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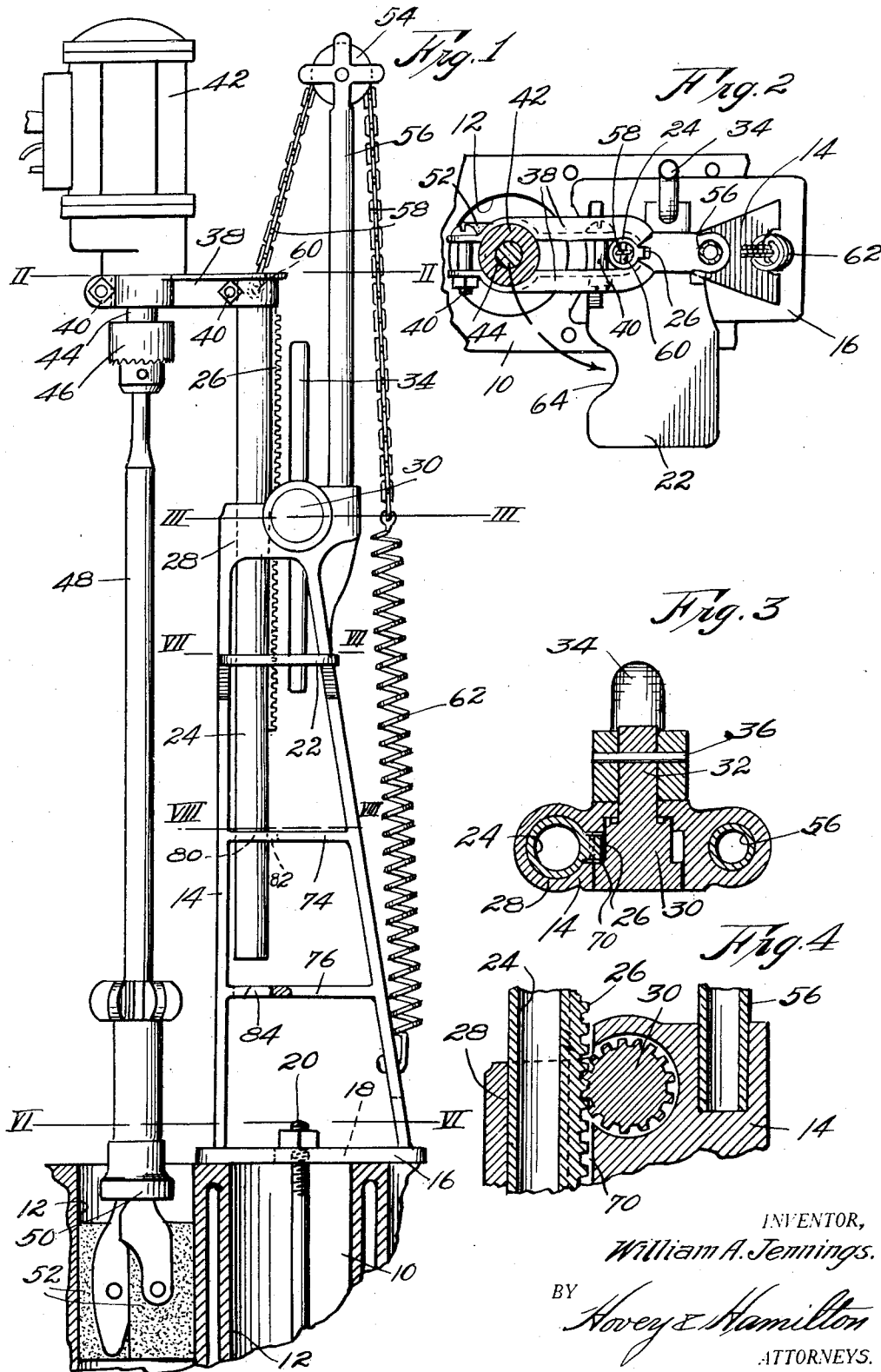
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CYLINDER GRINDING STAND

