table 10, a rotary head-spindle 11 for rotating the work, and a grinding wheel 12. The grinding wheel is operated in any desired way, and the table is shown as being reciprocated by means of a shaft 15 which has a reversing rotary motion in one direction and then in the other governed by the usual table dogs 13 or in any other desired way. On this shaft is a gear or pinion 16 which operates a gear 17 loose on the shaft 18. Mounted to rotate with this gear is a clutch member 19 adapted to be connected with a companion clutch member 20 which is fixed to a gear 21. This gear operates a gear 22 and a gear 23 which latter operates a rack 24 on the table 10. The gear 17 and clutch member 19 are capable of moving back and forth on the shaft 18, the gear meantime always remaining in mesh with the pinion 16. For causing this movement a reciprocating rod 25 is shown having an arm 26 thereon which directly reciprocates the gear and clutch member. This rod is operated by a table-stop lever 27 which is pivoted in a convenient position on the bed and adapted to be manually operated. It will be obvious that when this lever is in the position shown in Fig. 1 the clutch members are together and the table will be reciprocated regularly in accordance with the situation

of the dogs or other controlling devices, but when the lever is turned down at its outer end the clutch members will be apart and although the gear 17 will rotate continuously first in one direction and then in the other yet the table will be stopped.

Each of the clutch members is provided with means whereby when they are set in a certain way the reversal of motion of the driving shaft 15 will be transmitted to the table only after a certain period has elapsed, so that there will be a dwell of the table upon reversal. Thus it may be considered as a convertible positive or lost motion clutch. For this purpose each of the clutch members is provided with a plurality of teeth 30 in the ordinary way. These teeth are spaced equally apart around the circumference of the clutch members and are equally spaced also with an additional series of teeth 31. These latter teeth occupy the same position as would be occupied by some of the teeth 30, but they are fewer in number so that they are spaced a greater distance apart than the teeth 30 are. They differ from the teeth 30 only in being longer so that they project out toward the other clutch member and are adapted to engage it before the teeth 30 can do so, when the two clutch members are moved toward each other. When the two clutch members are in the position shown in Fig. 1 the table is driven without dwell, the long teeth 31 on each clutch member meshing between two of the teeth on the other member, so that the table is driven positively back and forth in accordance with the operation of the shaft 15. If it is desired, however to cause the above mentioned dwell at the end of the stroke the clutch members are moved apart so that the long teeth 31 of each one do not engage the teeth 30 of the other, but only engage the long teeth 31 thereof. Now it will be seen that each tooth 31 of the driving member is in engagement with the corresponding long tooth 31 of the driven member, and that upon reversal the driving member will have to turn through the space between two of the teeth 31 on the driven member before it can pick the latter up and carry it in the reverse direction. Thus the table has the usual dwell. The length of this dwell will of course be controlled by the space between the long teeth 31, consequently by the number of these teeth on the clutch members. In the present instance three of them are shown on each clutch member.

It will be understood, of course, that the clutch can be operated by hand to secure the desired result, but it is preferred to have means whereby the operator will not have to hold the table-stop lever 27 in the proper position to get this result. For this purpose the motion of this lever is limited by means of a yoke 35 fixed to the frame 36 of

the machine and provided with one or more fixed stops 37. Journaled on the yoke is a short shaft 38 having a handle 39 thereon and provided with a stop 40 preferably in the form of an adjustable screw. Now when it is desired to cause the usual dwell to take place this shaft is turned to the position shown in Fig. 2 the handle engaging one of the stops 37 and the table stop lever is held down from its upper limiting position. In this position the movable clutch member 19 is held in such position that only the long teeth are in position to engage each other and the above described operation takes place. When it is desired to have the reversal take place without any appreciable dwell the handle 39 is turned to the position shown in Fig. 1, in which position the dwell producing means is rendered inoperative. It will be understood of course, that irrespective of the shaft 38 the lever 27 can be moved down and the clutch entirely thrown out at the will of the operator.

As an illustration of the character of work on which this machine is designed particularly to be used, reference is to be had to Fig. 8, in which a piece of work A is illustrated. This work is shown as having a portion B which in the present instance is cylindrical and has shoulders at the ends, so that the table and work on it can be reciprocated to bring the work beyond the wheel at each end. In this case, with the usual practice time would be lost on reversal at both ends but as no dwell is required to give a uniform surface, the parts are put in the position shown in Fig. 1 and this time is saved. Yet when it is desired to grind the small cylindrical portion so that the wheel will come up to the shoulder C, the dwell is desired, and in this case the handle 39 is put in the position shown in Fig. 2, and it will be seen that as the wheel comes to the shoulder the mechanism will be reversed, but the table will not start back immediately, thus the portion adjacent to the shoulder C will be accurately ground on each stroke as usual. When employed for grinding up to two opposite shoulders the device will work automatically, because of the dwell at each end.

While I have illustrated and described a preferred embodiment of the invention I am aware that many modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to all the details of construction herein shown and described, but

What I do claim is:—

1. The combination with a cutting tool and a work holder, of driving means for causing one of said parts to reciprocate with relation to the other, a convertible positive

or lost motion clutch interposed between said driving means and the reciprocating part, and manual controlling means for operating said clutch without stopping the driving mechanism, whereby immediate or delayed reversal may be secured at will.

2. The combination of a reciprocating table, a reciprocation controlling lever capable of being set in any one of a plurality of positions, means operated by setting the lever in one position to give the table a dwell at the end of each stroke and by setting it in another to render the dwell producing means inoperative, and means for retaining the lever in either of said positions.

3. In a machine of the character described, the combination of a reciprocable table, a lever for controlling the reciprocation of the table, means operated by the lever for causing the table to return at the end of its stroke without dwell, a yoke

mounted on the frame of the machine, a shaft thereon, and means connected with the shaft for holding the operating lever in position to cause the table to return with a dwell.

4. In a machine of the character described, the combination of a table, reciprocating means therefor, a pivoted lever for controlling the reciprocating means, a yoke on the frame surrounding the lever, a shaft on the frame, and an adjustable projection on said shaft adapted to stop the lever in a position away from the shaft when the shaft is turned to a certain position.

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

CHARLES H. NORTON.

Witnesses:

ALBERT E. FAY,
J. ELMER HALL.