Feb. 24, 1942. A. BECHLER 2,274,230

AUTOMATIC LATHE

Filed Nov. 30, 1940 3 Sheets-Sheet 1

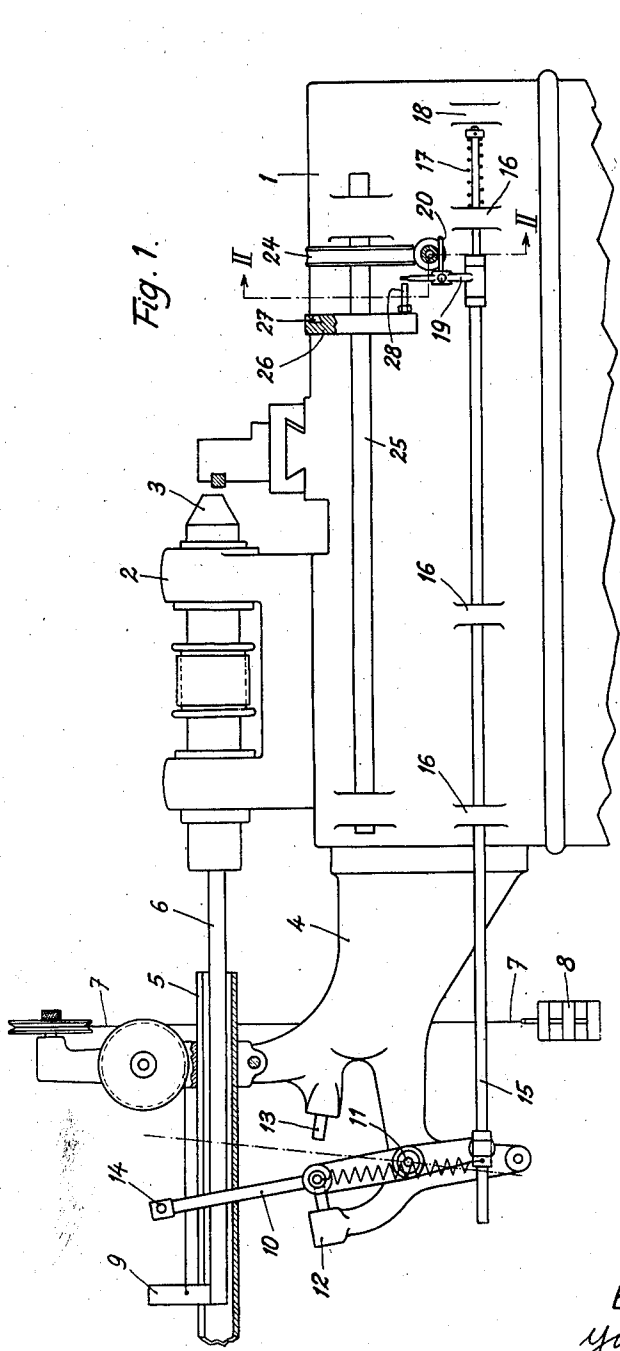


Fig. 1.

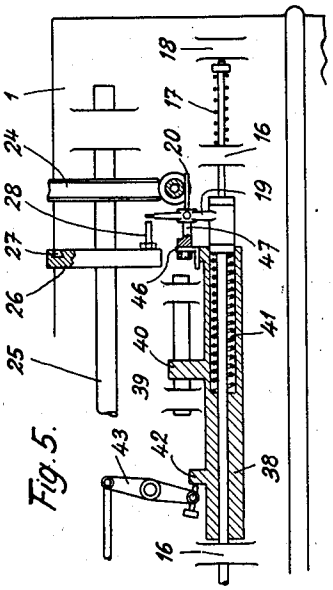


Fig. 5.

