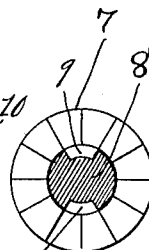
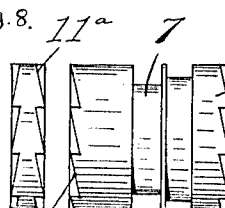
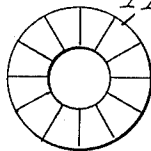
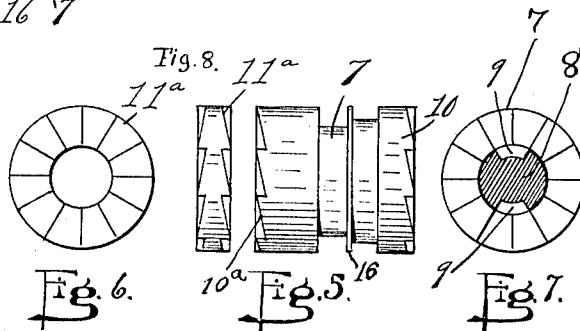
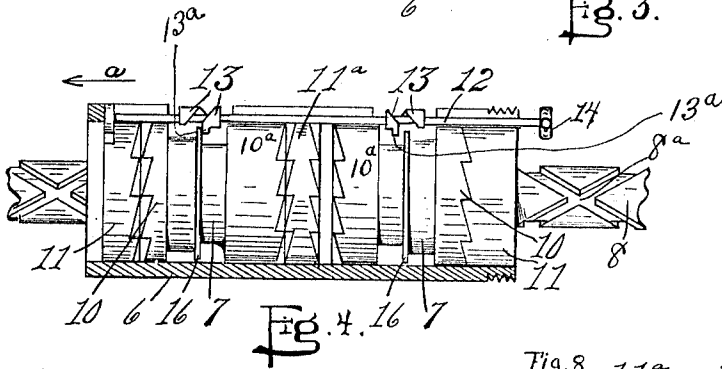
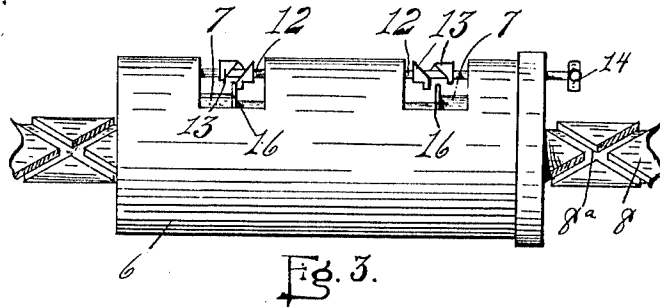
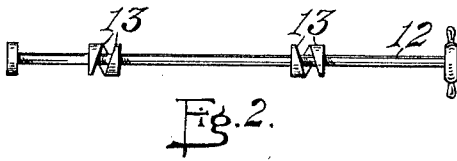
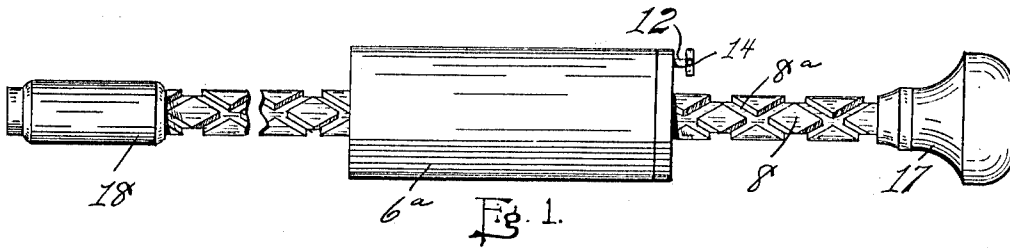


J. NAHLINGER.  
DRIVING MECHANISM FOR SPIRAL TOOL DRIVERS.  
APPLICATION FILED DEC. 18, 1912.

1,061,773.

Patented May 13, 1913.



Witness  
H. L. Fisher  
Gertrude M. Kerner.

Inventor  
John Nahlinger.  
By John A. Bonnhardt  
Attorney

# UNITED STATES PATENT OFFICE.

JOHN NAHLINGER, OF CLEVELAND, OHIO.

