

B. M. W. HANSON.
ELECTRICALLY CONTROLLED FEED MECHANISM.
APPLICATION FILED MAR. 11, 1908.

915,671.

Patented Mar. 16, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

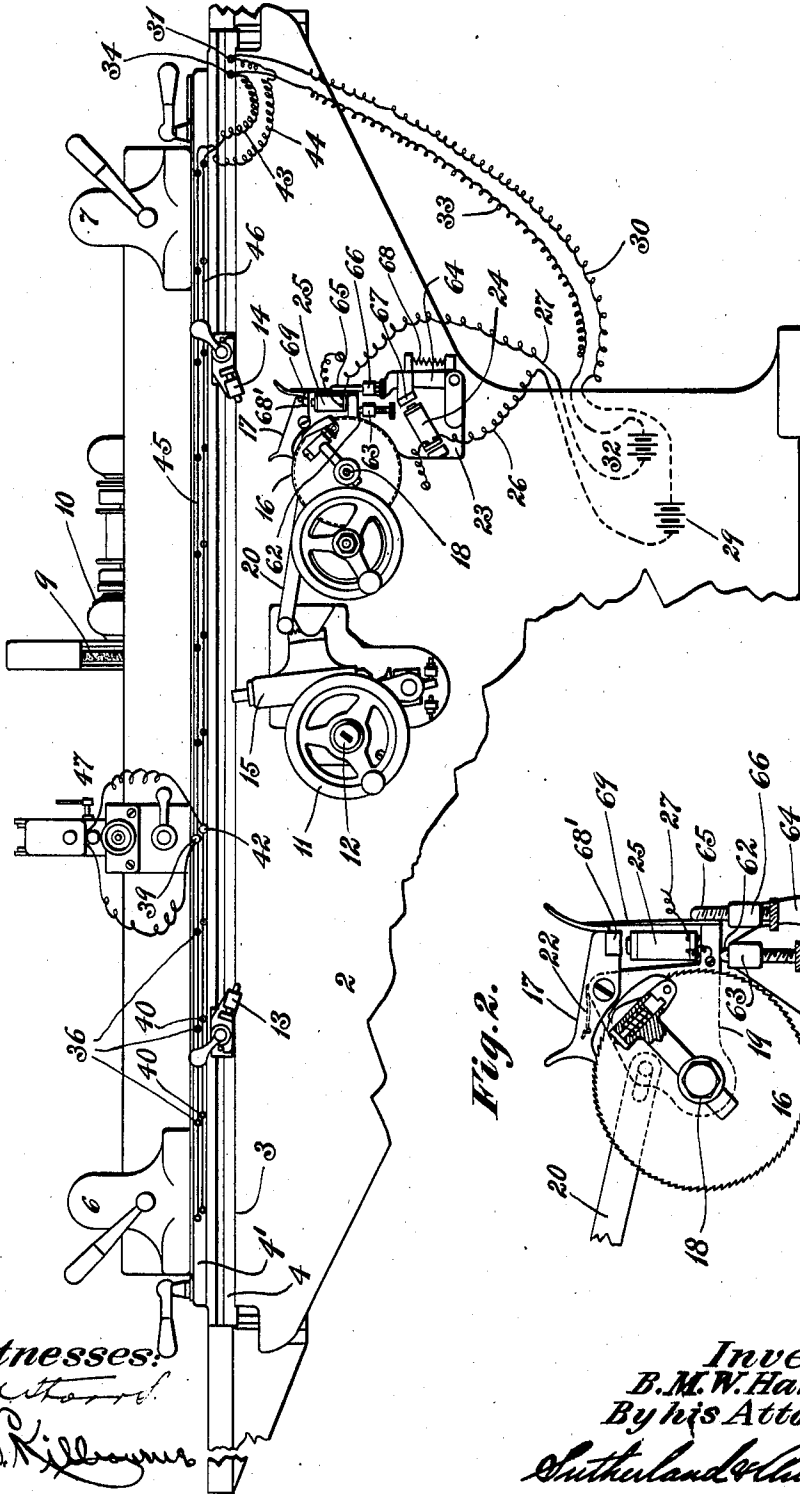
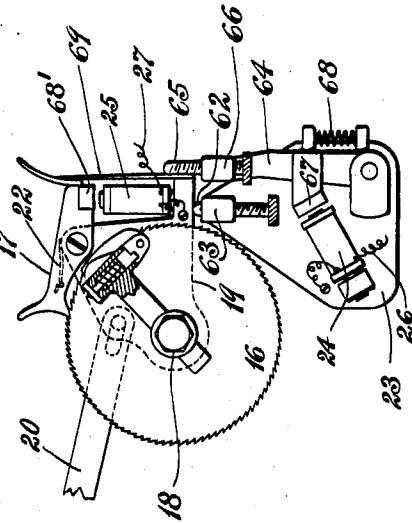


