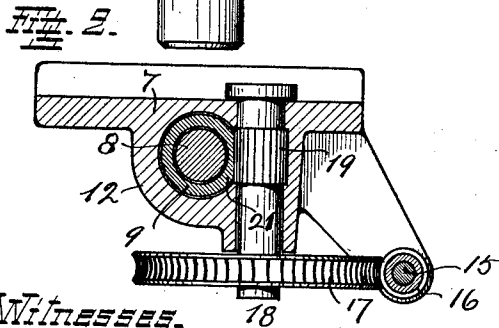
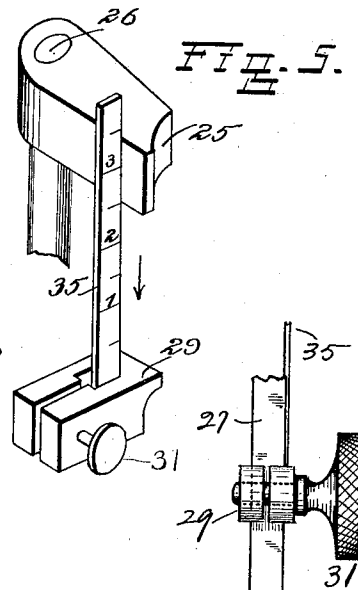
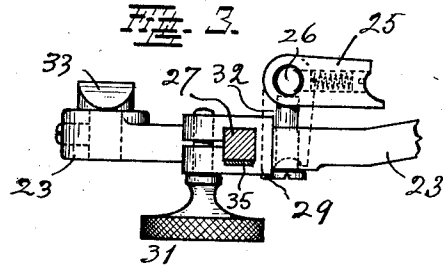
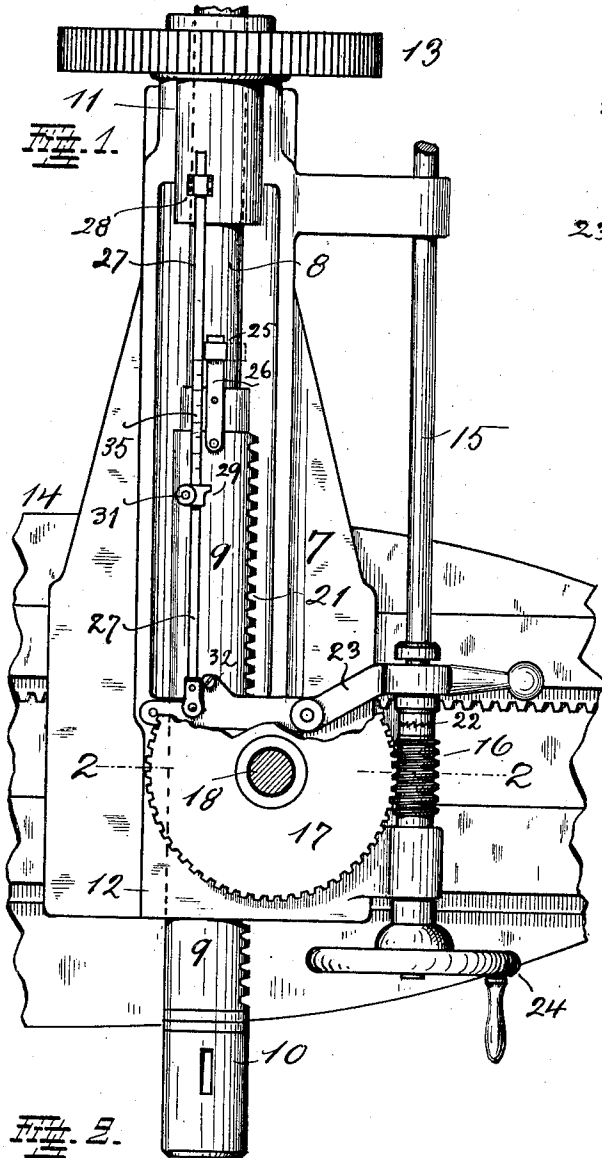


H. DRESES & E. J. SPAETH.
 AUTOMATIC TOOL STOP.
 APPLICATION FILED MAY 22, 1912.

1,063,665.

Patented June 3, 1913.



WITNESSES.

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DRESES MACHINE TOOL CO., A FIRM CONSISTING OF HENRY DRESES AND
WILLIAM GILBERT, BOTH OF CINCINNATI, OHIO.

AUTOMATIC TOOL-STOP.

1,063,665.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, HENRY DRESES and EDWARD J. SPAETH, citizens of the United States, and both residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Automatic Tool-Stop; and we do declare that the following is a clear, full, and exact description of the invention, attention being called to the drawing which accompanies this application and forms a part thereof.

This invention concerns machine tools and similar mechanical appliances in which metal-working devices like boring-tools, drills, bits, etc., are used, said devices being actuated by machine-elements like rams, spindles, etc., whereby they are carried and moved with respect to the work.

The invention relates to stops whereby the advance movement or feed-motion of such a device is automatically stopped by means which act upon the mechanism which is concerned in the operation of the feed-motion.

