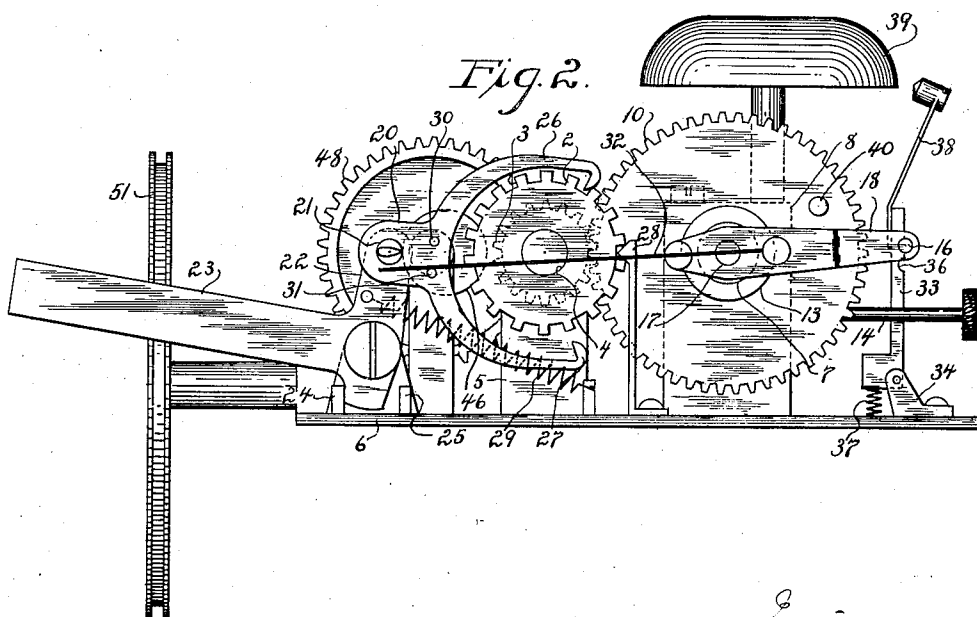
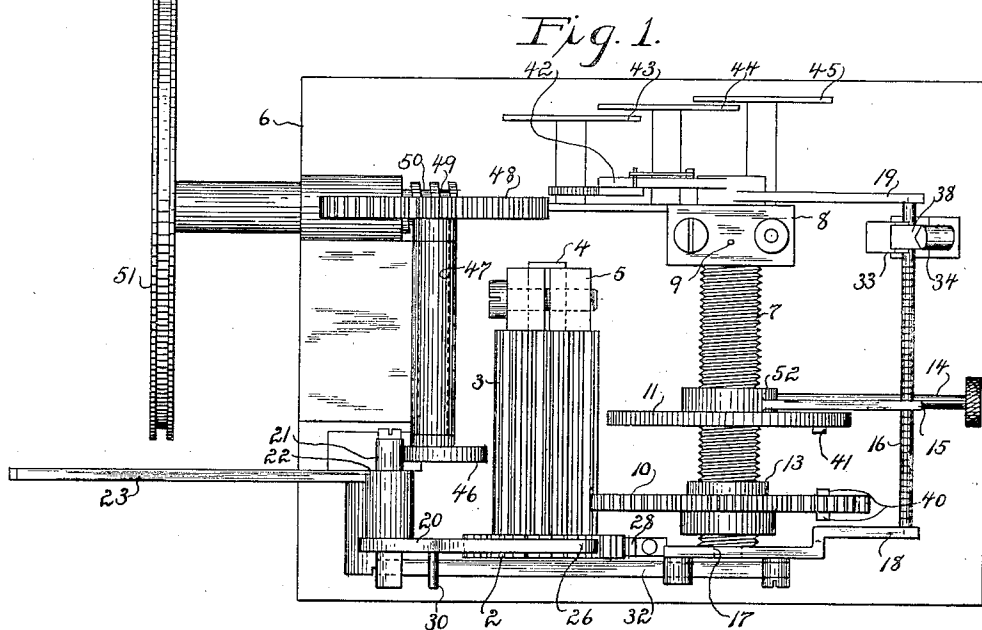


W. GRUNOW, JR.
REPEATING COUNTER.
APPLICATION FILED OCT. 24, 1912.

1,056,411.

Patented Mar. 18, 1913.