Fig. 2.



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R. A. Thornd
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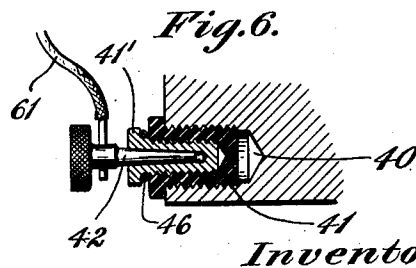
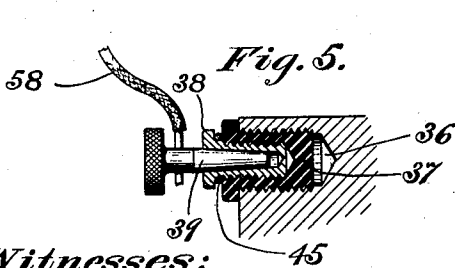
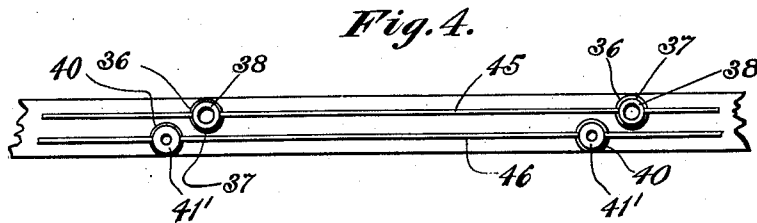
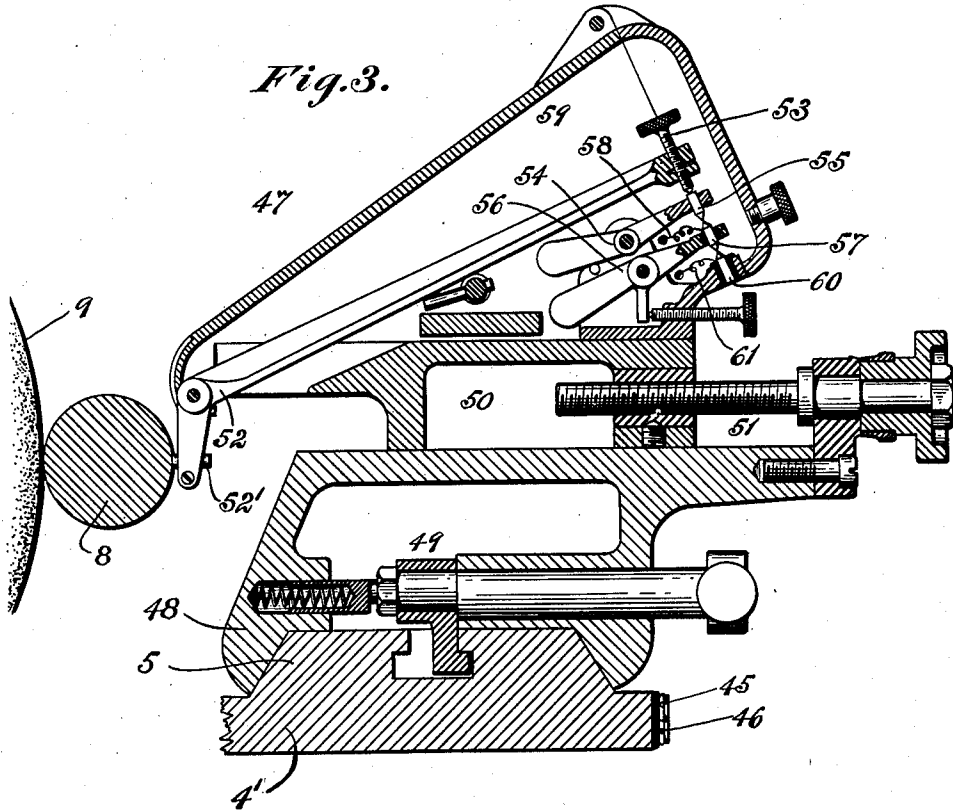
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By his Attorneys,
Sutherland & Hudson