Our invention is illustrated and described as applied to a drill-press, to be used for stopping automatically the feed-motion of the drill-spindle which carries the tool-bit and consists of the particular means and their construction as hereinafter described and claimed and as illustrated in the accompanying drawing in which:—

Figure 1, shows a front view of a drill-head of conventional construction, together with a drill-spindle mounted in the same. Fig. 2, shows a horizontal section taken on line 2—2 of Fig. 1. Fig. 3, is an enlarged top-view of the complementary parts which constitute the principal parts of the stop. Fig. 4, shows parts of the preceding figure in side-elevation. Fig. 5, shows in perspective view the complementary parts of the stop as they appear in their relative positions and when adjusted for action.

In the drawing, 7 indicates the head of the drill on which the drill-spindle 8 is supported, the same being contained in a sleeve 9. Both spindle and sleeve are connected so as to be capable of moving together in an axial direction and to and from the work. The spindle is also capable of a rotary movement within the sleeve and independent thereof. It projects at both its ends beyond this sleeve and at its lower end a chuck or socket 10 is provided for attachment of a

tool or bit. Two bearings are provided on the head to guide and support this movable structure, an upper bearing 11, which is fitted to the spindle and a lower bearing 12, which is fitted to the sleeve. A gear-wheel 13 is used for rotating the spindle, it being connected thereto by means of a spline to permit the spindle to move vertically without interfering with this rotation. This gear-wheel is driven in the usual manner by gearing carried on the head, generally rearwardly of the same and not shown. This rotary movement of the spindle is for the purpose of actuating the tool carried by it, while the vertical movement is for the purpose of moving the tool to and from the work. The head is supported on an arm 14 which extends from a frame or column and may be moved thereon in order to adjust the position of the tool on the spindle with reference to the work below it.

Part of the gearing previously referred to as being carried on head 7 and serving to drive gear 13 whereby the spindle is rotated, serves also to impart the vertical movement of the spindle, the action from said gearing being ultimately received by an upright shaft 15 and transmitted by it, by means of a worm 16 thereon, to a worm-wheel 17, mounted on a horizontal shaft 18. A pinion 19 is provided on this shaft and meshed into a rack 21 on the spindle-sleeve, thereby transmitting motion to the spindle in a vertical direction. Worm 16 is loosely mounted with reference to shaft 15, its operative connection thereto being subject to the adjustment of a clutch 22, manipulated by a lever 23. When this latter is adjusted to disconnect the worm from shaft 15, gear driven movement of the spindle in an axial direction as derived from said shaft is stopped. The spindle may then be moved by hand and by means of a hand wheel 24 whereby worm 16 is rotated.

In order to secure prompt stoppage of the vertical motion of the spindle while feeding the tool, and independent of any manual action, we provide means for terminating automatically the rotation of pinion-shaft 18 which actuates the rack on the spindle-sleeve. We do this by means which act upon lever 23 for the purpose of effecting adjustment of clutch 22, so as to cause operative disconnection of worm 16

from its gear-driven shaft 15. The arrangement is so that this action may be had at two points located in the range of the feed-motion. As to one point the arrangement is so that the movement of the spindle stops always when it has about reached the limit of its travel in a downward direction. As to the other point the arrangement is so that the feed-motion may be caused to stop anywhere between highest and lowest positions. In connection with this latter arrangement of stopping the feed-motion, we provide an adjustable depth-gage whereby the extent of any particular movement of the spindle may be determined in order to stop at a certain predetermined point, that is after the tool has moved to the required depth into the work. For such purpose we provide a dog 25 connected so as to move vertically with the spindle, a preferable way of attaching it being by means of a post 26 to sleeve 9.

27 is a push-rod, connected to lever 23 and sustained in a position parallel to the spindle by means of a guide 28 which engages the upper end of said rod. Slidably mounted upon said rod is an adjustable stop 29, provided with suitable means, as a clamping-screw 31 for instance, whereby it may be rigidly held in any position on rod 27. The dimensions and positional relation of the involved parts are so that when dog 25, traveling downwardly with the spindle, encounters stop 29, it will depress this latter and with it rod 27 to which it is connected. This action moves lever 23 the same as if it had been manipulated by hand for the purpose of adjusting clutch 22, to disconnect worm 16 from gear-driven shaft 15. Dog 25 is connected to post 26 in a manner permitting it to be swung out of the way of stop 29 as shown in Fig. 3, see also dotted lines in Fig. 1, thereby rendering these parts ineffective for the purpose of stopping the feed-motion of the spindle between the possible limits of its range of movement. This is done when it is desired to have the spindle travel through the full range of its possible movement. Means are provided however to stop the feed-motion when the spindle has reached its lowest position, said means also acting upon lever 23 automatically, so as to produce the same effect as before described, viz. adjustment of clutch 22 for the purpose of disconnecting worm 16 from gear-driven shaft 15. These means consist of a projection 32, it may be a pin or a screw, provided on lever 23 and located so as to project into the path of the hub of dog 25. Observe Fig. 3 and also dotted lines there. A friction lock, consisting of complementary members 33 and 34, one of which is carried by lever 23 and the other immovably positioned, co-act for the purpose of holding lever 23 in either one of its positions

