Sept. 11, 1962 V. E. ANDERSON 3,053,119

ENGINE BORING STANDS

Filed Oct. 8, 1959 2 Sheets-Sheet 1

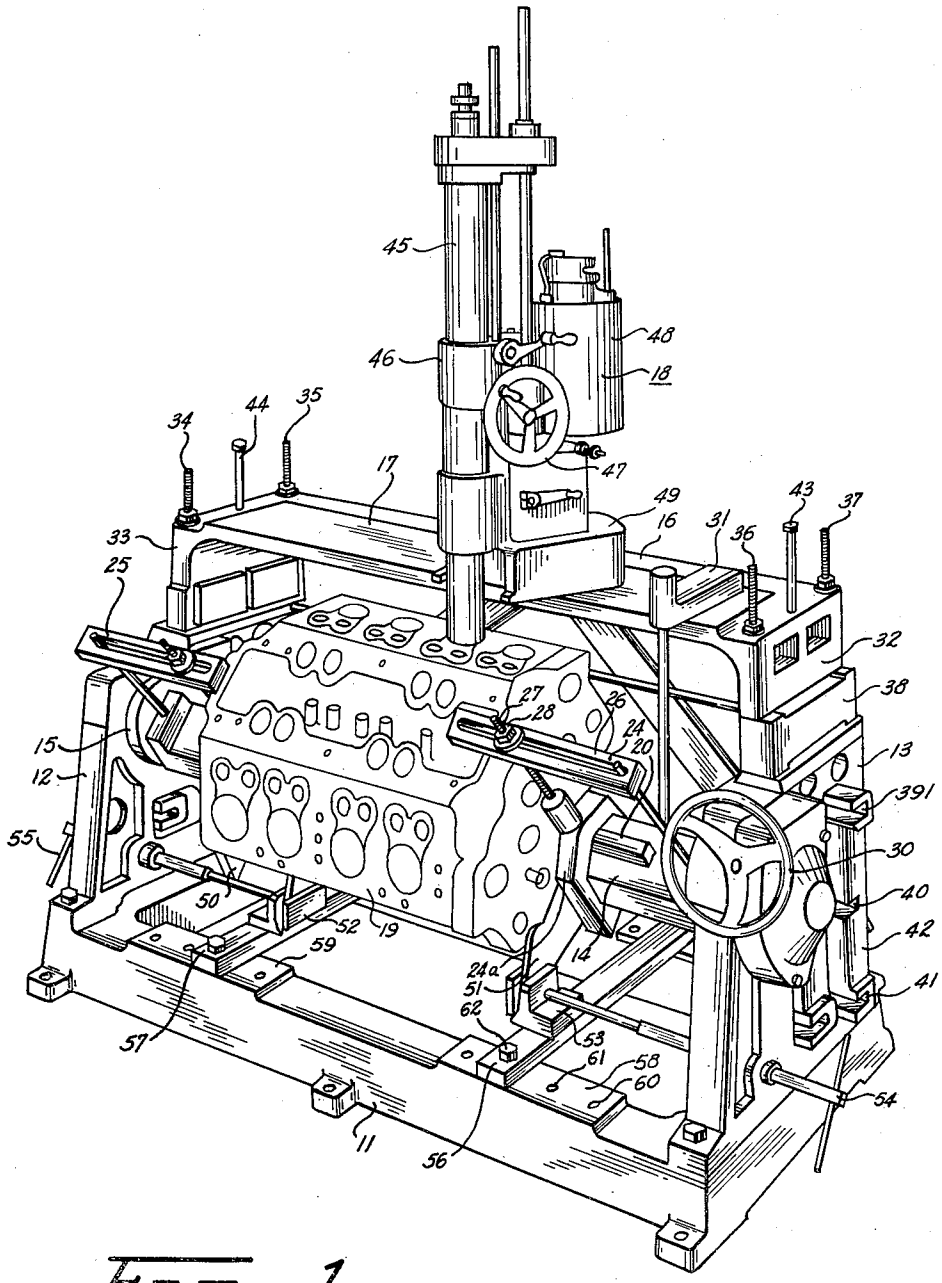

FIG 1

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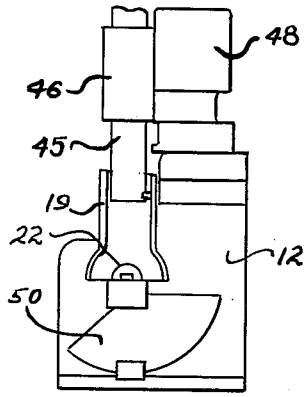