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2 SHEETS—SHEET 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

BENGT M. W. HANSON, OF HARTFORD, CONNECTICUT, ASSIGNOR TO PRATT & WHITNEY COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

ELECTRICALLY-CONTROLLED FEED MECHANISM.

No. 915,671.

Specification of Letters Patent.

Patented March 16, 1909

Original applications filed February 28, 1906, and October 13, 1906, Serial Nos. 303,453 and 338,864. Divided and this application filed March 11, 1908. Serial No. 420,332.

To all whom it may concern:

Be it known that I, BENGT M. W. HANSON, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Electrically-Controlled Feed Mechanism, of which the following is a specification.

This invention relates to electrically-controlled feed mechanism, the present application being a division of my co-pending application Serial No. 303,453 filed February 28, 1906 and also of another co-pending application Serial No. 338,864 filed October 13, 1906.

Electrically-controlled feed mechanism involving my invention may be employed with advantage in a variety of ways from which it will be obvious that I do not limit myself to the use of such mechanism in any particular connection. As a matter of fact some of the features of the invention may be used independently of others.

One of the objects of the invention is to provide mechanism of the character set forth having means to insure proper electrical connection in the various adjustments of a movable member when the latter is a part of an apparatus in conjunction with which said mechanism is employed.

Another object of the invention is to eliminate the possibility of the wires or analogous electrical connections unduly kinking or fouling any of the parts of such an apparatus.

The invention includes other advantageous points which with the foregoing will be set forth at length in the following description wherein is outlined that embodiment of the mechanism which I have selected for illustration in the drawings accompanying and forming a part of this specification.

Referring to said drawings, Figure 1 is a front view of a machine such as disclosed in the second of the applications hereinbefore mentioned and equipped with feed controlling mechanism including my invention. Fig. 2 is a detail view of pawl and ratchet mechanism, certain electrical devices coöperative therewith and other parts which coact with said pawl and ratchet mechanism. Fig. 3 is a transverse view of the feeler mechanism and certain adjunctive devices. Fig. 4 is a front view of a portion of the platen,

metallic socket members, and electrical connections uniting the latter. Fig. 5 is a cross sectional view through one of said socket members, its receiving bushing, a part of the platen, and a portion of a conductor leading from a plug also shown. Fig. 6 is a like view of another of said socket members and the parts that are immediately associated therewith.

The figures are on different scales but like characters refer to like parts in all the figures of the drawings.

From what has been hereinbefore stated it will be evident that the subject of the present invention may be used with utility in many different fields. In practice I have found it of especial advantage when used in connection with a metal reducing machine as fully shown in Fig. 1 of the drawings and to indicate the intent and purpose of the invention I shall briefly describe such a machine. The machine shown in said Fig. 1 includes in its make up a chambered base or equivalent foundation member as 2 which is represented as having an extended top on which are suitably formed ways as 3 for the support and reciprocatory travel of a carriage as 4. Upon this carriage is movably mounted ordinarily by a pivotal connection, a platen or equivalent supporting member as 4' furnished with ways as 5 on which are mounted a head stock as 6 and a tail stock as 7 and between the centers of which the work as 8 is held. This work may be a bar, rod or the like which is adapted for reduction by a suitable tool such as a grinding wheel 9, the shaft of which is sustained for rotation by suitable bearings on the transversely movable slide 10. It will be understood that the tool or grinding-wheel carrying slide has a movement in the present instance substantially at right angles to the line of travel of the carriage 4.

