Dec. 5, 1939. R. K. LE BLOND 2,182,231

ATTACHMENT FOR CUTTER GRINDERS

Filed June 14, 1939 3 Sheets-Sheet 1

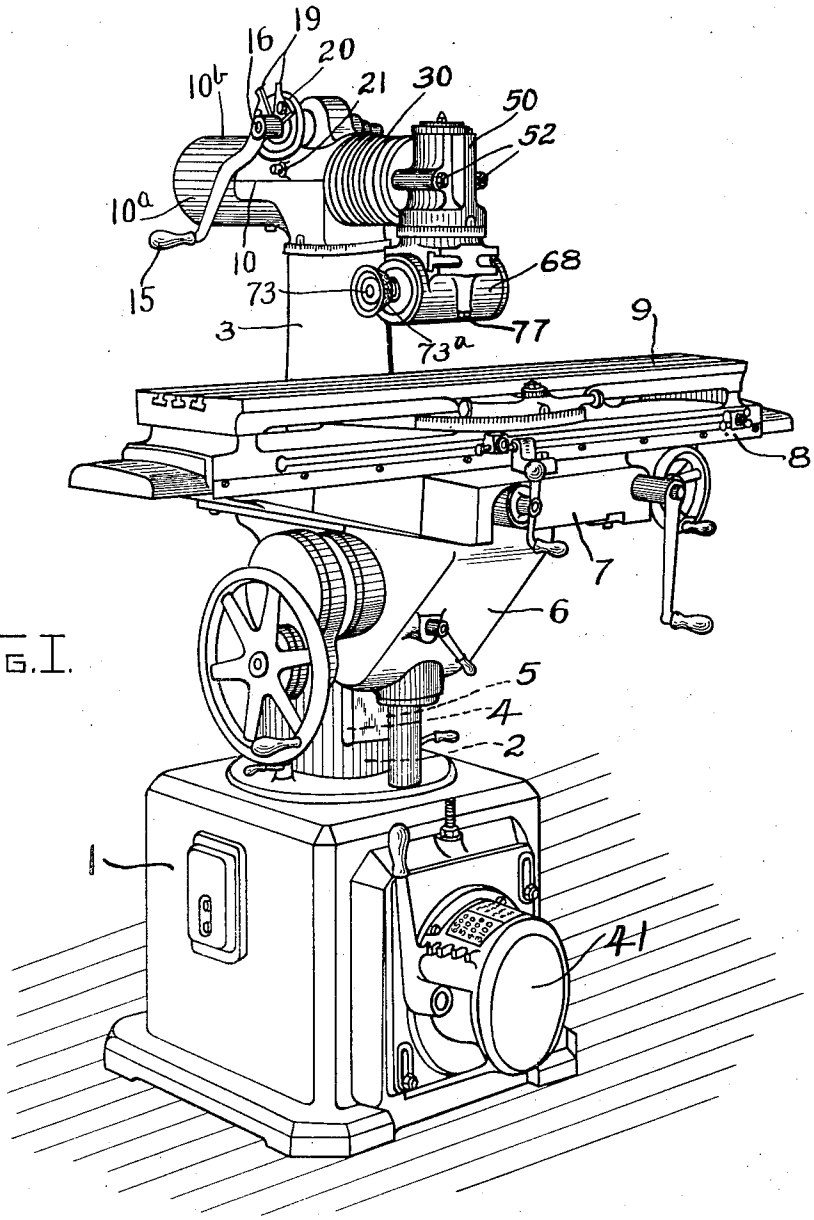


FIG. I.