DRIVING MECHANISM FOR SPIRAL-TOOL DRIVERS.

1,061,773.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed December 18, 1912. Serial No. 737,533.

*To all whom it may concern:*

Be it known that I, JOHN NAHLINGER, 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 Driving Mechanism for Spiral-Tool Drivers, of which the following is a specification.

This invention relates to spiral tool drivers of the reversible type, in which rotation of a spirally grooved shaft is effected by the engagement therewith of driving devices including right and left ratchets and means to shift the same to make either operative, so that the tool may be turned to either the right or the left.

In the accompanying drawings Figure 1 is a side view of the driver. Fig. 2 is a detail of the shifting devices for the ratchets. Fig. 3 is a view of the ratchet casing with the cover removed. Fig. 4 is a side view partly in section of the device. Figs. 5, 6, 7 and 8 are details of the ratchets.

Referring specifically to the drawing, 6 indicates a cylindrical casing or barrel preferably provided with an outer cover or sleeve 6<sup>a</sup>. At each end this barrel has fixed therein a ring with ratchet teeth 11, presented inwardly or toward the interior of the barrel, and at the middle the barrel has fixed therein a ring with ratchet teeth 11<sup>a</sup> on opposite sides thereof, the teeth on the respective sides being presented in opposite direction. In each end space between the rings 11 and 11<sup>a</sup> in the barrel is a sleeve 7 provided at its opposite ends with ratchet teeth 10 and 10<sup>a</sup> presented respectively in opposite directions. A circular flange 16 projects from the sleeve 7 at about the middle thereof. Each sleeve has at the inside thereof projections 9 which projections, on the respective sleeves, run in the right and left spiral grooves 8<sup>a</sup> respectively in the spindle 8, which has a chuck 18 at one end and a bearing head 17 at the other end. The ratchet bearing sleeves 7 may be shifted lengthwise in the barrel, to engage and disengage the respective ratchets, by means of a rod 12 extending lengthwise through the barrel at one side thereof, provided with spiral grooved cams 13 which engage the flanges 16, the cams being so constructed that the sleeves are shifted in opposite directions when the rod 12 is turned, as it may be by the handle 14.

Each cam groove terminates in a lip 13<sup>a</sup>

on one side of the rod or shaft, the cam block being cut away on that side of the rod 12, to permit a certain amount of play or longitudinal movement of the sleeve 7, and the length of each sleeve is such that when shifted in position to engage its teeth 10 with one of the end ratchets 11, the teeth 10<sup>a</sup>, at its opposite end, cannot engage with the teeth of the middle ratchet 11<sup>a</sup>; and when by turning the rod 12 the sleeves 7 are shifted toward the middle ratchet 11<sup>a</sup>, in position to engage the same by the teeth 10<sup>a</sup>, the teeth 10 cannot engage the end ratchets 11. The relative location or position of the rib 16 and the finger 13<sup>a</sup> is such that either block 7 may shift to disengage its teeth from the teeth of the fixed ratchets 11 and 11<sup>a</sup> in the barrel. Thus, in Fig. 4, the barrel is illustrated as moving in the direction of the arrow *a*. This movement causes the teeth 10 on the right hand sleeve 7 to engage the ratchet 11 at the right hand or rear end of the barrel, and the same movement retracts the teeth 10 of the other or left hand sleeve 7 from the ratchet 11 at the front end of the barrel, as shown, but the rib 16 of said left hand sleeve 7 stops against the finger 13<sup>a</sup> before the teeth 10<sup>a</sup> of said barrel can engage the teeth 11<sup>a</sup> of the middle ratchet. The result is that the right hand sleeve 7 is locked to the barrel, while the left hand sleeve is disengaged at both ends, and can float or rotate freely as the barrel 6 is pushed in the direction shown by the arrow *a*, that is, toward the front end of the shaft 8, and the engagement of the projections 9 in the right hand sleeve 7 in the spiral groove 8<sup>a</sup> causes the shaft 8 to turn in one direction, that is, clockwise in the illustration shown. When the barrel 6 is then reversed and drawn toward the handle end of the shaft 8 the friction of the projections 9 in the spiral grooves first causes the right hand sleeve 7 to shift to the left until its teeth 10 are disengaged from the ratchet 11, and the same movement causes the left hand sleeve 7 to shift to the left until its teeth 10 engage with the ratchet 11 at the left hand of the barrel, and, the movement of the barrel being continued, the engagement of the projection 9 in the other spiral groove 8<sup>a</sup> causes the shaft 8 to rotate, in the same direction as that produced by the forward movement of the barrel. Therefore by reciprocating the barrel on the shaft the sleeves 7 are caused to become alternately