The transversely movable slide has two periods of operation, the grinding wheel movable therewith being adapted on its initial operation to make a primary or rough dressing or reduction of the work, and thereafter to make a finishing or final dress at the conclusion of which the transverse advancing movement of the slide is arrested, the work at this time being finished. The machine is set in operation and at the predetermined point thereof the grinding wheel

is caused to reduce the stock, the dressing operation then takes place, and finally the feeding movement of the slide is arrested, the parts being so organized that these three actions occur automatically and in absolute sequence. I will of course describe my invention in connection with the feeding mechanism for the slide the latter including a pawl or equivalent element. At the commencement of operation of the slide this pawl, which will be hereinafter described somewhat briefly, has its maximum throw or stroke; at a preselected point this throw is reduced to obtain the finishing dress after which the pawl is thrown out of action to stop the advancing or inward motion of the slide, the work at this time being finished.

The mechanisms for reciprocating the carriage 4 and for transversely feeding the slide 10 form in themselves no part of the invention for which reason it is unnecessary to refer to the same in detail. I might state, however, that the carriage is reciprocated and that when it has reached the limit of its travel in either direction, means coöperative with it, put the slide advancing mechanism into operation, the latter being concluded when the pawl, constituting one of the elements of the slide actuating mechanism, is disengaged from its coöperating ratchet. The only part of the mechanism for reciprocating the carriage 4 is shown in Fig. 1, and that is the hand wheel 11, the shaft 12 of which is supported by suitable bearings on the framing of the machine. The power-actuated means for obtaining the function just alluded to, are not represented in the drawings.

On the carriage 4 are dogs as 13 and 14 which are adapted to alternately engage the rocker 15 to throw the mechanism for advancing the slide 10 into action. The means for thus advancing said slide comprehends in its make-up a ratchet-wheel as 16 and a pawl as 17 and the latter is the part which in the present instance is governed to attain the results to which I have hereinbefore referred. I do not deem it necessary to fully describe the connections between said ratchet wheel 16 and the slide 10; they may as well be clear of any desirable nature. On the shaft 18 of the ratchet wheel 16, there is loosely supported for oscillation or vibration, a pawl-carrier as 19, and to the latter said pawl 17 is pivoted or otherwise suitably connected. There is loosely connected with said pawl-carrier, one end of a link as 20, the opposite end of said link being connected with suitable mechanism on a rocker as 15 sustained by the bed 2, said rocker being swung alternately in opposite directions by the dogs 13 and 14. The rocker is provided with means for actuating the link 20. It will be assumed that the carriage has practically concluded

its travel toward the right in Fig. 1; at this stage, the dog 13 will strike and then swing the rocker over to the right, during which the mechanism which is operable with said rocker will move the link 20 in an endwise direction to correspondingly shift the pawl-carrier 19 and necessarily the pawl to obtain a feed movement of the ratchet. I might add that the mechanism which is operable with said rocker is of such a nature that when the rocker is swung in one direction, the pawl-carrier is moved in the opposite direction, so that when the dog 13 operates the rocker a working motion of the pawl is accomplished. When the dog 14 acts upon said rocker a backward and ineffective movement of the pawl is the result and during this period of operation the pawl rides idly over the teeth of its ratchet wheel. The pawl is normally held to its work or against the teeth of its coöperating wheel preferably in some positive manner and a spring as 22 can be employed for this purpose.