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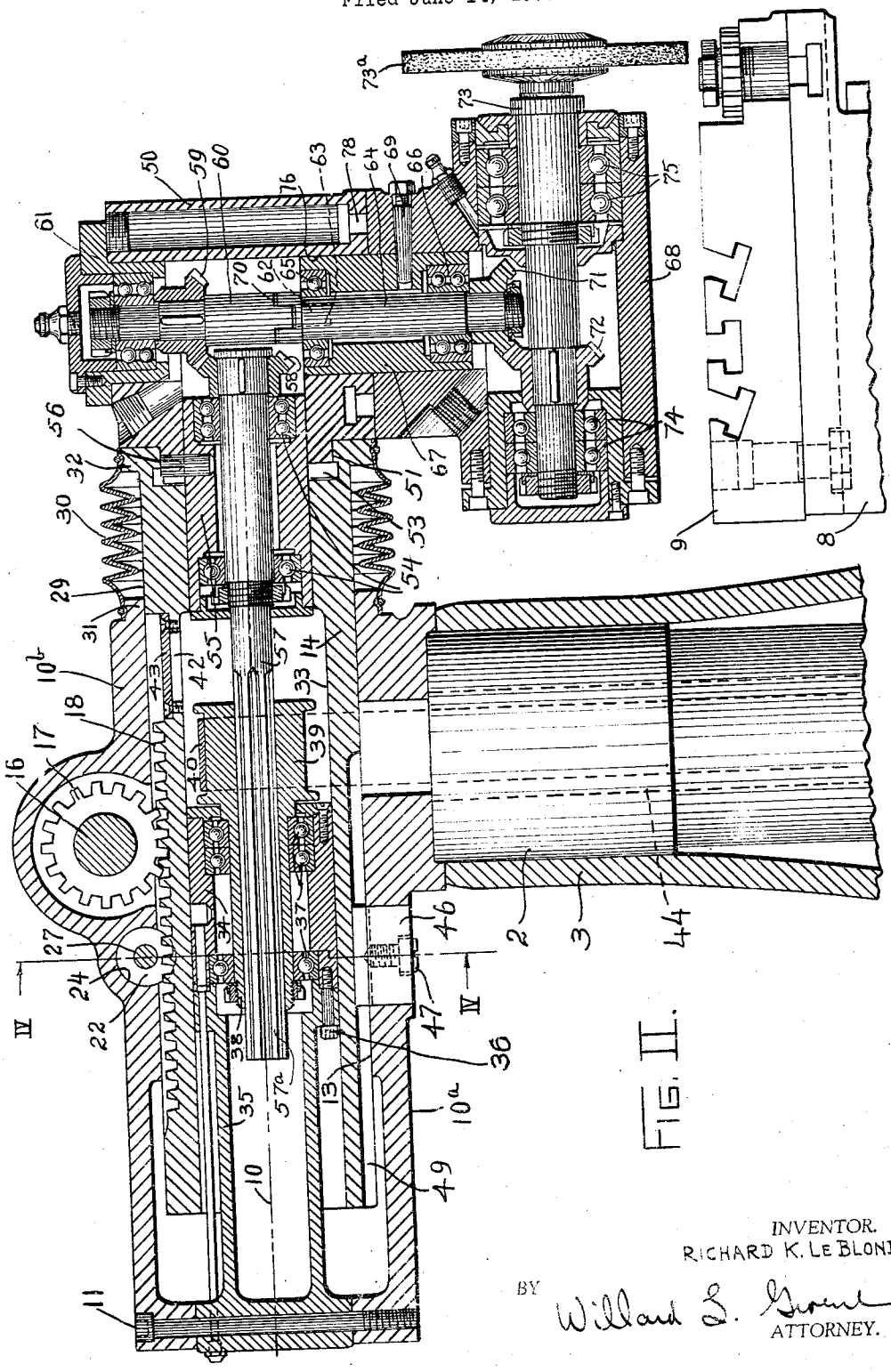


FIG. II.