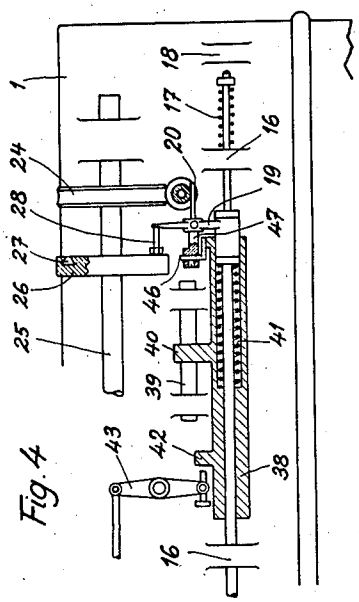


Fig. 4

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Feb. 24, 1942. A. BECHLER 2,274,230

AUTOMATIC LATHE

Filed Nov. 30, 1940 3 Sheets-Sheet 2

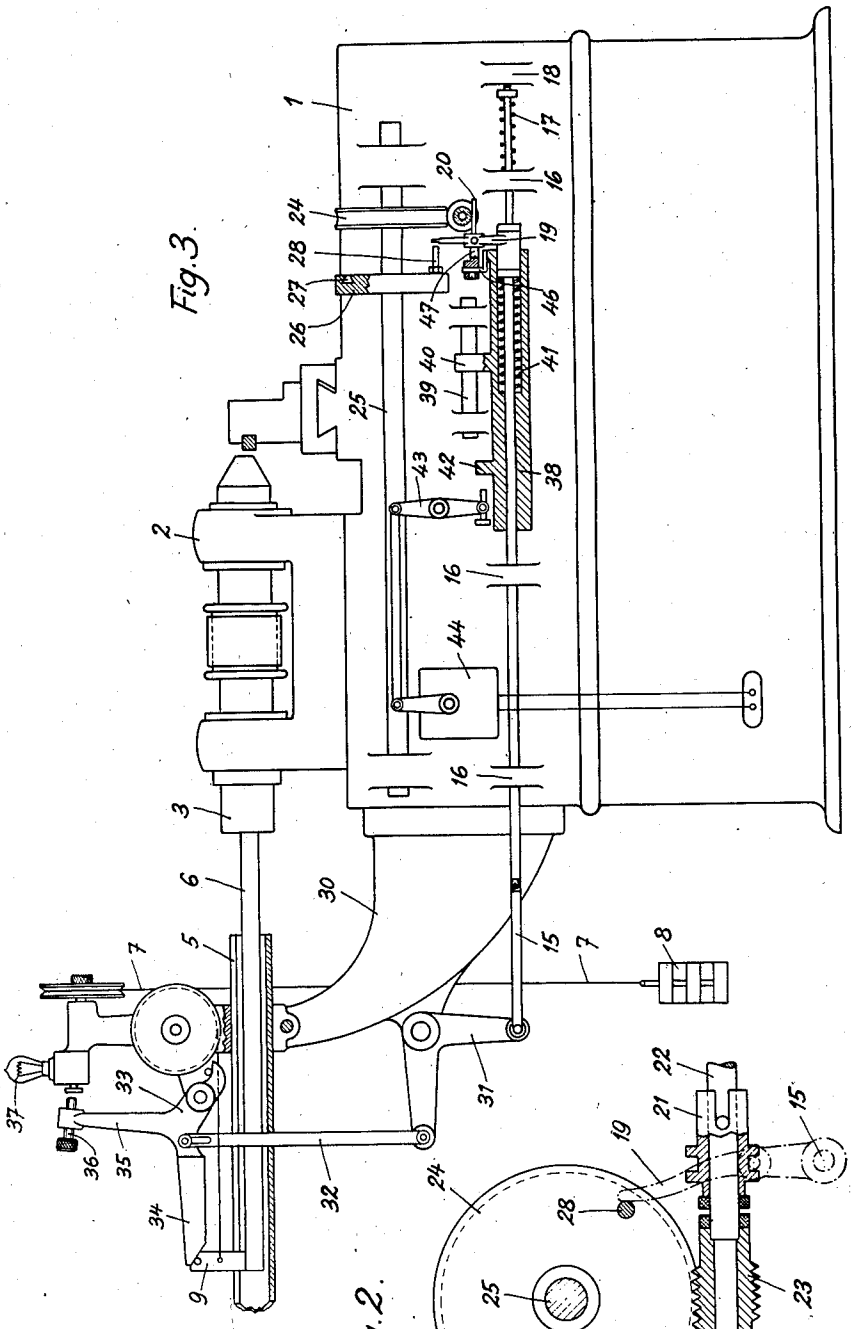


Fig. 3.

