

Dec. 23, 1941.

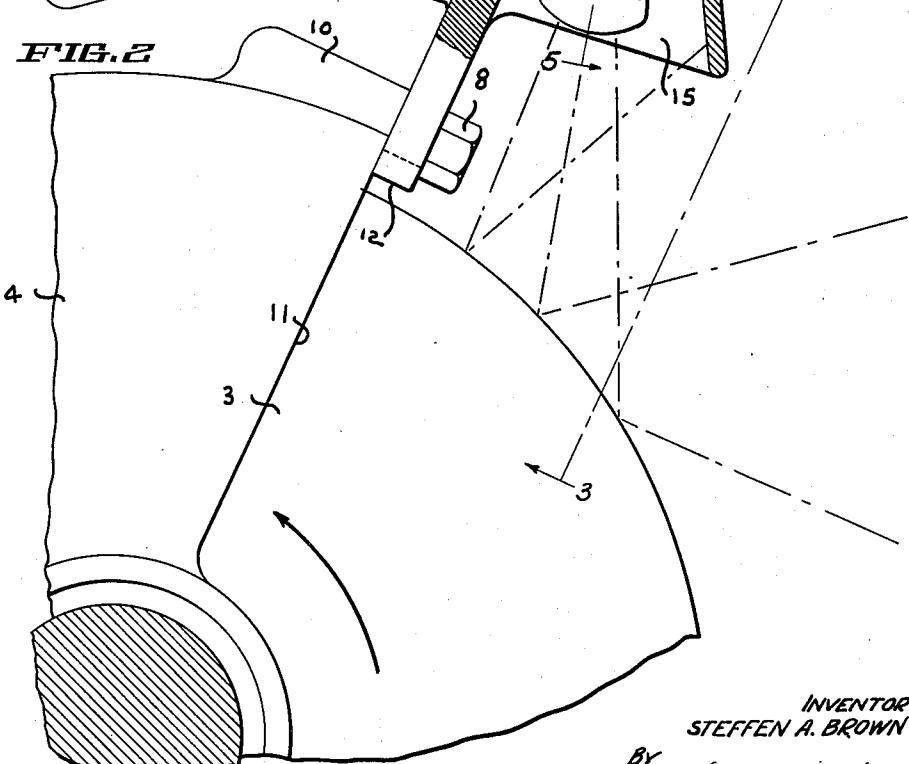
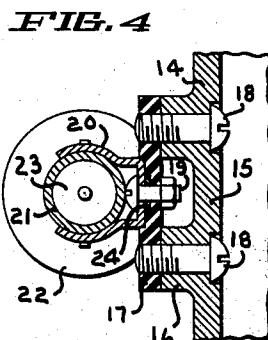
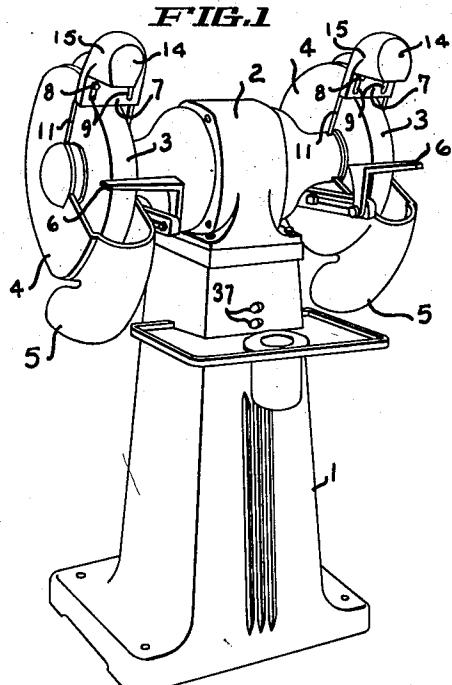
S. A. BROWN

2,267,189

COMBINED SHIELD AND ILLUMINATING MEANS FOR GRINDING WHEELS

Filed Jan. 11, 1940

2 Sheets-Sheet 1



INVENTOR
STEFFEN A. BROWN

BY
Toulmin & Toulmin
ATTORNEYS.