Filed May 24, 1930

2 Sheets-Sheet 1



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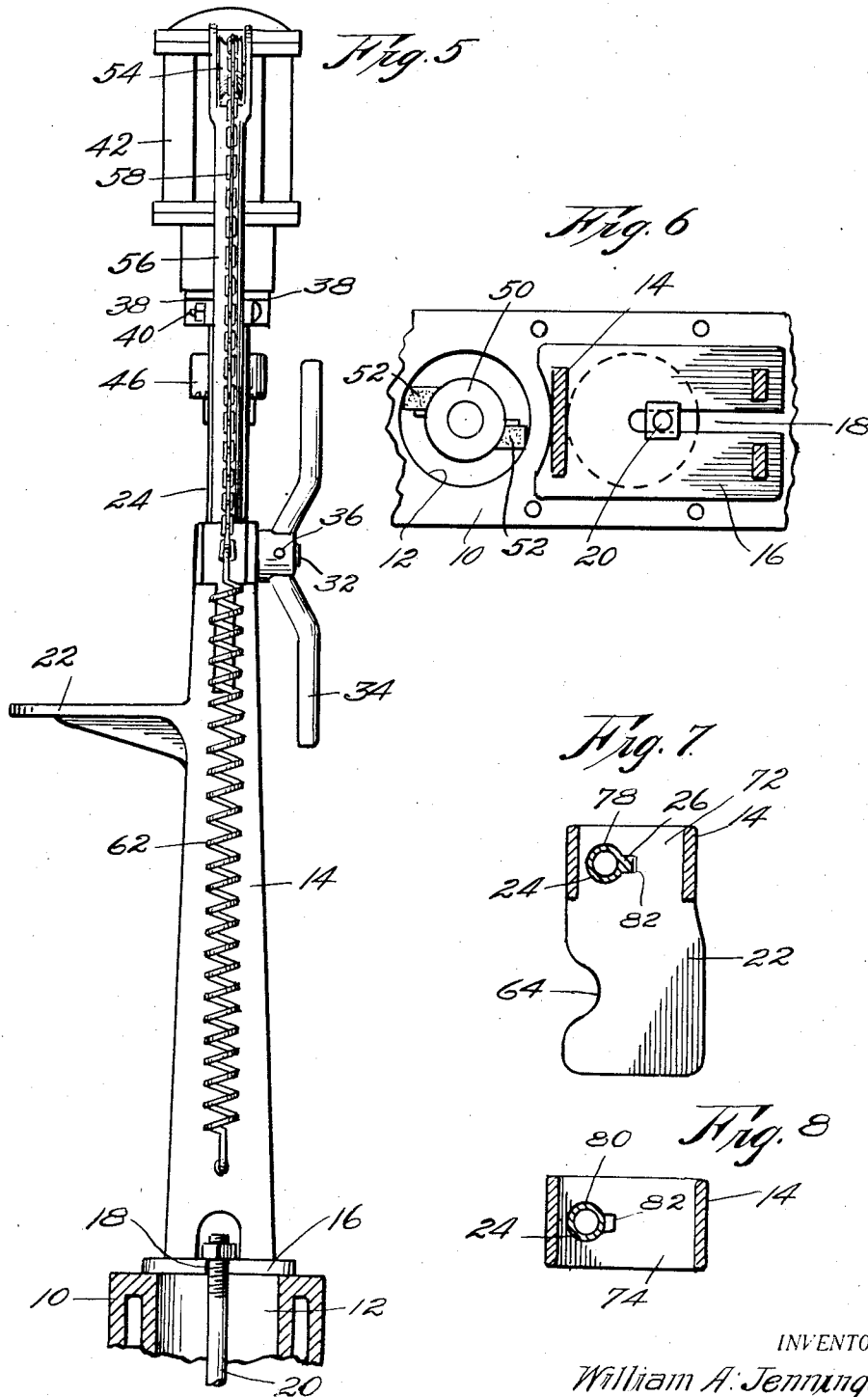
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UNITED STATES PATENT OFFICE

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CYLINDER GRINDING STAND

Application filed May 24, 1930. Serial No. 455,289.

This invention relates to cylinder grinding apparatus and has for its primary object the provision of a portable grinding tool which may be attached directly to the work to be acted upon, supported thereby in operative relation and is susceptible of quick attachment and removal without the use of complicated parts which involve an excessive amount of time and labor.