whether adjusted manually or automatically, the engagement being a yielding one for which purpose one of these members is spring-actuated. In connection with these means for stopping the feed-motion of the spindle between its limits, we provide a graduated depth-gage, to facilitate gaging of the movement of the spindle and to determine any particular extent of travel it is desired to have before it is stopped by the co-action of dog 25 and stop 29. This gage indicated at 35, is connected to adjustable stop 29 so as to move with it, its zero-mark being even with the upper edge of said stop, where contact takes place with dog 25. If for instance an opening should have to be drilled to a depth of four inches, stop 29 is moved away from dog 25 with which it co-acts at its upper edge, until the graduation indicating four inches on the depth-gage, is even with the lower edge of said dog which co-acts with the upper edge of the stop. If now the motion of the spindle is started, dog 25 will encounter stop 29 when the spindle is moved four inches, after which stop 29, acting by means of push-rod 27, upon lever 23, actuates* this latter to adjust clutch 22. Observe also Fig. 5, in which stop 29, is so adjusted, that contact which arrests the feed-motion will result after the spindle has traveled $2\frac{1}{2}$ inches.

Having described our invention we claim as new:

1. In a machine-tool like a drill for instance, the combination of a head, a spindle mounted on it for rotation, a rack on the spindle to move this latter axially, a pinion to actuate the rack, means to operate the pinion, a clutch which controls this operation, a lever to manipulate the clutch and complementary members, one adjustably connected with said lever and the other permanently connected to the spindle and traveling with the same in the path of the former member and adapted to co-act therewith for the purpose of actuating the clutch-lever to terminate the movement of the spindle.

2. In a machine-tool like a drill for instance, the combination of a head, a spindle mounted on it for rotation, a rack on the spindle to move this latter axially, a pinion to actuate the rack, means to operate the pinion, a clutch which controls this operation, a lever to manipulate the clutch, complementary members, one connected so as to travel with the spindle, means connected with the lever mentioned upon which the other member is mounted in a manner so as to project in the path of the traveling member and to be adjustable with reference to said member, and a graduated gage connected to this adjustable member and serving for the purpose of positioning the same with reference to the traveling member so as

to time contact and co-action therewith which effects actuation of the clutch-manipulating lever.

3. In a machine-tool like a drill for instance, the combination of a head, a spindle mounted on it for rotation, a rack on the spindle to move this latter axially, a pinion to actuate the rack, means to operate the pinion, a clutch which controls this operation, a lever to manipulate the clutch, a push-rod on this lever, a stop adjustably mounted on this rod, and a dog traveling with the spindle and adapted to co-act with the stop on the rod to actuate the clutch-lever for the purpose of terminating the movement of the spindle.

4. In a machine-tool like a drill for instance, the combination of a head, a spindle mounted on it for rotation, a rack on the spindle to move this latter axially, a pinion to actuate the rack, means to operate the pinion, a clutch which controls this operation, a lever to manipulate the clutch, a push-rod on this lever, a stop adjustably mounted on this rod, and a dog traveling with the spindle and adapted to co-act with the stop on the rod to actuate the clutch-lever for the purpose of terminating the movement of the spindle, said dog being pivotally mounted to permit adjustment of it to a position rendering it inoperative with reference to the stop.

5. In a machine-tool like a drill for instance, the combination of a head, a spindle mounted on it for rotation, a rack on the spindle to move this latter axially, a pinion to actuate the rack, means to operate the pinion, a clutch which controls this operation, a lever to manipulate the clutch, a push-rod on this lever, a stop adjustably

mounted on this rod, a dog traveling with the spindle and adapted to co-act with the stop to actuate the clutch-lever for the purpose of terminating the movement of the spindle and a graduated gage adapted to be moved with the adjustable stop to determine its position with reference to the dog.

6. In a machine-tool like a drill for instance, the combination of a head, a spindle mounted on it for rotation, a rack on this spindle to move this latter axially, a pinion to actuate the rack, means to operate the pinion, a clutch which controls this operation, a lever to manipulate the clutch, a push-rod on this lever and a projection on this latter adjacent the connection of the push-rod thereto, a stop adjustably mounted on this rod, a post traveling with the spindle and a dog mounted on this post and adjustable in a plane at right angles to the direction of the spindle-travel whereby it may be adapted to either co-act with the adjustable stop to terminate the movement of the spindle at a pre-determined point between the limits of its travel, or to be ineffective with respect to said stop and in which case the hub of the dog is adapted to co-act with the projection on the lever mentioned to terminate the movement of the spindle absolutely at the lower limit of its possible travel.

In testimony whereof, we hereunto affix our signatures in the presence of two witnesses.

HENRY DRESES.
EDWARD J. SPAETH.

Witnesses:

C. SPENGEL,
T. LE BEAU.