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S. A. BROWN

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FIG. 3

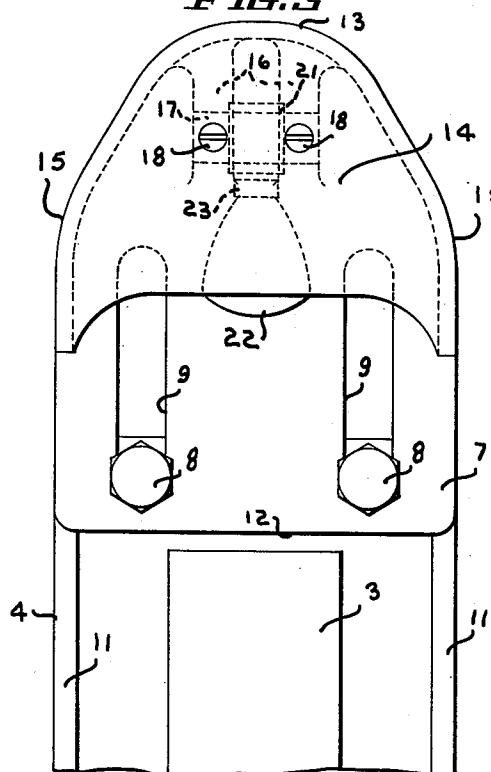


FIG. 5

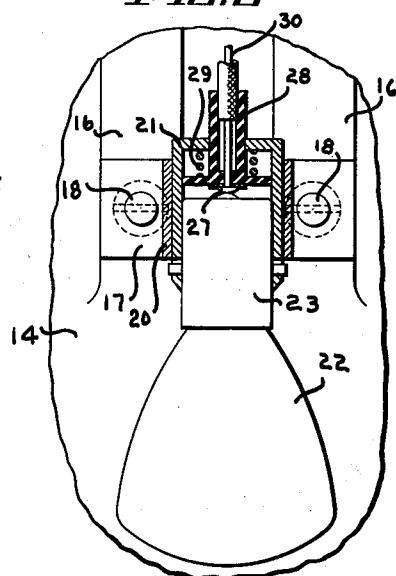


FIG. 6

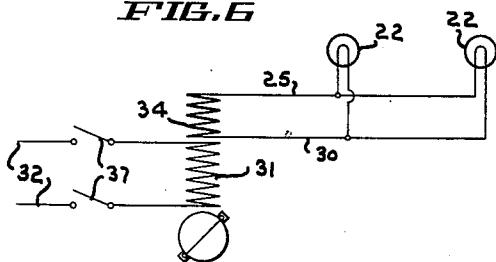


FIG. 7

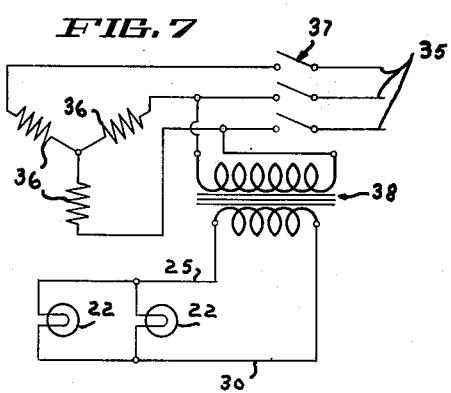
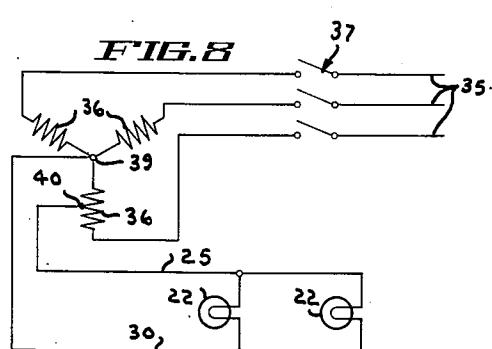


FIG. 8



INVENTOR
STEFFEN A. BROWN

By
Joulmin & Joulmin
ATTORNEYS

UNITED STATES PATENT OFFICE

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COMBINED SHIELD AND ILLUMINATING
MEANS FOR GRINDING WHEELSSteffen A. Brown, Dayton, Ohio, assignor to The
Brown-Brockmeyer Co., Inc., Dayton, Ohio, a
corporation of Ohio

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7 Claims. (Cl. 240—2)

This invention relates to a grinder and more particularly to means associated with the grinder for lighting the wheel and the work and means associated therewith for shielding and arresting sparks thrown off by the grinding wheel.