On a bracket as 23 suitably fastened to the bed 2 of the machine, there is attached a magnet as 24 a convenient electrically-operated device and constituting part of a feed or work reducing circuit. In addition to said magnet there is a second magnet as 25 constituting part of a feed arresting circuit. It will be apparent that when the magnet 24 is energized that the feed of the slide 10 is reduced and that when the magnet 25 is energized the feed of said slide is stopped. The magnet 25 is connected with the pawl-carrier 19. To one pole of the magnet 24 a wire or equivalent connection as 26 is electrically united, while to one pole of the magnet 25 a wire or equivalent connection as 27 is connected. The other poles of said magnets are electrically connected with the metal framing of the machine which is utilized in the present case as convenient conducting means. There are therefore two independent circuits each including as a part thereof the frame-work of the machine. The wire 26 leads to a battery or other source of electrical energy as 29 while from said battery 29 a wire as 30 leads and has electrical connection with a contact as 31 mounted upon but insulated from, one extremity of the reciprocatory carriage 4. The wire 27 leads to a battery as 32 from which a wire as 33 extends and is connected with a contact as 34 mounted like the contact as 31.

On the outer side of the platen there is a line or horizontal row of spaced bores as 36 which receive bushings as 37 of some electrical insulating material such for example of vulcanized rubber. In the bushings are removably fitted socket-members as 38 of metal or other conducting material said socket-members being adapted to removably receive a metallic or other conducting

plug as 39. It will be understood that the plug 39 can be taken from a socket member in which it is fitted and introduced into any other one of said socket-members and the advantage of this will hereinafter appear. The socket-members 38 may be and preferably are screwthreaded into their receiving bushings 37. There may be any desired number of such socket members. I have shown below the bores 36 a second row of bores as 40, to receive bushings 41 into which are fitted socket-members as 41' exactly as just described. The internal diameters of the respective socket members are, however, different. In the socket-members of the lower row may be removably fitted a metallic plug or pin as 42. In the embodiment illustrated the internal diameters of the upper row of socket-members 38 is greater than that of the lower row of socket members and the reason for this will be hereinafter set forth. The right terminal socket member 38 is connected by a wire as 43 with the contact 34 while the corresponding socket-member 41' is connected by a wire as 44 with the contact 31. The upper socket members 38 may be connected together in any suitable manner for example by a wire as 45 approximately coextensive with the platen, while a substantially similar wire as 46 can connect electrically the lower socket-members 41. The feed reducing circuit will therefore include one or more of the socket-members 41 while the feed arresting circuit will include one or more of the socket-members 38.

There is coöperative with the work or bar to be ground what might be termed sizing mechanism such as that denoted in a general way by 47 and said sizing mechanism includes in its construction a feeler to be hereinafter described and a slide as 48 supported for endwise movement on the platen 4' and adapted to be clamped in fixed relation thereto by a device as 49. By virtue of the two rows of contact members which have been hereinbefore spoken of as metallic socket members I provide for the proper electrical connection of devices on the slide 48 with the batteries 29 and 32 throughout the different adjustments of said slide. In this way I dispense with long free feed wires which are in the way and which generally foul parts of the apparatus. By employing contact or socket-members of different sizes, which in the present case is accomplished by making them of different internal diameters, there is no possibility of the plugs or pins 39 and 42, which also constitute contact members, being wrongly used. The large pin 39 cannot be inserted into the small socket-members 41 and although the small plug or pin can be introduced into the large socket-members 38, the difference in

fit when this occurred would indicate at once to the attendant of the machine, his error.