FIG. 4

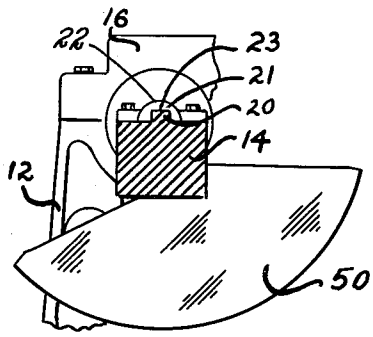

FIG. 3

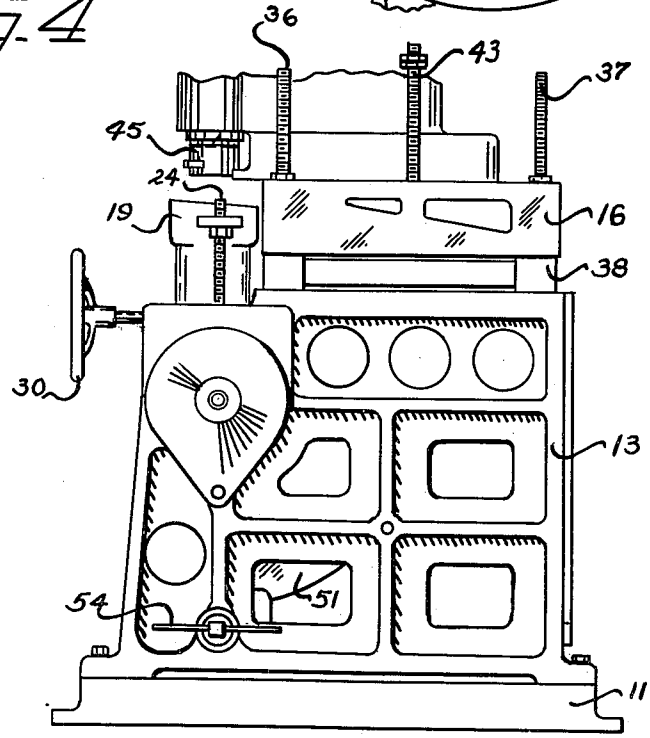

FIG. 2

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3,053,119

ENGINE BORING STANDS

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1 Claim. (Cl. 77—4)

This invention concerns engine boring stands, and more particularly one in which the motor block can be positioned for vertical boring of cylindrical walls, one in which the cylinder walls can be bored vertically with reference to the crank shaft axis.

For many years it has been the general practice in the manufacture of internal combustion engines to cast the blocks in such a manner that the plane of the top face of the block is at right angles to the bore of the cylinders. It is this plane to which the heads are bolted and boring tools are generally aligned with this surface, the axis of the bore being at right angles to the axis of the crank shaft.

It is now becoming the practice of the industry to align this plane at a slight angle in relation to the vertical axis of the bore, this angle being about 10 degrees. It is apparent, then, that the plane or surface of the block can no longer be used as a reference point to bore the cylinder walls, particularly when the boring is a part of the process of reconditioning an engine. All reference under these circumstances must be made with relation to the horizontal axis of the crank shaft.

It is therefore a primary object of this invention to provide a stand in which the engine block can be positioned in such a manner that a boring tool can be positioned on the stand and bore towards the axis of the crank shaft, regardless of the angle of the upper face of the engine block.

It is a further object of my invention to provide a device in which an engine block can be positioned on the stand and then locked in position.

It is yet another object of my invention to provide a device in which a boring machine may be positioned on the stand at varying elevations above the engine block to be bored.

It is still another object of my invention to provide a device in which two machined flat surfaces may be aligned in relation to each other at exact angles.

Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawings and following specifications, wherein is disclosed a single exemplary embodiment of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims, without departing from the spirit of the invention.

In said drawings:

FIGURE 1 is a three-quarter view in perspective of a stand constructed according to my invention, having a motor block positioned on the stand and the boring bar positioned on top of the stand, with the cutting tool extending into one of the cylinders.

FIGURE 2 is an end view of the boring stand showing the manner in which the boring bar is mounted on the top table for adjustment.

FIGURE 3 is a view in cross section of the center portion of the stand, the further end thereof being broken away to show means whereby the engine block is centered in relation to the boring stand, and

FIGURE 4 is a schematic view of the stand to show the angular relation of the several planes.

Referring now to the drawings:

A machine constructed according to my invention comprises a rectangular base casting **11**. Mounted on each end of this casting are two vertical pedestals **12** and **13**.

Pivotally mounted between these two pedestals is a heavy rectangular bar **14** which is journalled at each end in the pedestals in a circular bearing assembly, as shown at **15**, of pedestal **12**. Mounted on the top of these two pedestals is a horizontal platform **16** which is supported by the pedestal and has an accurately machined surface **17** for a substantial portion of the length and width thereof. It is this platform on which the motor-driven boring bar assembly **18** is positioned.

In the operation of this stand, the motor block **19** is mounted on the cross bar **14**. The cross bar has a center guide lock **20** which is used to center the engine block on the cross bar. The base of this guide is accurately aligned with the center line of the pedestal bearings such as **15**. All internal combustion engines are built with the opposite end portions of the block machined to receive the crank shaft bearing. This machined portion is indicated at **22** in FIGURE 3. I have provided a semi-circular guide block **21** which is of such a size as to fit within this machined opening and also having a notched portion **23** which fits onto the bar **20**. It will be understood that this semi-circular block **21** will be provided in various sizes, and in any event will align the center line of the engine bearings and crank shaft with the center line of the pedestal bearings and all rotation will be around this point.

