J. J. LICHTER & J. N. MAHER.

GRINDING MACHINE.

APPLICATION FILED MAY 7, 1914.

1,112,015. Patented Sept. 29, 1914.

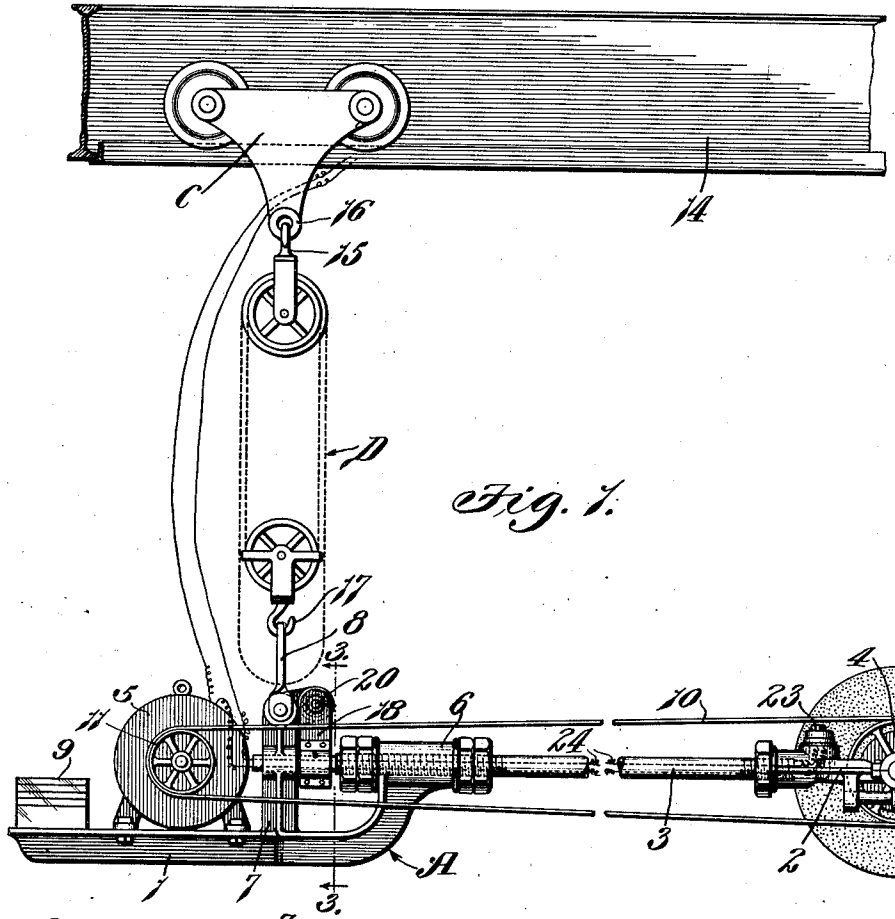

Fig. 1.

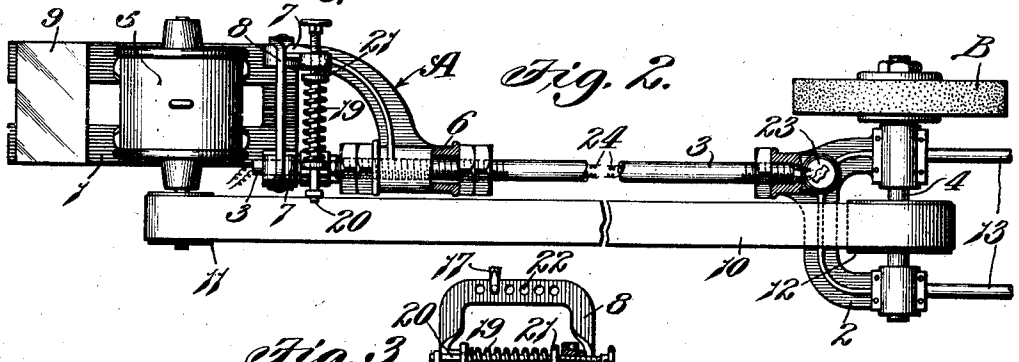

Fig. 2.