Fig. 2.

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AUTOMATIC LATHE

Filed Nov. 30, 1940 3 Sheets-Sheet 3

Fig. 6.

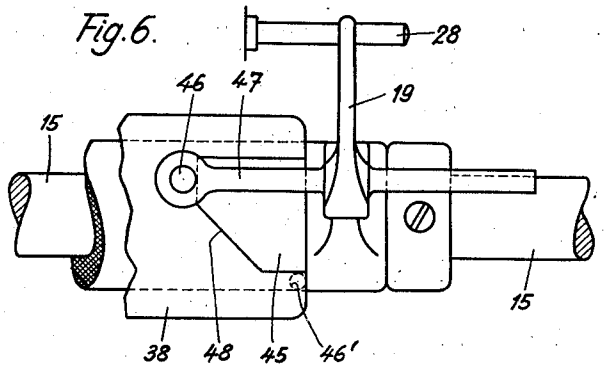
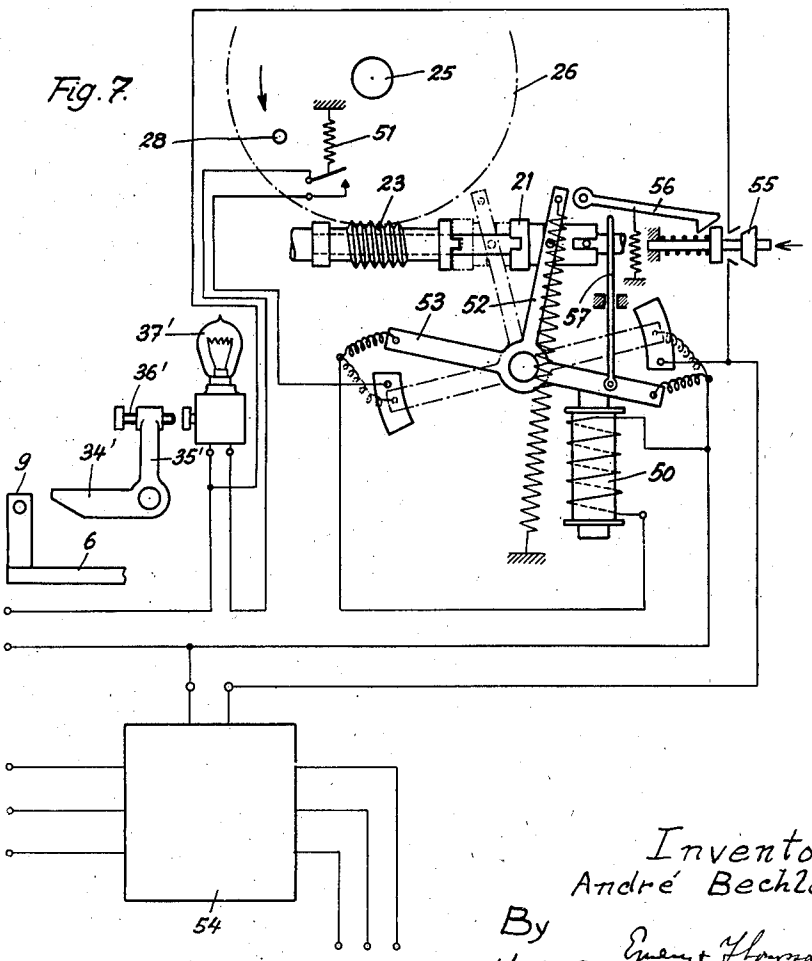


Fig. 7.



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UNITED STATES PATENT OFFICE

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AUTOMATIC LATHE

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8 Claims. (Cl. 29—65)

This invention relates to automatic lathes specially to a lathe with a disengageable camshaft controlling the different operations for machining a work piece.