2 SHEETS—SHEET 1.



WITNESSES
M. P. Nichols
C. L. Weed

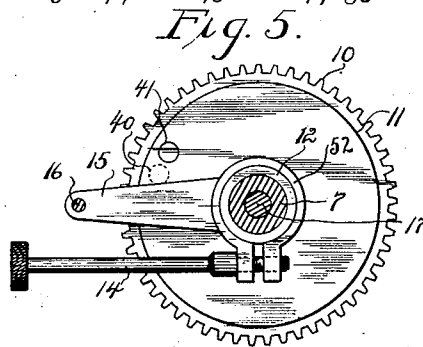
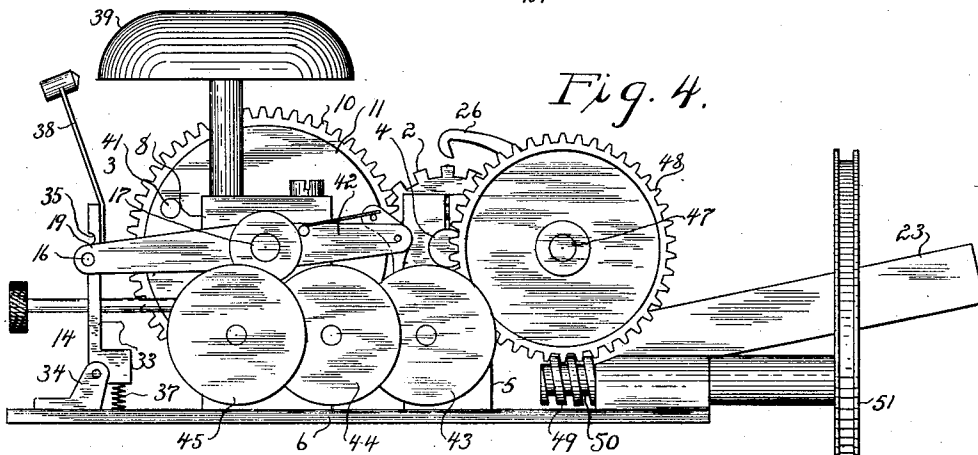
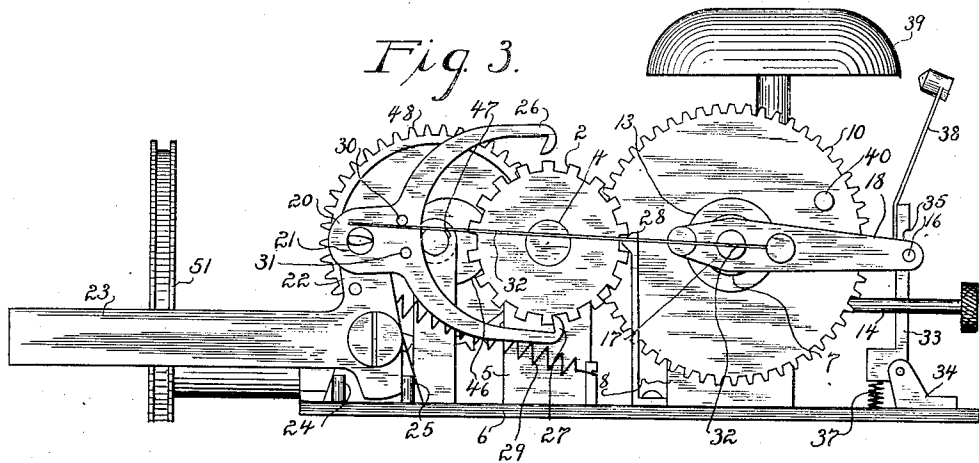
Inventor
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2 SHEETS—SHEET 2.



WITNESSES
M. P. Nichols.
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UNITED STATES PATENT OFFICE.

WILLIAM GRUNOW, JR., OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE C. J. ROOT CO., OF BRISTOL, CONNECTICUT, A CORPORATION.

REPEATING-COUNTER.

1,056,411.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed October 24, 1912. Serial No. 727,517.

To all whom it may concern:

Be it known that I, WILLIAM GRUNOW, Jr., a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Repeating-Counters; and I do hereby declare the following, when taken in connection with the accompanying drawings and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this application, and represent, in—

Figure 1 a top or plan view of a repeating counter constructed in accordance with my invention. Fig. 2 a side view of the same, showing the mechanism adapted to move in one direction. Fig. 3 a similar view showing the mechanism adapted to move in the opposite direction. Fig. 4 a side view the reverse of Figs. 2 and 3. Fig. 5 a broken sectional view showing means for fixing the position of the index.

This invention relates to an improvement in repeating counters, the object being to provide a counter which will operate a predetermined number of times in one direction, then reverse and operate an equal number of times; for instance, where three operations are performed the device will operate in one direction three times, then reverse and operate three times, and repeat this counting by three as long as required, and at the same time register the number of series of three or any other predetermined number. As another instance of use in measuring thread, the device can be adjusted to operate at the end of each hundred yards and register the number of hundred yards passing; and the invention consists in the construction hereinafter described and particularly recited in the claims.