Once the block is positioned on the bar **14**, a pair of clamp assemblies **24** and **25** are provided to lock this engine block in relation to the cross bar. This clamp assembly consists of a yoke casting such as **24***a*, a slotted bar **26**, and the vertical post **27**. The bar is positioned on the post **27** at one end and engages the yoke **24***a* at the other. A locking nut **28** is used to draw the assembly into a firm clamp.

Once the engine block is locked on the cross bar **14**, the bar is then manually rotated by turning wheel **30** in the end pedestal **13** until proper angular relationship is established between the cross bar and the platform **16**. A gauge block **31** is then used to check the alignment and to make sure that the axis of the cylinder is at right angles to the surface **17** of the platform **16**. Extreme care must be taken in this adjustment, since it is the relationship between this bar **14** and the platform **16** which establishes the accuracy of the boring operations that follow.

It will be understood that engine blocks vary considerably in height, and therefore the vertical elevation of the platform **16** must be adjusted to accommodate this variation in engine blocks. This is desirable since it is good machine practice to maintain as short a length of the bore bar proper as possible.

The platform **16** is formed with the horizontal surface **17** in two downwardly depending legs **32** and **33**. A plurality of vertically extending bolts **34**, **35**, **36** and **37** are provided to align this platform in relation to the pedestals **12** and **13**, these bolts extending downwardly through the legs and into the pedestals proper. Spacer blocks **38** and **39** are positioned immediately below the legs **32** and **33** of the platform and the pedestals **12** and **13**. These spacer blocks are elongated castings with three slots in them such as **391**, **40** and **41** of block **42**. These slots are positioned in registry with the bolts such as **34**, **35**, **36** and **37**. The blocks themselves are of varying thickness and one pair of blocks may be substituted for another to vary the elevation of the platform.

Two adjusting bolts **43** and **44** are provided to facilitate the raising and lowering of this platform. These two bolts are threaded into the legs **32** and **33** and extend downwardly into contact with the pedestals **12** and **13**. By turning these bolts in either direction, the platform may be raised or lowered, its movement being guided by the corner bolts **34**, **35**, **36** and **37**.

The boring bar assembly is of conventional form. It consists of the boring tool itself, which is a vertical shaft **45** which is carried in the bearing assembly **46** and may be moved up and down by turning the wheel **47**. The boring bar is driven by an electric motor **48**. The base of the boring bar assembly is shown at **49** and this base must be accurately related to the boring bar **45** at exactly 90 degrees.

To lock the engine block in position once it is mounted on the cross bar **14**, I have provided two semi-circular plates **50** and **51** which are fixed to the cross bar **14**. Two clamp assemblies **52** and **53** are provided to hold these plates **50** and **51**. A threaded screw assembly **54** may be rotated to lock clamp **53** and a second assembly of similar nature **55** may be rotated to lock the clamp **50**. The clamps are carried on cross bars **56** and **57** which are mounted on the base member **11**. These cross bars may be positioned at various points on the base to accommodate different motor lengths by moving them on the pads **58** and **59** and bolting them into one of several openings provided on the pads, such as **60** and **61** by means of bolts such as **62**. Four of these pads are provided and the means of fastening the cross bars are identical on all four pads.

It may be seen from the foregoing that an engine stand, constructed according to my invention, will hold an engine block and permit vertical boring of the cylinder walls without alignment reference with anything other than the horizontal axis of the crank shaft as fixed by the construction of the engine block itself. The upper horizontal face of the engine block may be at any angle in relation to the vertical axis of the cylinder walls without disturbing this alignment. It is preferable that the entire assembly be manufactured of relatively heavy castings or weldments in order that considerable rigidity will exist once all these individual components are properly positioned in relation to each other. The maintenance of an accurate relationship between the engine block, the pivotal cross bar **14**, and the platform **16** can always be maintained.

Although I have described a specific embodiment of my invention, it is apparent that modifications thereof may be made by those skilled in the art. Such modifications may be made without departing from the spirit and scope of my invention as set forth in the appended claims.

I claim as my invention:

In an engine reboring stand, a base member, a pair of pedestals mounted on either end of said base member and extending upwardly therefrom, a cross bar pivotally mounted between said pedestals in a plane parallel to said base member, said cross bar being adapted to hold an engine block in a manner whereby the center line of the crank shaft bearing housings thereof will be in line with the central axis through the pivotal mounting of said cross bar, a platform positioned in a parallel plane above the base member and mounted on the aforesaid pedestals, spacer blocks adapted to be interposed between said pedestals and said platform to regulate the elevation of said platform, means for raising and lowering said platform, means for locking said platform in relation to said pedestals when said spacer blocks are positioned therebetween, the upper face of said platform being adapted to hold a boring tool, a boring tool mounted on said platform and extending downwardly therefrom at a 90 degree relation thereto, said cross bar being adapted to permit the engine block to be rotated radially to a point whereby the boring bar is in exact vertical alignment relative to the cylinder bore of said engine block and in a radially exact relation to the aforesaid crank shaft bearing center line to assure an accurate boring of the cylinder walls of said engine block.

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