On the slide 48 there is mounted the feeler-support 50, which can be adjusted toward and from the work by a micrometer screw as 51 mounted on a bearing carried by said slide. The feeler is denoted by 52 and is represented as consisting of an angle lever pivoted at or near its angle on the support 50. The short arm of said feeler is illustrated as furnished with a pin 52' to engage against the circumference of the work. The long arm of the feeler has a sufficient preponderance of weight with respect to the short arm as to descend as the grinding progresses due as will be obvious to a reduction in the diameter of the work. At the commencement of operation the support 50 will have been so manipulated as to bring the feeler element proper or the pin 52' directly against the periphery of the work. As the reducing operation progresses the long arm of the feeler lever falls, this motion continuing until the closing of the first or feed reducing circuit, the point at which this occurs being regulable for example by a screw as 53 tapped through the tail of the feeler lever 52. The screw 53 coöperates with a lever as 54 pivotally mounted between its ends on the support 50. At its outer end said lever 54 is provided with a single pointed pin as 55. The inner arm or branch of the second lever 54 has a preponderance of weight with respect to the outer arm thereof or that which directly supports the single pointed pin 55, whereby the upper flat or blunt end of said pin 55 will be normally held against the lower end of the screw 53. The support 50 pivotally carries below the second lever 54, a third lever 56 which is mounted and operates precisely like the second lever. The lever 56 is provided at its outer end with a double pointed pin as 57 insulated therefrom and the upper point of which is normally in contact with the lower pointed end of the pin 55. The double pointed pin 57 is electrically connected by a wire as 58 with the upper plug 39. It will be assumed that the latter has been inserted into one of its coacting socket members 38 and that the machine is in action with all its parts in correct position. As the grinding progresses the stock or work is reduced in diameter and when the requisite reduction in size thereof has been obtained, the screw 53 will have forced the outer branch of the lever 54 downward a sufficient distance, due to the dropping of the longer outer arm of the lever 52, as to project the single pointed pin 55 against the upper pointed end of the double pointed pin 57, thereby closing the primary or feed reducing circuit and of course energizing the magnet 24 to reduce the stroke of the pawl carrier 19 as will hereinafter appear. The several le-

vers to which allusion has just been made, may if desired be incased in a housing or shell as 59 on the support 50.

A pin as 60 is passed through the housing or shell 59, is insulated therefrom and is electrically connected by a wire or equivalent conductor as 61 with the plug or contact member 42 which it will be understood is inserted into one of the socket-members 41'.

It will be assumed that the feed reducing circuit has been closed and it of course follows that the magnet 24 is energized. The grinding of the stock of course continues beyond this point and the outer long arm of the feeler lever 52 continues to descend. At the proper point said outer arm presses the corresponding arms of the levers 54 and 56 downward and presses the lower end of the double pointed pin or contact 57 against the upper end of the pin 60 thereby closing the second or feed-arresting or stopping circuit and naturally energizing the magnet 25.

The maximum throw of the pawl 17 is governed by a stop as 62 which may consist of a screw tapped through a lug as 63 on the bracket 23, the upper end of the stop or screw 62 being engaged by the pawl carrier 19 when at the limit of its back or outward stroke. The screw as will be evident presents an adjustable stop. There is shown as pivoted to said bracket a lever as 64 which is provided with an adjustable stop 65 and which consists preferably of a screw tapped through a lug as 66 on said lever 64. The latter is represented as provided with the armature 67 of said magnet 24 which armature is normally held out of contact with the said magnet by a spring as 68. The adjustable stop 65 is therefore normally held out of the path of movement of the pawl-carrier by said spring 68 which is represented as being of the "coil" type and as connected with the bracket 23 and lever 64 respectively. When the magnet 24 is energized in the manner hereinbefore described, it attracts its armature 67, the result being that the lever 64 is swung inward and the adjustable stop 65 is carried into the path of the pawl-carrier 19 by virtue of which the stroke of said pawl-carrier 19 and necessarily that of the pawl is limited or restricted whereby the feed of the slide 10 is reduced. After this occurs the upper or feed-stopping magnet 25 is energized in the manner previously set forth. The armature 68' for the upper magnet 25 is suitably united to the tail of the pawl 17. When said magnet 25 is energized it attracts its armature and lifts the point of the pawl 17 out of engagement with the teeth of the ratchet wheel 16 and thereby at once stops or arrests the inward feed of the slide.

To the pawl-carrier 19 is suitably fastened the lower end of a spring-latch as 69. When the pawl 17 is thrown out of action in the

manner indicated the upper working end of said spring-latch is snapped over the tail of the pawl 17 and thereby positively and with certainty holds the pawl out of engagement with its wheel 16. To release the pawl the latch is swung outwardly.