One of the primary objects of this invention is to provide a grinding apparatus particularly adapted for use in connection with the grinding of cylinder blocks where it is desirable to vertically move a grinding tool into and out of the cylinder to face the walls thereof, said apparatus being formed to present a novel structure in the form of a supporting frame having a base to rest on the cylinder block and having means mounted thereon for operating a vertically movable shaft, which in turn carries a rotatable spindle, disposed in substantially parallel relation with the shaft and carrying a grinding tool which is progressively moved into the cylinder to be ground by the operating means mounted on said frame.

A yet further object of this invention is the contemplation of a grinding apparatus which is provided with novel means of counterbalancing the movable parts of the apparatus which are operatively mounted upon a specially constructed frame adapted to be connected directly to the work.

A still further object of this invention is to provide a cylinder grinding stand which may be converted into a drill press and used as such simply by removing the rotatable tool supporting spindle from the source of power which is supported by the frame in a novel manner which allows the same to be swung around into a position above a table formed integrally with the frame of the stand.

Other objects of the invention which will include specific details of construction and the many uses to which the tool made in accordance with this invention might be put, will be brought forth during the course of the specification.

The cylinder grinding apparatus illustrated in the accompanying drawings em-

bodies but one form of the invention and shows but one use to which the apparatus might be put. It is understood that this invention is not limited in any way whatsoever to the details shown nor the adaptation of the device. It is desired to use the grinding stand and the motor associated therewith to support tools, fixtures, appliances and attachments of many forms and characters. Since the structure herein described and shown is capable of such uses, it is understood that the invention is to be limited only by the scope of the appended claim.

In the drawings, wherein like reference characters refer to similar parts throughout the several views;

Figure 1 is a side elevation of a cylinder grinding stand made in accordance with this invention and showing the same in the operative position upon a cylinder block.

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

Fig. 3 is a horizontal cross section taken on line III—III of Fig. 1.

Fig. 4 is a fragmentary vertical section taken through a portion of the stand.

Fig. 5 is an edge elevation of the cylinder grinding stand.

Fig. 6 is a horizontal cross section taken on line VI—VI of Fig. 1.

Fig. 7 is a horizontal cross section taken on line VII—VII of Fig. 1, and

Fig. 8 is a horizontal cross section taken on line VIII—VIII of Fig. 1.

Referring to the details of construction embodied in the preferred form illustrated in the drawings, the numeral 10 indicates a cylinder block within which are formed cylinders 12 the arcuate walls of which it is desired to face by grinding. The grinding stand used to perform this function and which is made in accordance with this invention may include a frame 14 which is provided with a base 16 having a slot 18 projecting inwardly from one side thereof by means of which a bolt or similar clamping element 20 may be utilized to secure the stand in place. The construction set forth permits quick attachment and removal and allows for adjustment without disassembling

the clamping element 20 which in this instance has been illustrated to be the bolt and its coacting nut. The upper surface of cylinder block 10 is faced to present a smooth surface and when the faced base 16 of frame 14 is positioned thereon the perpendicularly extending side of frame 14 will be maintained in the position shown in Fig. 1 to be substantially parallel to the axis of the cylinder 12 wherein is to be placed the herein-after described grinding tool.

The opposite side of frame 14 is angled to present a bracing function and the two sides are tied together through the use of suitable webs located at regular intervals throughout the height of frame 14. A table 22 extends to one side of frame 14 and is disposed in a position which permits using the grinding stand as a drill press or tool of similar characteristics after the later described grinding tool has been removed from the position shown.

A vertically reciprocating tool supporting shaft 24 has a rack 26 formed integrally therewith and the bearing 28 formed as shown in Fig. 3 allows such vertical movement, yet precludes any rotary motion until rack 26 has been lifted to a point where it is beyond the confines of bearing 28. To operate shaft 24, a pinion 30 maintained in the operative relation to rack 26 by the upper portion of frame 14 is rotatably mounted as shown in Fig. 3 and has a stub shaft 32 projecting axially therefrom to be engaged by any suitable handle 34 rigidly secured thereto by a pin or analagous means 36.

To further describe an important and extremely novel feature of the cylinder grinding apparatus attention should be given the specific manner in which shaft 24 is operatively associated with the supporting frame 14. Bearing 28 has a key-way 70 formed therethrough for the reception of rack 26. Obviously, this key-way will eliminate or preclude rotation on the part of shaft 24 which would set up a destructive maladjustment of the grinding tool 50.