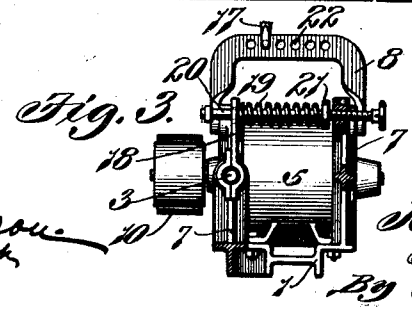

Fig. 3.

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UNITED STATES PATENT OFFICE.

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GRINDING-MACHINE.

1,112,015. Specification of Letters Patent. Patented Sept. 29, 1914.

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To all whom it may concern:

Be it known that we, JOHN J. LICHTER and JOHN N. MAHER, citizens of the United States, residing in St. Louis, Missouri, have invented a certain new and useful Improvement in Grinding-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to swing frame grinders, namely, grinding machines of the type in which the grinding wheel is carried by a horizontally disposed support that is pivotally connected to a frame which can be swung back and forth about a horizontal axis on a stationary bracket, connected to the ceiling of the work shop, said support and frame being so constructed that the grinding wheel can be moved in a straight path over a piece of work and also arranged in an inclined plane.

The main object of our invention is to provide a grinding machine of the general type referred to, in which the entire supporting structure for the grinding wheel can be moved or shifted bodily along a straight path, thereby giving a greater range of movement to the grinding wheel, and enabling said wheel to be moved along the surface of the work more conveniently and through greater range than is possible with the swing frame grinding machines now in general use, in which the supporting structure for the grinding wheel is suspended from a stationary bracket.

Another object is to provide a grinding machine that can be moved from place to place in the work shop and used at any point where there is an over-head runway, trolley or other means of suspension.

Another object is to provide a grinding machine in which the horizontally disposed support that carries the grinding wheel can be swung laterally and held in a line parallel to the path of travel of the grinding wheel over the work; and still another object is to provide an over-hung grinder which comprises a spring or springs, instead of over-head counterbalancing weights for holding the grinding wheel in balance.

Other objects and desirable features of our invention will be hereinafter pointed out.

Figure 1 of the drawings is a side elevational view of a grinding wheel constructed in accordance with our invention. Fig. 2 is a top plan view of same; and Fig. 3 is a vertical cross-sectional view taken on the line 3—3 of Fig. 1.

Referring to the drawings which illustrate the preferred form of our invention, A designates a horizontally disposed support that carries a grinding wheel B, said support being composed of a frame 1 and a frame 2 that are connected together by a rod 3. The frame 2 is substantially yoke-shaped or is provided with a pair of arms in which the shaft 4 of the grinding wheel B is journaled, and the frame 1 carries an electric motor 5 and is provided with a bearing 6 in which the rod 3 can turn freely. Intermediate the ends of the frame 1 are standards 7, to which a yoke 8 is pivotally connected, and on the outer end of the frame 1 are counter-balancing weights 9. A belt 10 that passes around pulleys 11 and 12 on the shaft of the motor and on the shaft of the grinding wheel, respectively, imparts rotary movement to the grinding wheel when the motor is in operation, and at the outer end of the frame 2 are handles 13, which the operator grasps during the operation of positioning the grinding wheel or moving it over the work. The rod 3 that connects the frames 1 and 2 together is secured to the frame 2 in such a manner that said frame can turn with relation to the rod, but, as previously stated, said rod is journaled in the bearing 6 on the frame 1, so as to enable the frame 2, with the grinding wheel mounted thereon, to be turned or oscillated with relation to the frame 1, so as to arrange the grinding wheel in an inclined position.