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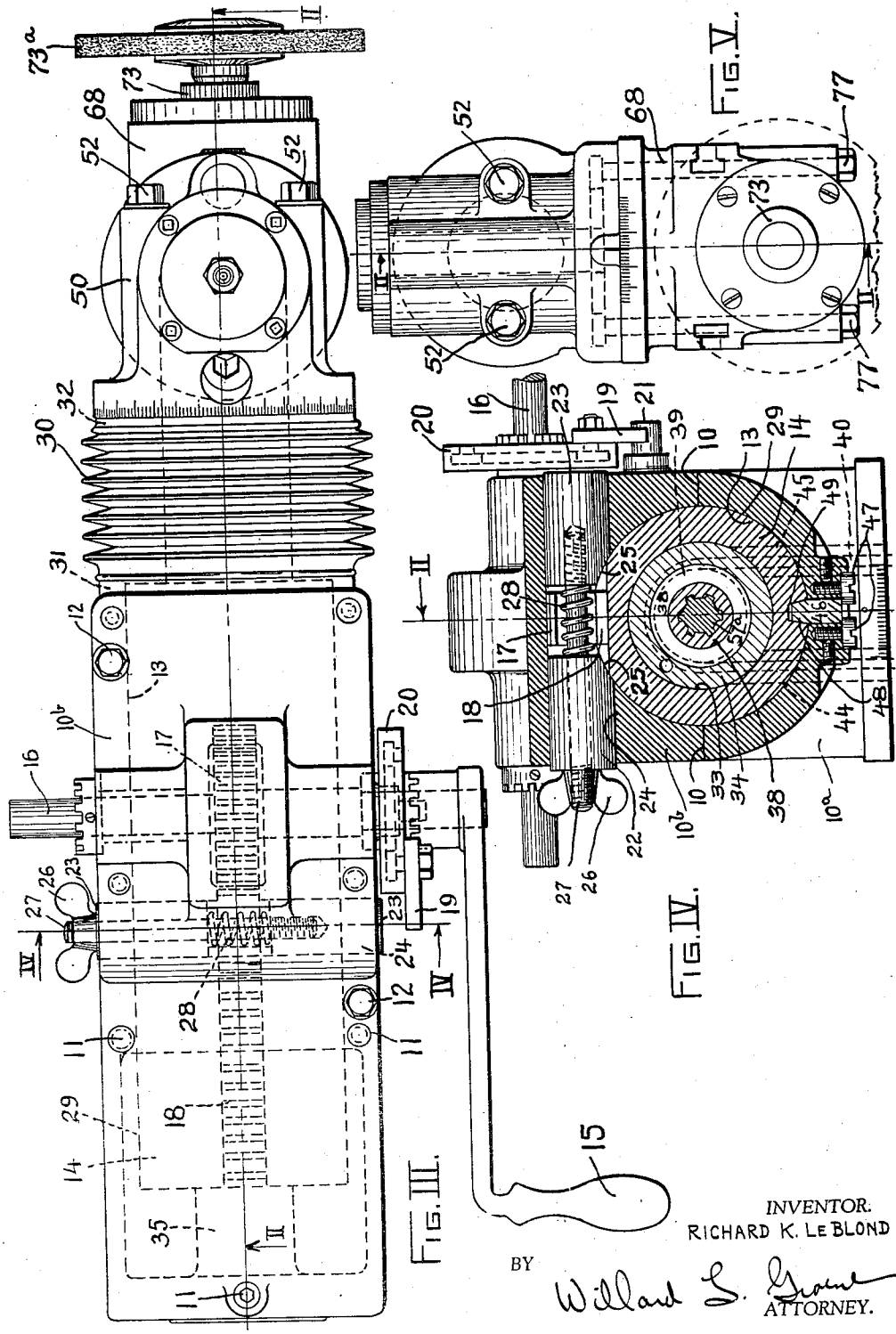


FIG. V.

FIG. IV.

FIG. III.

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Patented Dec. 5, 1939

2,182,231

UNITED STATES PATENT OFFICE

2,182,231

ATTACHMENT FOR CUTTER GRINDERS

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Application June 14, 1939, Serial No. 279,154

10 Claims. (Cl. 51—45)

This invention pertains to an attachment for cutter grinders of a character shown in Patent 932,791 dated August 31, 1909, and in copending application Serial Number 203,368, filed April 21, 1938, now Patent No. 2,164,212, dated June 27, 1939. More particularly this invention pertains to specific improvements in construction and arrangement for universally mounting the grinding wheel on the supporting stump of a cutter grinder as shown in said application 203,368.

One object of this invention is to arrange the moving parts of the attachment so that none of the adjustable bearing surfaces is exposed to the abrasive materials thrown off by the grinding wheel when operating on the work.