The principal object of the present invention is to provide a combination spark shield and lamp for illuminating the wheel and the work; by combining the spark-arrester with the lamp housing, the most convenient and effective way of illuminating the work and arresting sparks is brought about.

Another object is to so construct and arrange the light and the light housing that a maximum illumination of the wheel in the area of grinding is attained and at the same time the passage of light from the lamp directly to the eyes of the operator is prevented, thus eliminating glare; it is preferred to project the light from the lamp directly onto the work area and to reflect it therefrom to the operator's eyes, thus insuring maximum illumination and minimum glare, the front of the lamp housing being so disposed that no light can pass directly from the light bulb to the operator's eyes.

Another object is to provide a lamp for illuminating the wheel and the work which is integral with the grinder.

Still another object is to employ in the combination described above a bayonet type of lamp and lamp socket which prevents the lamp from working loose from vibration.

Another object is to provide a resilient mounting for the lamp whereby long life of the lamp is insured by protecting the lamp filament from vibration; at the same time, the lamp is so disposed within the housing therefor that it is protected from injury and is not likely to be broken by accident while the bulb is easily renewed.

Another object is to provide a low voltage lamp which is energized from the main power line which supplies the electric motor rotating the grinding wheel; since the motor is operated at relatively high voltage, say 110 or 220 volts, while the lamp voltage is from 6 to 8 volts, means is provided requiring no separate external connection for taking off electrical energy at the desired low voltage from the main power line within the grinder and for supplying the low voltage power thus taken off to the lamp; this result may be accomplished in several ways, some of which will be more fully described below.

Still another object is to provide for adjustment in a single operation of the spark shield and thereby the lamp carried integrally therewith to-

wards the grinding wheel whereby to compensate for wear of the grinding wheel or for the substitution of different sized wheels; thus it is insured that the spark shield and the lamp are moved together in a single adjusting operation and that the shield and lamp are maintained at the same distance apart from one another and are by a simple and convenient adjusting operation maintained at the same distance from the wheel; thus it is insured that a constant spark-shielding effect is maintained and a constant illumination of the wheel and the work is effected, while the illumination is kept in the proper place on the working area.

15 Other objects of the present invention will hereinafter appear.

In the accompanying drawings,

Fig. 1 is a perspective of a grinder having two grinding wheels, each of which is equipped with 20 apparatus embodying the principles of the present invention.

Fig. 2 is a fragmentary sectional view of the wheel, the wheel housing and the combined spark shield and lamp housing; this view shows how 25 the lamp projects its light onto the working area without causing glare in the eyes of the operator.

Fig. 3 is a view taken on the line 3—3 of Fig. 2 looking in the direction of the arrows.

Fig. 4 is a detailed sectional view showing the 30 resilient mounting of the lamp bulb and is taken on the line 4—4 of Fig. 2, looking in the direction of the arrows.

Fig. 5 is a detailed sectional view taken on the line 5—5 of Fig. 2 looking in the direction of the 35 arrows.

Figs. 6 to 8 are diagrammatic views showing 40 various electrical hook-ups for taking off the low voltage for operating the lamp bulbs from the high voltage supplied to the electric motor of the grinder, Fig. 6 showing the utilization of a winding of the motor as the primary of a transformer, a secondary of which is employed to light the lamp bulbs, the motor winding additionally performing its function in causing rotation of the motor. Fig. 7 shows a built-in step-down transformer operated across two of the three-phase power lines. Fig. 8 shows a three-phase motor wherein the low voltage is tapped off of one of the motor windings between the neutral point and the tapping point.