In carrying out my invention, I employ a square toothed or sprocket wheel 2 securely attached to a long pinion 3 both of which have an equal number of teeth, and both being free to rotate upon a shaft 4 which is held against rotation by being clamped within a post 5 mounted on a suitable base 6. Adjacent to and parallel with the pinion 3 is a hollow screw-threaded shaft 7 firmly clamped in the upper end of a post 8 also projecting upward from the base 6. To insure the correct replacement

of the screw shaft with respect to its threads, a pin 9 may be passed through the end of the post 8 and into the threaded shaft 7. On this screw shaft are mounted a stop-wheel 10 and an index-wheel 11 provided respectively with threaded hubs 13 and 12 which freely fit the screw shaft 7 to permit of being rotated about the same. The stop-wheel 10 is toothed and meshes with the pinion 3 by which it is driven and caused to rotate about the screw shaft 7, and to travel lengthwise with its axis, whereby the wheel 10 is caused to travel spirally. The index-wheel 11 preferably has its rim graduated into divisions corresponding with the number of teeth in the stop-wheel 10. Around the hub 12 is a split collar 52 the ends of which are connected by a screw 14 by which the hub may be connected with the screw shaft 7. The collar 52 is also provided with an outwardly projecting index-arm 15 which is perforated at its outer end for the passage through it of a graduated rod 16 hereinafter referred to. Passing through the screw shaft 7 is a freely fitting shaft 17 which is firmly secured at one end to an arm 18 which supports one end of the graduated rod 16, the divisions of which correspond with the pitch of the screw shaft 7. The other end of the graduated rod is mounted in an arm 19 fixed to the shaft 17. A double pawl 20 is mounted on a stud 21 mounted in the outer end of a crank arm 22 of a lever 23 which is pivotally mounted on the base which base is provided with stop-lugs 24 and 25 to limit the movement of the lever. The double pawl 20 comprises an upper pawl 26 and a lower pawl 27 adapted to engage with the teeth of the sprocket wheel 2, one pawl causing the sprocket to turn in one direction and the other in the opposite direction, the length of the stroke being fixed by the said stop-lugs 24 and 25. To hold the sprocket wheel during the return stroke of either of the pawls, I employ a detent 28, and to cause the return movement of the pawls I employ a spiral spring 29. Projecting outward from one side of the double pawl 20 are two pins 30, 31, between which a flexible strip 32 extends, this strip being fixed to the arm 18, and at the other end extending over the stud 21 on which the double pawl is mounted, the outer end of this stud being flattened, and so that the strip 32 may have a bearing upon

either the upper or lower side of the flattened portion. To provide a lock for the arms 18 and 19 in the two positions, I mount a locking-lever 33 in a bracket 34 secured to the base 6, and form this locking-lever with two notches 35, 36, either of which may be engaged by the graduated rod 16, the lever being forced against the rod by a spring 37. The lever is also provided at its upper end with a hammer-arm 38 which will engage with a bell 39 when the graduated rod is shifted. The stop-wheel 10 is provided with an actuating pin 40 projecting from opposite sides, and the index-wheel 11 is provided with a count pin 41 adapted to be engaged by one end of the actuating pin 40, the other end of which pin 40 is adapted to engage with the arm 18. The index-wheel 11 being set at the desired point and the lever 23 operated, will cause one or the other of the pawls 26 or 27 to engage with the sprocket 2.

As shown in Fig. 2 of the drawings, the pawl 26 will engage with the sprocket wheel 2 and each downward movement of the lever 23 will turn the sprocket one tooth and move the wheel 10 a corresponding degree. At this time the strip 32 bears against the lower pin 31 carried by the double pawl, and the graduated rod 16 is held by the upper notch 36 in the lever 33. A continued operation of the lever 23 will move the stop-wheel 10 a predetermined number of times and until the actuating-pin 40 carried by the wheel 10 engages with the count-pin 41 carried by the index wheel 11, and these pins are so arranged that the stop-pin 40 will engage with the top of the count-pin 41 so as to depress the graduated rod 16, and hence depress the arms 18 and 19, and this depression of the arm 18 shifts the double pawl 20 so that the lower pawl 27 is in position to engage the teeth of the sprocket 2. The continued operation of the lever 23 then reverses the movement of the pinion 3 and hence reverses the movement of the stop-wheel 10 which will turn upon the screw shaft 7 until the opposite end of the stop-pin 40 engages with the underside of the arm 18. The number of movements necessary to cause this engagement being the same as was required in the opposite direction, so that by adjusting the index-wheel 11 on the screw shaft 7, the sprocket wheel may be moved one tooth in one direction, then reverse and move one tooth in the opposite direction, or it may be adjusted so that one thousand or more movements in one direction are necessary to bring the stop-pin into engagement with the index-wheel, and the same number of operations in the return direction; and at each shift the bell will be sounded. Fixed to the end of the shaft 17 is a lever 42 which operates a series of counting-wheels 43, 44 and 45 of usual con-

struction by which each shift of the graduated rod is registered, thus indicating at once the number of series of any predetermined number.