Another object is to provide an improved arrangement for accurately adjusting and locating the bevel gearing for quiet and smooth operation of the grinding wheel spindle.

A further object is to provide a more accessible arrangement for installing or removing the driving belt of the attachment.

Also a novel locating and friction key is provided to prevent rotation of the main reciprocating member and to provide the proper amount of frictional restraint for said member for effecting smooth and controlled motion thereof when manually actuated.

Further objects and advantages of this invention will appear from the following description of the drawings in which:

Figure I is a perspective view of a cutter grinder showing the attachment applied thereto.

Figure II is a vertical section through the attachment on the line II—II of Figures III, IV, and V.

Figure III is a plan view of the attachment.

Figure IV is a vertical transverse section through the attachment on the line IV—IV of Figures II and III.

Figure V is a front elevation of the attachment.

Noting particularly Figure I, the machine comprises a base 1 upon which is fixed the stump 2 in a manner shown in the patent and application set forth above. Surrounding and swiveling on the stump 2 is the column 3. Vertically slidable on the column 3 on dove-tail guideways 4 and 5 is the knee 6 on the top of which is horizontally slidable the saddle 7 in a direction radially of the axis of swiveling of the column 3. On the saddle is mounted the sliding table 8 which is reciprocatable in a direction perpendicular to the direction of movement of the saddle 7 on the knee 6. A swivel table 9 is mounted on top of the sliding table 8 on which may be placed the various work holding fixtures.

The novel grinding attachment comprises a supporting housing which is split on the line 10 so as to form a lower portion 10*a* on the top of the stump 2 and an upper portion 10*b* securely attached thereto by suitable screws 11 and pins 12. Formed in this housing is the bore 13 in which nicely fits the reciprocating cylindrical member 14 which is actuated by the hand crank 15 carried on the rock shaft 16 journaled in the upper portion 10*b*, this rock shaft having a pinion 17 fixed on it and engaging the rack 18 cut integral with the cylindrical member 14. Stop dogs 19 adjustably carried in the T-slot disc 20 fixed to the rock shaft 16 are arranged to engage the abutment pin 21 fixed in the upper portion 10*b* so as to give selectable degrees of limited reciprocatory movement to the cylindrical member 14.

In order to lock the reciprocating member 14 in any position in the housing a locking device, best shown in Figure IV, is provided comprising two plungers 22 and 23 slidably mounted in a bore 24 extending tangentially of the bore 13 of the housing. These plungers each have contacting surfaces 25 which engage the periphery of the cylindrical member 14 when drawn together by tightening the wing nut 26 on the stud 27 fixed in the plunger 23. A suitable compression spring 28 serves to release these plungers from the cylindrical member 14 when the wing nut 26 is loosened.

In order to completely protect the bearing surface 29 of the reciprocating cylindrical member where it projects outside of the bore 13 from all abrasive material discharged by the grinding wheel a bellows 30 is arranged to securely fit around the annular portion 31 of the housing and the integral annular flange portion 32 of the reciprocating member 14. Thus the reciprocating member may be extended any amount without exposing the vital bearing surfaces, upon which this member is mounted, to any foreign matter which might destroy the accuracy of these vital surfaces.

Slidably carried in the internal bore 33 of the cylindrical member 14 is a quill 34 which is fixed to bushing 35 by suitable screws 36, the bushing in turn being fixed to the housing by one of the screws 11. Thus as the member 14 is reciprocated the quill 34 remains stationary relative to the housing. In the quill 34 are mounted bearings 37 which rotatably carry the pulley spindle 38 having an integral pulley 39 over which passes

the driving belt 40 coming up through the stump 2 from the driving transmission 41 in the base 1 of the machine.