Referring to the accompanying drawings in detail, 1 designates the base of the grinder upon which is mounted the motor 2 which has fixedly carried upon its shaft in any suitable manner 50 and at the opposite ends thereof, the two grind-

ing wheels 3. The grinding wheels 3 are rotatably driven by the motor 2 in the usual manner. Surrounding each of the grinding wheels is a partially encircling wheel housing 4 which is secured in any desired manner on its inward face to the housing of motor 2. The housing 4 has formed integrally therewith the hollow discharge casing 5 which is of the usual type. Adjustably positioned adjacent the periphery of the wheel 3 is the steady rest 6 which may be adjustably mounted in any desired manner upon the wheel housing 4.

Coming now to the description of the spark shield and lighting means, 7 designates the spark shield or arrester which is mounted radially of the wheel 3 and which is adjustably secured to the housing 4 by means of the cap screws 8 which pass through outwardly extending parallel slots 9 in the spark shield 7 into threaded reception within bosses 10 integrally formed with the wheel housing 4. The spark shield 7 is mounted so as to be supported along the upper face 11 of the wheel housing 4 within the opening formed therein for access to the grinding wheel. Normally the shield 7 is adjusted so that its radially inward face 12 is closely adjacent the periphery of the wheel 3 so that the passage of sparks along around the wheel into the working area is substantially prevented.

The shield 7 has integrally formed thereon a lamp housing. The shield 7 acts as the rear wall of this housing and cooperates with the top 13, front 14 and sides 15 to form a lamp housing which is adapted to project light onto the upper exposed portion of the grinding wheel whereby to illuminate this portion of the wheel and the workpiece held thereagainst. In order to support the lamp socket and the lamp bulb within this housing at the proper position, inwardly extending bosses 16 (Fig. 2) are provided integrally with the front face 14 of the lamp housing. Across these bosses 16, a strip 17 of resilient material such as rubber is mounted by means of the screws 18 which are accessible from the front of the lamp housing, projecting through the front wall 14 thereof. Rubber strip 17 is of semi-soft rubber, and has sufficient hardness to receive the threads of screws 18, but is sufficiently resilient to prevent the transmission of vibration or shock to the bulb. Rubber strip 17 may or may not be corded. This strip also performs an electrical insulating function by insulating the base and socket of the bulb from the metal lamp housing and thereby from the machine. Mounted intermediate of this rubber strip 17 by means of the bolt 19 is a spring clip 20 which is adapted to detachably surround the lamp socket 21 and hold it securely in place. The lamp socket 21 is of the bayonet type and is adapted to receive the conventional low voltage lamp 22 which has the usual bayonet type base 23. The base 23 is of the usual metal construction and is connected as usual to one side of the lamp filament. In order to establish electrical connection to this base without connecting the lamp housing to the electrical source, the lug 24 is mounted between the clip 20 and the rubber strip 17 around the bolt 19 and an insulated wire 25 connects to this clip 24 and leads rearwardly through an insulating bushing 26 mounted in an aperture in the upper portion of the spark shield 7.

Electrical contact is made to the other side of the bulb 22 by means of the centrally located contact member 27 which is mounted in the insulating washer and sleeve 28 slidably mounted

adjacent the bottom of the socket 21. This member 28 is normally urged downwardly by the resilient spring 29. The contact 27 is electrically connected to an insulated wire 30 which likewise leads rearwardly through the insulating bushing 26 in the shield 7.

From the foregoing, it will be seen that the lamp and the spark shield are adjustable inwardly or outwardly as a unit so as to take care of wear of the grinding wheel and so as to allow for substitution of grinding wheels of different diameter. It will further be seen that this is advantageous because it is desirable to have both the shield and the lamp at a constant distance from the working area. It will also be seen that the lamp 22 is so positioned as to project its beam onto the work without projecting any of it into the eyes of the operator standing in front of the grinder. It is impossible for any of the light from bulb 22 to reach the operator's eyes except by reflection from the grinding surface of the workpiece. This results in very high illumination of the working area without glare. The dotted lines in Fig. 2 indicate that the light from bulb 22 is projected onto the working area and is then reflected outwardly towards the operator. Thus, the zone of maximum lighting is right in the area of grinding.