Instead of mounting the horizontally disposed support A on a swing frame suspended from a stationary over-head bracket, as has heretofore been the general practice in swing frame girders, we have provided the machine with a movable carriage C, from which the horizontally disposed support A is suspended, preferably by means of a chain block or other suitable adjustable hanger D. The carriage C travels on an over-head track or runway 14 and the chain block D is pivotally connected to said carriage, preferably by means of a hook 15 on the block that engages an eye 16 on the carriage C, and at the lower end of said chain block D is a hook 17 that engages the yoke 8, to which the frame 1 of the horizontally disposed support A is

pivotally connected. The grinding wheel B is kept in balance by means of novel construction, which consists of an arm 18 on the rod 3, which is acted upon by one or more springs 19 that exert sufficient pressure on said rods to normally hold the grinding wheel B in a vertical plane.

It is immaterial, so far as our broad idea is concerned, how the arm 18 and spring 19 are arranged, but in the form of our invention herein shown, the spring 19 is mounted on a horizontally disposed rod 20 that is carried by one of the standards 7 on the frame 1 and projects loosely through an opening in the upper end of the arm 18, said spring being interposed between the arm 18 and a stop or abutment 21 on the rod 20, as shown clearly in Fig. 3. The rod 20 is preferably adjustably mounted in the upright or standard 7, so as to enable the tension of the spring 19 to be varied to compensate for variations in the weight of the grinding wheel B, thus making it possible to keep the grinding wheel in perfect balance by merely adjusting the rod 20.

If desired, the yoke 8, that coöperates with the hook 17 on the chain block, can be provided with a plurality of holes 22, as shown in Fig. 3, so as to enable the horizontally disposed support A as an entirety to be adjusted laterally with relation to the path of travel of the carriage C of the machine. A switch 23, for controlling the current that operates the motor 5, is preferably arranged on the frame 2, so as to enable the operator to stop and start the motor without leaving the controlling handles 13 of the machine, the wires 24 that lead to said switch passing through an opening in the rod 3, as shown in Figs. 1 and 2.

In a grinding machine of the construction above described, the entire supporting structure that carries the grinding wheel can be moved bodily in a straight line, owing to the fact that said supporting structure comprises a carriage that travels on an over-head track or runway, consequently, the grinding wheel of our improved machine has a greater range of movement and can be handled more conveniently than is possible with the swing frame grinding machines now in general use, in which the supporting structure for the grinding wheel is pivotally connected to a stationary bracket on the ceiling of the work room. Furthermore, our improved grinding machine can be moved from place to place in the work room and can be used at any point where an over-head runway, or trolley or other means of suspension is located. The vertically adjustable hanger or chain block D permits the support A to be raised and lowered, and, as said hanger or block is pivotally connected to the carriage C, the support A as an entirety can be swung or shifted laterally and held in a position parallel to the path of travel of the grinding wheel, or to the track on which said carriage travels. And still another desirable feature of such a machine is, that it does not comprise over-head counterbalancing weights for keeping the grinding wheel in balance, the balancing of the grinding wheel being effected by a resilient device that exerts pressure on a frame that is secured to the rock shaft or rod 3, which resilient means can be adjusted easily, so as to compensate for variations in the weight of the grinding wheel.

Having thus described our invention, what we claim is:

1. A grinding machine, comprising a horizontally disposed frame equipped with a grinding wheel, and a carriage from which said frame is suspended by means that permits a universal movement of the frame.

2. A grinding machine, comprising a horizontally disposed support equipped with a grinding wheel, a movable carriage that travels on a track or runway, and a connection between said support and carriage which permits the support to be bodily shifted laterally and held in a position parallel to the path of travel of said carriage and also raised and lowered with relation to the work.

3. A grinding machine, comprising a horizontally disposed support provided with a grinding wheel, a carriage that travels on an over-head track, and a vertically swinging hanger on said carriage in which said support is oscillatingly mounted.

4. A grinding machine, comprising a carriage that travels on an over-head track, a grinding wheel, a vertically swinging supporting structure for said grinding wheel which permits said grinding wheel to be raised and lowered, a connection between said carriage and supporting structure which permits said wheel to be swung laterally and moved bodily in a path parallel to said track.