locked to the barrel, the other sleeve running idle, whereby practically continuous rotation of the shaft 8 in one direction is produced by the reciprocation of the barrel.

- 5 To rotate the shaft in the opposite direction, the rod 12 is turned, and the cams 13 act to shift the sleeves 7 toward the middle, the projections 13<sup>a</sup> then being on the outer side of the ribs 16, instead of on the inner side, 10 as shown in Fig. 4. In this position the sleeves 7 will be incapable of engaging with the end ratchet 11, but will have sufficient play to permit one or the other to engage its teeth 10<sup>a</sup> with the middle ratchet 11<sup>a</sup>. 15 Since the teeth of the middle ratchet 11<sup>a</sup> are presented oppositely to the teeth of the end ratchets 11 the shaft 8 will, when the barrel 6 is reciprocated, turn in reverse direction, that is, counterclockwise.
- 20 The alternate engagement of the teeth 10<sup>a</sup> on the respective sleeves 7 and the corresponding teeth of the middle ratchet 11<sup>a</sup> is effected in a manner similar to that above described. That is, when the barrel is 25 pushed forwardly the teeth 10<sup>a</sup> of the left hand sleeve 7 will slip to engagement with the middle ratchet 11<sup>a</sup>, and when the barrel is pulled rearwardly or toward the handle 17, the left hand sleeve 7 will shift out of 30 engagement, and the right hand sleeve 7 will shift into engagement. Therefore by the means shown the reciprocation of the barrel will produce practically continuous rotation of the shaft in one direction or the 35 other, according to the position of the sleeves 7 as controlled by the cams 13.

What I claim as new is:

1. The combination of a spindle having right and left spiral grooves, a barrel slidable lengthwise thereon and having ratchets 40 at opposite ends and at the middle, sleeves having projections engaging in said grooves and shiftable in the barrel between the end and middle ratchets, each of said sleeves 45 having ratchets at opposite ends thereof engageable respectively with said end and middle ratchets, and means to shift the sleeves.

2. The combination of a spindle having right and left spiral grooves, a barrel slidable lengthwise thereon and having ratchets at opposite ends with teeth presented in one direction and also having ratchets at the middle with teeth presented in the opposite direction, sleeves shiftable in the barrel, between each end ratchet and middle ratchet, each of said sleeves having teeth at opposite ends presented in opposite directions to engage the said end or middle ratchet respectively, said sleeves having projections engaging in the grooves, and means to shift the sleeves in opposite directions, to engage the same with the end or middle ratchets respectively.

3. The combination of a spindle having right and left spiral grooves, a barrel slidable lengthwise thereon and having ratchets at opposite ends and at the middle, sleeves having projections engaging in said grooves, and shiftable in the barrel between 70 the end and middle ratchets, each of said sleeves having ratchets at opposite ends thereof engageable respectively with said end and middle ratchets, and means to shift 75 the sleeves, comprising a rod movable in the barrel, beside the sleeves and operatively connected to the latter.

4. The combination of a spindle having right and left spiral grooves, a barrel slidable lengthwise thereon and having ratchets 80 at opposite ends and also at the middle, sleeves having projections engaging in said groove and shiftable in the barrel between the end and middle ratchets, each of said sleeves having ratchets at opposite ends 85 thereof engageable respectively with said end and middle ratchets, and each sleeve having a circular flange, and a rod mounted to turn in the barrel and having cams engaging said flanges and adapted to shift the sleeves. 90

In testimony whereof, I do affix my signature in presence of two witnesses.

JOHN NAHLINGER.

Witnesses:

D. C. REED,

JOHN A. BOMMARDT.