It is preferred that bulbs 22 be of the low voltage type since such bulbs are commercially available with the bayonet type base which insures against their coming loose due to vibration. Furthermore, the space available in the lamp housing is so small that it would be impracticable to use a large high voltage bulb therein. Accordingly, means is provided which is integral with the grinder itself and which requires no separate electrical connection to the power lines for supplying low voltage electricity to the bulbs. Thus, by a single operation of plugging in a single cord, energization of the electric motor 2 and of the bulbs 22 is assured. In Figs. 6 to 8, there are portrayed several ways in which low voltage current may be derived without requiring a separate attachment to the power mains.

In Fig. 6, the electric motor has the winding 31 which is adapted to be connected across the power lines 32 by means of the switch 33 and which is adapted to cause the motor to rotate. The winding 31 may be either a rotor or a stator winding. Provision is made for causing this winding 31 to additionally function as the primary of a step-down transformer, the secondary 34 of which is placed closely adjacent the winding 31. If winding 31 is a rotor winding, slip rings must be provided for taking off the current induced in secondary 34. The current induced in secondary 34 is connected by the wires 28 and 30 to the bulbs 22. Since the bulbs 22 are normally of low wattage rating, the disposition of the secondary winding 34 adjacent the high voltage motor winding 31 will not interfere appreciably with the operation of the motor. It will be understood that the motor is a single-phase motor of any suitable type, the showing in the drawings being merely diagrammatic.

In Fig. 7, the three-phase lines 35 are adapted to be connected by the switch 37 to the three-phase motor having the Y-connected windings 36. On the motor side of the switch 37, a step-down transformer 38 is disposed, its primary being connected across two of the leads to the windings 36 and its secondary being connected to the wires 25 and 30 which lead to the lamps

22. Thus, the lamps and the motor are controlled by a single switch 37 and the necessity for any external connection other than that which would normally be made to the grinding motor is eliminated.

In Fig. 8, the incoming power lines 35 are connected by the switch 37 to the windings 36 of the motor which are connected in Y as before. In order to provide the necessary low voltage for the lamps 22, the line 30 is connected to the neutral point 39 while the line 25 is connected to a point 40 on one of the windings 36. By thus tapping one of the motor windings, the required low voltage is obtained without materially interfering with the operation of the motor because of the flywheel effect of the motor armature and of the grinding wheels carried thereby.

A suitable flexible armored electrical cable (not shown) will be run from the rear of the lamp housings on the inward side of the wheel guards 4 and from there to the base of the pedestal 1 where the necessary electrical connections will be made. This line may run to the motor 2 where the connections of Figs. 6 and 8 are employed. Where the connection of Fig. 7 is employed, the step-down transformer 38 is desirably located in the base 1 of the grinder, proper connections being made thereto. The switch for the control of the grinder is designated as 37 in Fig. 1 and is of the start-stop type.

From the foregoing, it will be seen that the present invention provides a highly useful and convenient method for shielding against sparks and for illuminating the working area of the grinding wheel and that the objects set forth above are effectively attained by the application of the principles of the present invention. It is to be understood, however, that the invention is not limited to the specific form illustrated in the drawings, but that modifications may be made therein to adapt it to varying conditions and uses without departing from the inventive thought which is to be limited only as set forth in the appended claims.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A grinder comprising a grinding wheel, a housing therefor, a cut-out portion on said housing whereby a portion of said grinding wheel is exposed to the work to be ground, a combined spark arresting shield and lamp housing therefor, having rear wall means, said rear wall means including an extension, means for mounting said extension on said grinding wheel housing above said grinding wheel and in line with the upper rear face of the cut-out portion thereof, said last named means including adjustable means for adjustably mounting said extension and lamp housing to be adjusted toward and away from said grinding wheel, and means for mounting a lamp in said lamp housing whereby to illuminate the exposed portion of the grinding wheel.

