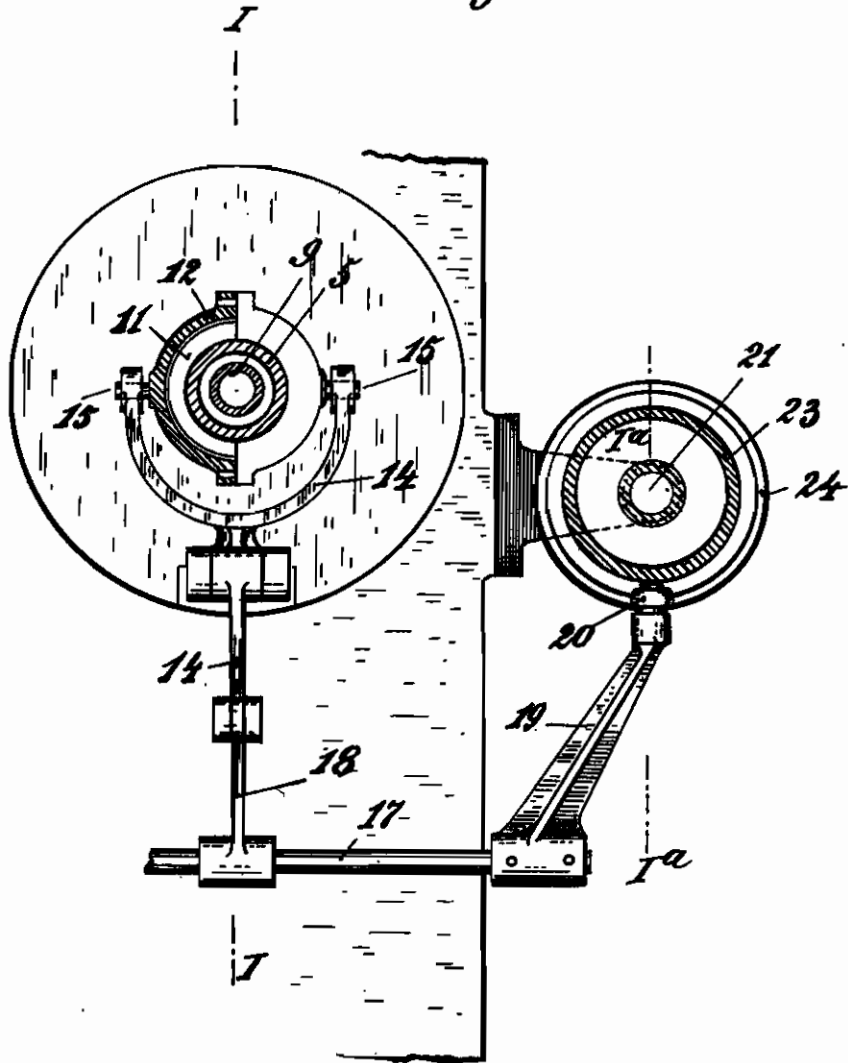


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F. R. DEURING
SEMI-AUTOMATIC LATHE
Filed Jan. 16, 1940

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Fig. 1.