5. A grinding machine, comprising a horizontally disposed support, a grinding wheel mounted on said support in such a manner that it can be arranged in an inclined plane, a movable carriage, and means suspended from said carriage on which said support is pivotally mounted.

6. A grinding machine, comprising a horizontally disposed support provided with a grinding wheel, a movable carriage from which said support is suspended, and means for enabling said support to be adjusted laterally with relation to the path of travel of said carriage and also oscillated in a vertical plane so as to raise and lower the grinding wheel.

7. A grinding machine, comprising a horizontally disposed support, a grinding wheel

mounted on said support in such a manner that it can be arranged in an inclined plane, a yoke pivotally connected to said support, a movable carriage that travels on an over-head track, and a vertically adjustable hanger on said carriage from which said yoke is suspended.

8. A grinding machine, comprising an over-hung grinding wheel, a horizontally disposed shaft or rod that carries a frame in which said grinding wheel is journaled, a bearing in which said rod can turn freely, and a resilient device coöperating with an arm on said rod for holding the grinding wheel in balance.

9. A grinding machine, comprising an over-hung grinding wheel, a horizontally disposed shaft or rod that carries a frame in which said grinding wheel is journaled, a bearing in which said rod can turn freely, a resilient device coöperating with an arm on said rod for holding the grinding wheel in balance, and means for enabling the tension of said resilient device to be varied to provide for variations in the weight of said grinding wheel.

10. In a grinding machine, a shaft or rod which forms the support for the grinding wheel, a bearing in which said rod can turn freely, and a resilient device coöperating with said rod for normally holding the grinding wheel in a vertical plane.

11. A grinding machine comprising an overhead carriage a horizontally disposed support that comprises a shaft or rod which can be turned so as to arrange the grinding wheel in an inclined plane, a resilient device that exerts pressure on the rod, and thus holds the grinding wheel in balance, and a universal connection between said support and carriage.

12. A grinding machine, comprising an over-head carriage, a hanger suspended from said carriage, a horizontally disposed support carried by said hanger and provided with a bearing, a shaft in said bearing that carries an over-hung grinding wheel, and a resilient device coöperating with said shaft to hold the grinding wheel in balance.

13. A grinding machine, comprising a horizontally disposed support equipped with a grinding wheel and an electric motor for operating said grinding wheel, a handle on said support for governing the grinding wheel, and a switch on said support in proximity to said handle for controlling the current that operates said motor.

14. A grinding machine, comprising an over-head carriage, a chain block suspended from said carriage, a horizontally disposed support pivotally connected to a yoke that is suspended from said chain block, a grinding wheel on said support, an electric motor on said support for operating said grinding wheel, means forming part of said support for enabling said grinding wheel to be arranged in an inclined plane, and a resilient device that normally holds said grinding wheel in a vertical plane.

15. A grinding machine, comprising an over-head carriage, a horizontally disposed support, an adjustable suspending means on said carriage provided with a yoke to which said horizontally disposed support is pivotally connected, an electric motor on said support, an oscillating rod forming part of said support and carrying a shaft that extends in the same general direction as the shaft of said motor, a grinding wheel and a pulley on said shaft, a driving belt operated by said motor for actuating said pulley, and means coöperating with said rod for normally holding the grinding wheel in balance.

16. A grinding machine, comprising an over-head carriage, a horizontally disposed support, an adjustable suspending means on said carriage provided with a yoke to which said horizontally disposed support is pivotally connected, an electric motor on said support, an oscillating rod forming part of said support and carrying a shaft that extends in the same general direction as the shaft of said motor, a grinding wheel and a pulley on said shaft, a driving belt operated by said motor for actuating said pulley, a resilient device coöperating with an arm on said rod for normally holding the grinding wheel in balance, and means for enabling the tension of said resilient device to be varied to provide for variations in the weight of said grinding wheel.

In testimony whereof, we hereunto affix our signatures in the presence of two witnesses, this fifth day of May, 1914.

JOHN J. LICHTER.
JOHN N. MAHER.

Witnesses:
WELLS L. CHURCH,
GEORGE BAKEWELL.