The three cross webs 72, 74 and 76 join the two sides of frame 14 and webs 72 and 74 act as bearings for shaft 24. The openings 78 and 80 formed in webs 72 and 74 respectively are formed to present ways 82 for the passage of rack 26. Since, when lowering shaft 24, rack 26 never reaches web 76, it is only necessary that the opening 84 therethrough be round to receive the lower end of the shaft. During the entire movement of shaft 24 when adjusting the same, it is obvious that bearings will be presented for its support which will render it rigid and securely held in the proper position.

In constructing a frame as set forth herein, it is plain to be seen that the same is extremely light, yet presents features which renders it capable of efficiently supporting the parts

of the apparatus in the proper related positions.

To carry out one of the functions of this invention, tool supporting shaft 24 has an arm 38 clampingly secured to the upper end thereof. This arm 38 may be formed as shown to present two parts secured together by a plurality of bolts 40, one of which is positioned adjacent shaft 24 while the other is located near the end of arm 38, which is projected from shaft 24 to maintain the two parts of arm 38 against a portion of a motor 42 which has a shaft 44 adapted to actuate a chuck 46 into which may be placed any suitable instrument or tool which it is desired to actuate.

In the instance shown, the apparatus is used as a cylinder grinding stand and a rotatable spindle 48 is secured in the operative position by chuck 46 so that a grinding tool 50 may be lowered into cylinder 12 as shown in Fig. 1. The grinding elements 52 may be of any substance and their travel vertically along the walls of cylinder 12 is controlled by the handle 34 which when moved by the operator, causes shaft 24 and the parts supported thereby to vertically reciprocate.

To relieve the operating parts of the apparatus from as much strain as possible, a counterbalancing means is provided, which in the form shown is a pulley 54, held in a relatively high position by a standard 56 which in turn is supported by the head of frame 14. A chain or suitable flexible means 58 is caused to pass over pulley 54 and one of the ends thereof brought into attaching engagement with the upper end of shaft 24 through the intermediacy of a pin 60 in such a manner that the shaft 24 and arm 38 may be rotated without interfering with the chain 58. A spring 62 joins the other end of chain 58 and is attached to frame 14 at a point near the base thereof. The tension of spring 62 will overcome the weight of the members before mentioned and operation is rendered easy and efficient.

While the general operation of the cylinder grinding stand has been made clear throughout the specification, it is desired to outline in a specific manner the advantages of the apparatus.

Obviously, the quick and easy placement of the stand renders the same susceptible of use in a large number of places where the ordinary apparatus would not be utilized in performing the functions desired. It is notable that there are no objectional toggle links or other involved mechanism which would preclude the performance of efficient work which is always of a precision character. The stand is made up of a small number of rugged, durable parts. It is cheap to manufacture and adapts itself to a large number of uses.

As an example, table 22 is provided to permit the device to be used as a drill press.

When altering the structure for such use the bolt 40 adjacent shaft 24 is loosened and the motor 42, chuck 46 and arm 38 are turned about the axis of shaft 24 to a point where the axis of chuck 46 overlies table 22. The bolt 40 is again tightened and the chuck 46 is provided with any suitable tool which will operate above the table 22. Manifestly spindle 48 and the grinding tool 50 are removed from chuck 46 when the above operations take place. When it is desired to raise shaft 24 and hold the same in a lifted position, it is moved upwardly to a point where the rack 26 is out of bearing 28, the shaft is then turned and the lower end of rack 26 rests upon the upper face of bearing 28.

During the time the apparatus is supported upon the cylinder block 10 and while the grinding tool is assembled ready for use, it may be desired to move spindle 48 in the direction of the arrow shown in Fig. 2. If so, a depression 64 formed in one side of table 22 allows for the proper clearance.

It is understood that modifications might be used in building structures in accordance with this invention and that stands of various sizes and constructed of materials of different natures might be used without departing from the spirit of the invention.

Having thus described the invention, what is desired to be secured by Letters Patent is:

In a cylinder grinding stand, a vertically disposed reciprocating shaft, a frame supporting said shaft, a laterally extending table integral with said frame, a tool actuating motor and an arm supporting said motor in operative position adjacent the upper end of said vertical shaft, said arm being releasably clamped to the shaft whereby the motor may be swung to and from a position above the table.

In testimony whereof, I hereunto affix my signature.

WILLIAM A. JENNINGS.