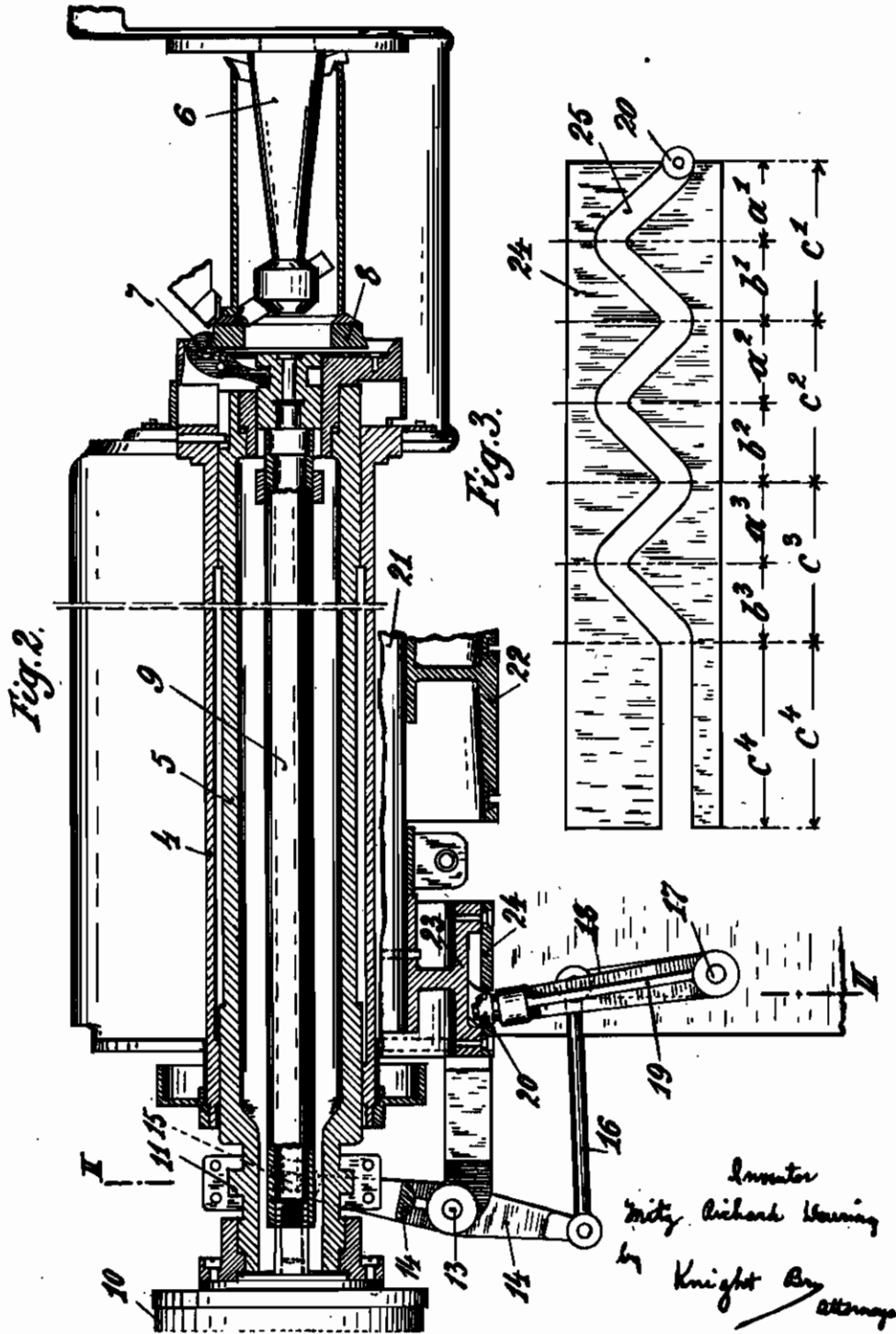


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ALIEN PROPERTY CUSTODIAN

SEMI-AUTOMATIC LATHE

Fritz Richard Deuring, Munchen-Gladbach, Germany; vested in the Alien Property Custodian

Application filed January 16, 1940

The invention relates to semi-automatic lathes with work-pieces held so that they can move forward and backward and with a revolving tool box adapted to be engaged and disengaged by a control device and the object of the invention is, to increase the working length at disposal, without exceeding the outer dimensions of the commonly used semi-automatic lathes.

This is attained according to the invention chiefly thereby, that in a hollow spindle a second inner spindle, which carries on its end facing the revolving tool box the holding device for the workpiece, is mounted axially shiftable but not rotatable relative to the first mentioned hollow spindle and connected with the control device, which, in the same rhythm as the control of the revolving tool box pulls back the inner spindle together with the workpiece after every operation and returns it again into the working position.

A second control drum, mounted on the control drum shaft, is preferably provided with this object in view and coupled with the inner spindle by a system of rods and has a control groove of such shape, that at every feed movement of the control drum shaft the inner spindle carries out a backward movement and again a forward movement, but remains at standstill during the last control cycle. The working length which is at disposal is therefore increased by the distance for which the inner spindle moves back. This movement takes place in the same cycle as the feeding of the revolving tool box. As semi-automatic lathes usually have a revolving tool box with four arms, also the control device for the inner spindle works in the four stroke cycle, the last stroke being however omitted, as at this moment the parting tool slides carry out the cutting off of the finished workpiece.

An embodiment of the invention is illustrated by way of example in the accompanying drawings.

Fig. 1 is a cross-section through an automatic lathe on line II—II of Fig. 2.

Fig. 2 is a longitudinal section corresponding to Fig. 1 along lines I—I and Ia—Ia of Fig. 1.

Fig. 3 shows the control groove developed.

In a hollow spindle 4 as commonly used on automatic lathes of this type, a second hollow spindle 5 is mounted according to the invention so that it can shift in longitudinal direction. This second hollow spindle 5 carries on its end facing the revolving tool box 6 a device 7 for gripping the workpiece 8. A rod 9 mounted in the hollow spindle 5 connects the gripping device with a pneumatic cylinder 10 mounted on the rear end of the hollow spindle 5, said pneumatic cylinder 10 controlling the gripping device. The

hollow spindle 5 has at its rear end a collar 11 over which engages a ring-shaped element 12. A lever 14 is mounted on an axle 13 and its forked upper end engages over pins 15 of this ring 12, so that a forward and backward movement of the hollow spindle 5 can be obtained by the movement of the lever 14. With this object in view a connecting rod 16 is hingedly mounted on the lower end of lever 14 and pivotably connected with an arm 18 pivotably mounted on a shaft 17. A lever 19 carrying at its free end a roll 20 is keyed on shaft 17. On the control shaft 21, which carries a drum 22 for controlling the movements of the semi-automatic lathe, a second control drum 23 is mounted according to the invention. This second drum 23 has a control groove 25 in its cover in which groove the roll 20 of the lever 19 fits.

During one operation of the automatic lathe the several elements assume the position shown in Fig. 2, the roll 20 being in the position shown in Fig. 3. If the operation is terminated, the control shaft 21 carries out a quarter revolution and controls in this manner the necessary movements of the automatic lathe. At the same time the control drum 23 is turned by 90° with the result, that the lever 19 is oscillated to the right during the first portion of the control movement, and again to the left into its original position during the second portion of the control movement. The control drum has then rotated through the distances $a^1+b^1=c^1$ and reached the second operative position.

The inner spindle 5 together with the workpiece is pulled back, owing to the oscillation of the lever 19, to move forward again into the operative position after the revolving tool box 6 has been turned again. This cycle is repeated after every operation, so that the control drum 23 moves successively through the distances $a^1+b^1=c^1$, $a^2+b^2=c^2$, $a^3+b^3=c^3$. During the last quarter of the control drum movement the control groove 25 extends in a plane perpendicular to the control shaft, so that no backward and forward movement is imparted to the inner spindle 5, and a rotation by the last distance c^4 takes place without a movement of the workpiece, so that the parting slides can carry out the cutting.

As under certain conditions semi-automatic lathes may be equipped in a similar manner, which have either less or more than four working strokes, the cover 24 of the control drum 23 is removably arranged so that a cover with a control groove of other shape can be placed on this drum.

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