2. A grinder comprising a grinder wheel, a housing therefor, a cut-out portion on said housing whereby a portion of said grinding wheel is exposed to the work to be ground, said cut-out portion having upper and lower faces, a combined spark arresting shield and lamp housing having rear wall means, said rear wall means including an extension, means for adjustably mounting said extension above said grinding wheel and in line with the upper face of said cut-out portion of said grinding wheel housing,

whereby said extension and lamp housing may be adjusted toward and away from said grinding wheel, and a lamp in said lamp housing whereby said lamp illuminates the exposed portion of the grinding wheel.

3. A grinder comprising a grinding wheel, a housing therefor, a cut-out portion on said housing whereby a portion of said grinding wheel is exposed to the work to be ground, a combined spark arresting shield and lamp housing therefor, having rear wall means, said rear wall means including an extension, means for mounting said extension on said grinding wheel housing above said grinding wheel and in line with the upper rear face of the cut-out portion thereof, said last named means including adjustable means for adjustably mounting said extension and lamp housing to be adjusted toward and away from said grinding wheel, a resilient lamp support in said housing, means for mounting a lamp in said lamp support whereby said lamp illuminates the exposed portion of the grinding wheel.

4. A grinder comprising a grinding wheel, a housing therefor, a cut-out portion on said housing whereby a portion of said grinding wheel is exposed to the work to be ground, a combined spark arresting shield and lamp housing therefor, having rear wall means, said rear wall means including an extension, means for mounting said extension on said grinding wheel housing above said grinding wheel and in line with the upper rear face of the cut-out portion thereof, said last named means including adjustable means for adjustably mounting said extension and lamp housing to be adjusted toward and away from said grinding wheel, a resilient lamp support in said housing including a rubber strip, means for securing the ends of said strip to said housing, the middle portion of said strip being free from said supporting means, a lamp socket mounted in the said middle portion of said strip, a lamp secured in said socket, whereby said lamp illuminates the exposed portion of the grinding wheel.

5. A grinding wheel, a housing therefor, said housing having a cut-out portion whereby a portion of said grinding wheel is exposed to the work to be ground, a combined spark arresting shield and lamp housing having a plurality of walls, the rear wall forming said spark arresting shield, said last named wall having an extension thereon, extending toward said grinding wheel, means for mounting said extension above said grinding wheel and in line with the upper rear face of said cut-out portion of said grinding wheel housing, and means for mounting a lamp in said lamp housing whereby to illuminate the exposed portion of said grinding wheel.

6. A grinding wheel, a housing therefor, said housing having a cut-out portion whereby a portion of said grinding wheel is exposed to the work to be ground, a combined spark arresting shield and lamp housing having a plurality of walls, the rear wall forming said spark arresting shield, said last named wall having an extension thereon, extending toward said grinding wheel, means for mounting said extension above said grinding wheel and in line with the upper rear face of said cut-out portion of said grinding wheel housing, said last named means including adjustable means for adjusting said spark arresting shield and said lamp housing toward and away from said grinding wheel.

7. A grinder comprising a grinding wheel, a housing therefor, a cut-out portion on said housing whereby a portion of said grinding wheel is exposed to the work to be ground, a combined spark arresting shield and lamp housing therefor, having rear wall means, said rear wall means including an extension, means for mounting said extension on said grinding wheel housing above said grinding wheel and in line with the upper rear face of the cut-out portion thereof, said last named means including adjustable means for adjustably mounting said

extension and lamp housing to be adjusted toward and away from said grinding wheel, and means for mounting a lamp in said lamp housing whereby to illuminate the exposed portion of the grinding wheel, a low voltage lamp mounted in said lamp housing, a shaft, a motor mounted on said shaft, said grinding wheel being mounted on said shaft, and an electric circuit connected to said motor and said low voltage lamp.

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STEFFEN A. BROWN.