In order to facilitate placement of the belt 40 over the pulley 39 and to connect it up with the driving transmission 41 without the necessity of completely removing the attachment from the stump of the machine a simplified arrangement is provided while at the same time providing means for keeping the important bearing surfaces free from external abrasive and also foreign matter which may come from the rapidly moving driving belt 40. The reciprocating member 14 is moved to the left, Figure II, until the opening 42 is directly over the pulley 39. The cover 43 (which keeps dust thrown off by the belt 40 from getting to the bore 13 and also keeps lubricant from the bore 13 from getting on the belt 40) is removed. In order to do this it is merely necessary to disconnect the bellows at 31, remove the screws 11, and lift off the upper half lobe of the housing. The remainder of the attachment stays in proper position on the machine. The belt 40 is then inserted through the opening 42 and passes over (Figure IV) and down each side of the pulley 39 through the belt passageways 44 and 45 in the cylindrical member and thus into the stump 2 to the base of the machine where it may readily be connected to the driving transmission through an appropriate access door in the base 1. The cover 43 and the upper half 10b are then replaced ready for further operation of the attachment.

In order to prevent all rotation of the cylindrical member 14 in the bore 13 and to provide the proper functional restraint for the movement of this member, a key 46 is provided in the lower half 10a of the housing which is capable of careful adjustment by means of the screws 47 to effect the proper contact between the tapered upper portion 48 of the key and the mating keyway 49 formed in the cylindrical member 14.

On the flanged portion 32 of the reciprocating cylindrical member 14 is mounted the swivel housing 50 which may be rotated about the axis of said member 14 on the bearing surface 51 and may be locked in any adjusted position by the bolts 52 which operate in the annular slot 53 against axial movement. In the quill 55 fixed to the swivel housing 50 by the pin 56 is the drive shaft 57 which has a splined portion 57a slidingly engaging in the mating splined bore of the pulley spindle 38 so as to at all times transmit power from the belt 40 to the shaft 57 at any position of the member 14. On the outer end of the shaft 57 is fixed a bevel gear 58 which drives the bevel gear 59 on the shaft 60 appropriately journaled at one end in the bearing 61 carried in the swivel housing 50. The other end of the shaft 60 has a stem 62 carried in a pilot bore 63 formed in the shaft 64 which in turn is journaled, coaxially with the shaft 60 in bearings 65 and 66 in the quill 67 fixed in the wheel spindle housing 68 by the pin 69. A driving coupling 70 between the shafts 60 and 64 is arranged to permit sufficient longitudinal relative adjustment between the shafts 60 and 64 to permit independent accurate adjustment between the bevel gears 58 and 59 and the bevel gears 71 and 72 in the wheel spindle housing 68 which connect driving power from the shaft 64 to the grinding wheel spindle 73 having the grinding wheel 73a in the bearings 74 and 75 in the housing 68. The grinding wheel housing 68 is capable of swivelling on the swivel housing 50 around the axis of the shafts 60 and 64 being thus guided by the quill 67 which is free to rotate in the bore 76 in the housing 50. The housing 68 may be locked in any desired position of swivelling by tightening appropriate T-slot bolts 77 operating in the annular T-slot 78 formed in the housing 50. The provision of the coupling 70 not only facilitates the initial careful adjustment of the bevel gearing but this also makes possible the removal or/and interchangeability of the wheel housing 68 without in any way disturbing the precise setting of the bevel gearing so essential to quiet and efficient operation of the drive to the grinding wheel 73a.

Having thus fully set forth and described my invention, what I claim and desire to secure by United States Letters Patent is:

1. A grinding wheel mounting for cutter grinder comprising a housing fixed on the stump of said grinder; a driving spindle journaled in said housing, means for driving said spindle, a cylindrical member reciprocatably mounted in and enclosed by said housings, a grinding wheel spindle universally mounted on said member, a grinding wheel on said spindle, a splined shaft slidably engaging in a mating splined bore in said driving spindle and journaled in said member, and bevel gear transmission mechanism interconnecting said shaft with said grinding wheel spindle.

2. A grinding wheel mounting for cutter grinder comprising a cylindrical horizontally disposed housing fixed on the stump of said grinder, a cylindrical member reciprocatably mounted in and enclosed by said housing, a driving spindle journaled in and supported by said housing inside of said member, a grinding wheel spindle universally mounted on said member, a grinding wheel on said spindle, a splined shaft slidably engaging in a mating splined bore in said driving spindle and journaled in said member, and bevel gear transmission mechanism interconnecting said shaft with said grinding wheel spindle.