An object of the invention is to provide a disengaging device for the camshaft, which device is controlled by the weight driving the feeding device of the lathe.

In a preferred embodiment the disengaging device also controls the running of the machine in that it acts, e. g., either upon the belt driving the motor shaft, or upon the feeding circuit of the motor in case of individual drive.

Another object is to provide for a disengaging device stopping the lathe, i. e. the drive, after said device has disconnected the camshaft from said drive.

A further object is to provide an electric apparatus for disconnecting the camshaft from its drive, said apparatus being in an electric circuit which, with the aid of suitable means, can be closed by the driving weight of the feeding device, besides which, said circuit is completed periodically by an interrupter controlled by a driver on a member which is driven by the camshaft.

The invention will be more fully described in connection with the accompanying drawings, in which—

Fig. 1 is a side view of the machine, showing those parts only which are necessary for the comprehension of the invention;

Fig. 2 is a section taken on line II—II of Fig. 1;

Fig. 3 is a side view of a second embodiment;

Figs. 4 and 5 show some essential parts of the second embodiment in different operating positions;

Fig. 6 is a plan view of a detail described hereinafter, shown in a schematic way and on a larger scale;

Fig. 7 is a scheme of a third embodiment.

In Figs. 1 and 2, 1 is the frame of the machine. 2 designates the movable head stock in the interior of which the spindle 3 is rotatably mounted. On this latter a chuck operating mechanism is provided for clamping the work piece in the course of the cycle of operations. These devices are well known to those skilled in the art and need not be described in detail.

A bracket 4 is fixed to the left side of the frame, carrying the feeding device. This latter comprises, as is usual in all lathes of the kind described, a slotted tube 5 in which a pressure rod 6 slides, moved towards the head stock by means of a cable 7. On the one end of this cable a weight 8 is suspended, while the other end is fixed to a vertical arm 9 of the pressure rod 6.

Beneath the slotted tube 5 the bracket 4 carries a lever 10 bearing now on the stop 12, now on the stop 13 provided on the bracket. The upper end 14 of lever 10 lies in the path of arm 9, while its lower end is fixed to a bar 15 guided in bosses 16 of the frame and kept in place by a spring 17 pressing it against a stop 18. To this bar 15 a disengaging lever 19 is attached carrying a lateral arm 20 engaging a groove of the claw 21 of a clutch, seen in section in Fig. 2. This claw connects the motor shaft 22 with a worm engaging a worm wheel 24 keyed on the camshaft 25. This camshaft carries a disc 26 with a dovetailed groove 27 in which a driver or tappet 28 is adjustably held into whose path the disengaging arm 19 is brought by the bar 15 for cooperation with the tappet 28.

The manner of action of the device described is as follows:

When the material has disappeared in the interior of the head stock, the pressure rod 6 has also penetrated the latter and, when the material is consumed, the arm 9 has pushed the lever 10 into the position indicated by a dotted line in Fig. 1 and from this position the spring 11 moves the lever 10 suddenly into its outermost right-hand position, and this lever and the bar 15 bring the disengaging arm 19 into the path of the tappet 28. The movement of the camshaft causes this tappet 28 to strike against the said disengaging lever and to move this latter to the right (Fig. 2). This movement is transmitted to the claw 21. This latter is shifted to the right so that the camshaft is stopped. This stopping may be provoked at any desired moment of the cycle of operation, in that the tappet 28 can be adjusted to any desired point of the disc 24 which, like the camshaft, makes one revolution per cycle of operations.