Instead of operating the pawls by the lever 23, the pawls may be operated by an eccentric 46 mounted on a shaft 47 and adapted to engage with the stud 21 on which the double pawl is mounted. This shaft may be turned by mounting a worm wheel 48 upon it and providing a worm 49 on a shaft 50 operated by a grooved or other wheel 51 by which the worm may be turned. This wheel would be of such size that a predetermined number of revolutions would operate the cam at the desired time to move the pawls; for instance, in measuring thread, the wheel could be of such size that each one, or two, or three, or any other number of hundred yards if passed over it would shift the pawls.

I claim:

1. In a counter, the combination with a sprocket wheel, of a double pawl adapted to turn the sprocket in opposite directions, a stop wheel moving with said pawl, an index with which said stop-wheel is adapted to engage after a predetermined movement, and means for the automatic reversal of the pawl.
2. In a counter, the combination with a sprocket wheel, of a double pawl adapted to turn the sprocket in opposite directions, a stop wheel moving with said pawl, an index wheel with which said stop wheel is adapted to engage after a predetermined movement, and means operated by the said wheel for shifting the pawl with relation to the sprocket wheel.
3. In a counter, the combination with a sprocket wheel, of double pawls adapted to engage with said sprocket wheel whereby it may be moved in opposite directions, a pinion turned with said sprocket, a screw shaft parallel with said pinion, a stop-wheel mounted on said screw shaft and meshing with said pinion, an index mounted on said screw shaft with which said stop wheel will engage when turned in one direction, a frame with which said stop-wheel will engage when moving in the opposite direction, said frame adapted to shift the pawl whereby the movement of the sprocket will be reversed.
4. In a counter, the combination with a sprocket wheel, a double pawl adapted to move the said sprocket in opposite directions, a pinion moving with said sprocket, a screw shaft parallel with said pinion, a stop-wheel movable on said screw shaft and engaging with said pinion, an index adjustably mounted on said screw shaft, a frame movable with said index, said stop-wheel provided with a stop-pin adapted to alternately engage with the index and with the

frame, and connections between the frame and the pawl whereby at the limit of movement of the stop-wheel in opposite directions the pawl will be shifted to reverse the movement of the sprocket.

5 5. In a counter, the combination with a sprocket wheel, of a double pawl adapted to move the said sprocket in opposite directions, a pinion moving with said sprocket, 10 a screw shaft parallel with said pinion, a stop-wheel movable on said screw shaft and engaging with said pinion, an index adjustably mounted on said screw shaft, a frame movable with said index, said stop-wheel 15 provided with a stop-pin adapted to alternately engage with the index and with the frame, connections between the frame and the pawl whereby at the limit of movement of the stop-wheel in opposite directions the 20 pawl will be shifted to reverse the movement of the sprocket, and means for operating said pawls.

6. In a counter, the combination with a sprocket wheel, of a double pawl adapted 25 to move the said sprocket in opposite directions, a pinion moving with said sprocket, a screw shaft parallel with said pinion, a stop-wheel movable on said screw shaft and engaging with said pinion, an index adjustably 30 mounted on said screw shaft, a frame movable with said index, said stop-wheel provided with a stop-pin adapted to alternately engage with the index and with the frame,

connections between the frame and the pawl whereby at the limit of movement of the 35 stop-wheel in opposite directions the pawl will be shifted to reverse the movement of the sprocket, means for operating said pawl, and means for registering each shifting of the pawls. 40

7. In a counter, the combination with a sprocket wheel, of a double pawl adapted to move the said sprocket in opposite directions, a pinion moving with said sprocket, a screw shaft parallel with said pinion, a stop- 45 wheel movable on said screw shaft and engaging with said pinion, an index adjustably mounted on said screw shaft, a frame movable with said index, said stop-wheel 50 provided with a stop-pin adapted to alternately engage with the index and with the frame, connections between the frame and the pawl whereby at the limit of movement of the stop-wheel in opposite directions the 55 pawl will be shifted to reverse the movement of the sprocket, means for operating said pawls, and means for audibly announcing the shifting of the pawls.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses. 60

WILLIAM GRUNOW, JR.

Witnesses:

CLARA L. WEED,
MALCOLM P. NICHOLS.