3. A grinding wheel mounting for cutter grinder comprising a cylindrical housing fixed on the stump of said grinder, a cylindrical member mounted for reciprocatory movement in said housing, a quill slidably supported in said member, means for holding said quill against movement relative to said housing, a driving spindle journaled in said quill, a pulley on said spindle, belted power transmission means for driving said spindle, a grinding wheel spindle universally mounted on said member, a grinding wheel on said spindle, a splined shaft slidably engaging in a mating splined bore in said driving spindle and journaled in said member, and bevel gear transmission mechanism interconnecting said shaft with said grinding wheel spindle.

4. A grinding wheel mounting for cutter grinder comprising a housing fixed on the stump of said grinder, a driving spindle journaled in said housing, a cylindrical member reciprocatably mounted in said housing, means for preventing rotation of said member in said housing and for providing proper frictional restraint of reciprocatory movement of said member comprising a key adjustably mounted in said housing having a tapered portion slidingly engaging a mating keyway in said member.

5. A grinding wheel mounting for cutter grinder comprising a housing fixed on the stump of said grinder, a driving spindle journaled in said housing, a cylindrical member reciprocatably mounted in said housing, means for locking said

member in any position in said housing comprising a pair of plungers slidably mounted in a tangential bore relative to said cylindrical member, abutment surfaces on said plungers adapted to engage the surface of said cylindrical member, means for drawing said plungers together to force said abutment surfaces in contact with said cylindrical member, and means to withdraw said plungers from said member when said last mentioned means is released.

6. A grinding wheel mounting for cutter grinder comprising a housing fixed on the stump of said grinder, a driving spindle journaled in said housing, a cylindrical member reciprocatably mounted in said housing, means for actuating said member comprising a rock shaft journaled in said housing, a pinion fixed on said rock shaft adapted to operate in a rack formed in said member, and crank handle means for actuating said rock shaft.

7. A grinding wheel mounting for cutter grinder comprising a housing fixed on the stump of said grinder, a driving spindle journaled in said housing, a cylindrical member reciprocatably mounted in said housing, means for actuating said member comprising a rock shaft journaled in said housing, a pinion fixed on said rock shaft adapted to operate in a rack formed in said member, crank handle means for actuating said rock shaft, means for limiting the extent of movement of said member comprising a disc fixed on said rock shaft, abutment dogs adjustably mounted on said disc, and an abutment fixed on said housing to be engaged by said dogs to limit rotation of said rock shaft.

8. A grinding wheel mounting for cutter grinder comprising a housing fixed on the stump of said grinder, a driving spindle journaled in said housing, a cylindrical member reciprocatably mounted in and projecting outwardly from said housing, universal mounting means for a grinding wheel carried on said projecting portion of said member, power transmission means for enclosing said driving spindle and said grinding wheel, and means for enclosing the projecting portion of said cylindrical member comprising a bellows connected to said housing and the outer end of the projecting portion of said cylindrical member.

9. A grinding wheel mounting for cutter grinder comprising a split cylindrical housing having a lower portion fixed on the stump of said grinder and an upper portion removably mounted in said housing, a driving spindle mounted inside of said member and supported by said housing, a driving pulley on said spindle, a belt passing over said pulley down through said stump and connected to a sourse of power in the base of said cutter grinder, an access opening in said cylindrical member to permit placing said belt on said pulley and passing it down through said stump when said upper portion of said housing is removed, and a closure for said access opening.

10. A grinding wheel mounting for cutter grinder comprising a housing mounted on the stump of said cutter grinder, a member reciprocatably mounted on said housing, a universal mounting means for a grinding wheel on said member comprising a swivel housing mounted on said member, a grinding wheel spindle housing mounted to swivel on said swivel housing, power transmission means for rotating the grinding wheel spindle in said spindle housing comprising a shaft carried in the housing mounted on the stump and driven by a source of power in the base of said grinder, a bevel gear fixed on said shaft adapted to drive a bevel gear on a shaft carried in said swivel housing, coupling means between said last mentioned shafts permitting relative axial movement between said shafts, and bevel gear transmission mechanism between said last mentioned shaft and said grinding wheel spindle.

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