In the embodiment shown in Fig. 3 the constitutive parts described in the example according to Fig. 1 are also to be found. They are indicated by the same reference characters. However, the gear for disengaging the claw is slightly different. The bracket 30 carries a bent lever 31 which, on the one side, is connected with bar 15 and, on the other side, with a second bar 32 attached to a second bent lever 33 also pivoted on the bracket 30. One of the arms of this lever, 34, lies horizontally above the slotted tube 5 and comprises an inclined surface adapted to cooperate with the vertical arm 9 of the pressure rod 6. The other arm 35 of the bent lever 33 carries

a contact screw 36 for closing the circuit of a signal lamp 37. The bar 15 passes through a tube 38 guided by means of an arm 40 on a slide bar 39 fixed to the frame. In the interior of tube 38 a spring 41 is located and on the exterior of this tube a stop 42 is provided adapted to strike against the lower end of a lever 43 controlling the switch 44 of the motor of the lathe. The hub of the disengaging lever 19 is pivoted in the right end of the tube 38. This end is illustrated in Fig. 6 on a larger scale. A cam 45 is fixed to this end, engaging a finger 46 attached to the end of a rod 47 carried by the disengaging arm 19. In the position shown in Fig. 3, when the finger 46 engages the flat part of the cam 45, the spring 41, which has given an initial stress, is stretched. The cam 45 has an inclined surface 48 at which the finger 46 arrives when, under the effect of the tappet 28, the disengaging arm 19 rotates in the interior of the tube 38 around the bar 15, thereby disengaging the claw 21. This position is shown in Fig. 4. With the aid of spring 41 the finger 46 now slides along the cam until it attains the position 46' (Fig. 6). This position is shown in Fig. 5, where the tube 38, with regard to the finger 46, occupies a position in which it has caused lever 43 to tilt in order to interrupt the circuit by means of the switch 44 of the motor.

From the aforesaid it follows that the stopping of the machine succeeds the disengaging of the machine. These two operations are displaced with regard to each other, such displacement being necessary in certain cases.

Referring to Fig. 7, the arm 34' of lever 35' cooperates with the vertical arm 9 of the pressure rod 6. The contact screw 36' not only closes the circuit of the signal lamp 37' but also that of an electromagnet 50 whose circuit is, furthermore, periodically completed by an interrupter 51 at each passing of the adjustable tappet 28 mounted on a disc 26. The camshaft 25 is driven by the worm 23 which can be coupled with the motor shaft by means of the claw 21. This claw is engaged and disengaged by the middle arm 52 of an interrupter 53 connected in series with the circuit of the electromagnet 50. When the vertical arm 9 has tilted lever 35 in order to close the contact controlled by the screw 36', the next cooperation of the tappet 28 with the interrupter 51, in the position of the interrupter 53 shown in dotted lines in Fig. 7, provokes the energizing of the electromagnet 50 and the operation of the interrupter 53. Before the interruption has taken place, that is, during the movement of the arm of the interrupter, the claw 21 has disengaged the worm 23 and the camshaft is stopped. On this, the circuit of the switch box 54 of the motor is opened and the machine totally stopped. The disengaged position is shown in full lines in Fig. 7.

An auxiliary switch 55 is shown in Fig. 7 allowing the motor to be started even if the interrupter 53 is in its open position. A spring catch 56 is adapted to keep the switch 55 in closed position and a rod 57 mounted on the interrupter 53 is adapted to disengage said spring catch 56 as soon as the interrupter 53 is again closed.

While some embodiments of the invention have been disclosed in such detail as to enable anyone skilled in the art to practice the invention, nevertheless it is not to be limited to any of the details described, but instead, it will be understood that the invention embraces such embodiments of the broad idea as fall within the scope of the subjoined claims, it being obvious that various changes may be made without departing from the spirit of the invention. What I claim is:

1. In an automatic lathe comprising a disengageable camshaft adapted to control the different operations for machining a work piece, a driving shaft adapted to drive said camshaft, a feeding device, a driving weight adapted to operate said feeding device, suitable means connecting said driving weight with said feeding device, a disengaging device adapted to disconnect said camshaft from said driving shaft, and a suitable mechanism adapted to control said disengaging device and to be operated by said driving weight.

2. In an automatic lathe comprising a disengageable camshaft adapted to control the different operations for machining a work piece, a driving shaft adapted to drive said camshaft, a feeding device, a driving weight adapted to operate said feeding device, suitable means connecting said driving weight with said feeding device, a disengaging device adapted to disconnect said camshaft from said driving shaft, a suitable mechanism adapted to control said disengaging device and to be operated by said driving weight, and a stopping device adapted to stop the lathe and to be controlled by said disengaging device.