The operation of the machine will be clearly apparent from the foregoing description. The carriage 4 is reciprocated, and at a predetermined point the slide 10 is automatically set into action. During the inward motion of the slide two electric circuits are successively closed, to cause first a reduced feed movement of the slide and subsequently an arrest of such feed movement.

It might be stated that in my claims when I mention the element carriage I wish to include as a part thereof the platen which it will be remembered is carried by said carriage and constitutes in effect a part thereof.

What I claim is:

1. The combination of a work-carriage, a tool-carriage, mechanism for controlling the feed of one of said carriages, comprising a plurality of electric circuits each circuit having a contact member and also having a series of socket-members all the socket members of each series being of uniform internal diameter and the internal diameter of one of said series being different from that of the other of said series, one of said contact members being adapted to interchangeably fit one of said series of socket-members and the other contact member being adapted to interchangeably fit the other series of socket-members.

2. The combination of a reducing tool, a work-holder the work supported by which is acted upon by said tool, electrical means for governing the amount of reduction of the work by said tool, comprising a circuit having a plurality of contact members and also having a contact, a feeler for engaging the work, an adjustable device for supporting said feeler and to which said contact is connected for movement therewith, said contact being adapted to engage said contact members in the different adjusted positions of said adjustable device, and circuit-controlling means governed by said feeler.

3. The combination of a work-holder, a reducing tool to act against the work supported by said holder, electrical means for governing the amount of reduction of the work by said tool, comprising a circuit having relatively fixed electrical connections and also having a contact, a feeler for engaging the work, an adjustable device for supporting said feeler and to which said contact is connected for movement therewith said contact being adapted to engage said electrical connections at different places in the adjustment of said adjustable device, and circuit-controlling means governed by said feeler.

4. The combination of a work-holder, a

reducing tool to act against the work supported by said holder, an adjustable device provided with a feeler for engaging the work, a plug connected by wire with said adjustable device, a row of electrically connected sockets spaced from each other and adapted to interchangeably receive said plug, an electric circuit including said plug, wire and sockets, and circuit-controlling means governed by the feeler.

5. The combination of a work-holder, a reducing tool to act against the work supported by said holder, an adjustable device provided with a feeler for engaging the work, a pair of plugs connected by wires with said adjustable device for movement therewith, two series of electrically connected relatively fixed sockets spaced from each other, the sockets of each series being of uniform internal diameter and the diameter of one series of sockets being different from that of the other, one of said plugs being adapted to interchangeably fit one series of sockets and the other plug being adapted to interchangeably fit the other series, and two electric circuits including respectively said plugs, their wires and said sockets.

6. In a mechanism of the class described, the combination of a base, a work-supporting carriage movable thereon, provided with a series of conducting socket members insulated therefrom, a conductor connecting said socket members, a work-reducing device, a supporting member for said work reducing device movable toward and from the work, a sizing device movable on said carriage and comprising a movable feeler, a contact cooperative with said feeler, and a plug electric-

ally connected with said contact and adapted to enter any one of said socket members.

7. In a mechanism of the class described, the combination of a work-supporting carriage, a series of contact members disposed in a row along said carriage, a sizing device shiftably supported by said carriage, comprising a feeler, a contact cooperative with said feeler, and another contact cooperative with the last mentioned contact, movably mounted and adapted to cooperate with any one of the row of contact members.

8. In a mechanism of the class described, the combination of a base, a work-supporting carriage movable on said base, and having a series of conducting socket-members insulated therefrom, a conductor connecting said socket members, a work-reducing device, a feeler member controlled by the work, and a plug cooperative with the feeler and adapted to enter any one of said socket members.

9. The combination with a base, a work-supporting carriage movable on said base, a series of metallic socket members supported by and insulated from the carriage, a conductor connecting said socket members, a work-reducing device, a feeler governed by the work, and feed reducing and arresting circuits controlled by said feeler, each circuit including separate series of said socket-members and appropriate plugs removably fitted therein.

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

BENGT M. W. HANSON.

Witnesses:

W. M. STORRS,
H. W. KILBOURNE.