3. In an automatic lathe comprising a disengageable camshaft adapted to control the different operations for machining a work piece, a driving shaft adapted to drive said camshaft, a feeding device, a driving weight adapted to operate said feeding device, suitable means connecting said driving weight with said feeding device, a disengaging device adapted to disconnect said camshaft from said driving shaft, a suitable mechanism adapted to control said disengaging device and to be operated by said driving weight, and a stopping device adapted to stop the lathe and to be controlled by said disengaging device in such a way that the lathe is stopped after the camshaft has been disengaged.

4. In an automatic lathe comprising a disengageable camshaft adapted to control the different operations for machining a work piece, a driving shaft, a clutch adapted to connect and to disconnect said camshaft from said driving shaft, a member adapted to be rotated by said camshaft, a driver on said member, a feeding device comprising a pressure rod, a driving weight adapted to move said pressure rod, suitable means connecting said driving weight with said pressure rod, a driving mechanism adapted to be operated by said pressure rod, and a disengaging member provided on said driving mechanism, adapted to cooperate with said driver when brought into the path of said driver by said driving mechanism and then to operate said clutch.

5. In an automatic lathe comprising a disengageable camshaft adapted to control the different operations for machining a work piece, a driving shaft, a clutch adapted to connect and to disconnect said camshaft from said driving shaft, a member adapted to be rotated by said camshaft, a driver on said member, a feeding device comprising a pressure rod, a driving weight adapted to move said pressure rod, suitable means connecting said driving weight with said pressure rod, a driving mechanism adapted to be operated by said pressure rod, a disengaging member provided on said driving mechanism, adapted to cooperate with said driver when brought into the path of said driver by said

driving mechanism and then to operate said clutch, a stopping device comprising an element, a spring adapted to move said element, a holding member on said disengaging member, adapted to hold said element against the effect of said spring and, when moved by said driver, to release said element, and a stopping apparatus adapted to be operated by said element when the latter is released and moved by said spring.

6. In an automatic lathe comprising a disengageable camshaft adapted to control the different operations for machining a work piece, a driving shaft adapted to drive said camshaft, a feeding device, a driving weight adapted to operate said feeding device, suitable means connecting said driving weight with said feeding device, an electric circuit adapted to be closed by said feeding device, an electric apparatus in said circuit, adapted to disconnect said camshaft from said driving shaft, a member adapted to be rotated by said camshaft, an adjustable driver on said member, and an interrupter adapted to be controlled by said driver and to complete said circuit periodically.

7. In an automatic lathe comprising a disengageable camshaft adapted to control the different operations for machining a work piece, a driving shaft adapted to drive said camshaft, a feeding device, a driving weight adapted to operate said feeding device, suitable means connecting said driving weight with said feeding device, an electric circuit adapted to be closed by said feeding device, an electric apparatus in said circuit, adapted to disconnect said camshaft from said driving shaft, a member adapted to be rotated by said camshaft, an adjustable driver on said member, an interrupter adapted to be controlled by said driver and to complete said circuit periodically, a motor for driving said driving shaft, a switch controlling said motor, and a contact in said electric apparatus, adapted to control said switch.

8. In an automatic lathe comprising a disengageable camshaft adapted to control the different operations for machining a work piece, a driving shaft adapted to drive said camshaft, a feeding device, a driving weight adapted to operate said feeding device, suitable means connecting said driving weight with said feeding device, an electric circuit adapted to be closed by said feeding device, an electric apparatus in said circuit, adapted to disconnect said camshaft from said driving shaft, a member adapted to be rotated by said camshaft, an adjustable driver on said member, an interrupter adapted to be controlled by said driver and to complete said circuit periodically, a motor for driving said driving shaft, a switch controlling said motor, and an auxiliary interrupter in said electric apparatus, adapted to shunt said switch and to be opened when said camshaft is coupled with said driving shaft.

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