Oct. 27, 1925. 1,559,245

J. E. GILBERT

GRINDING MACHINE

Filed May 16, 1924 3 Sheets-Sheet 1

Fig. 1.

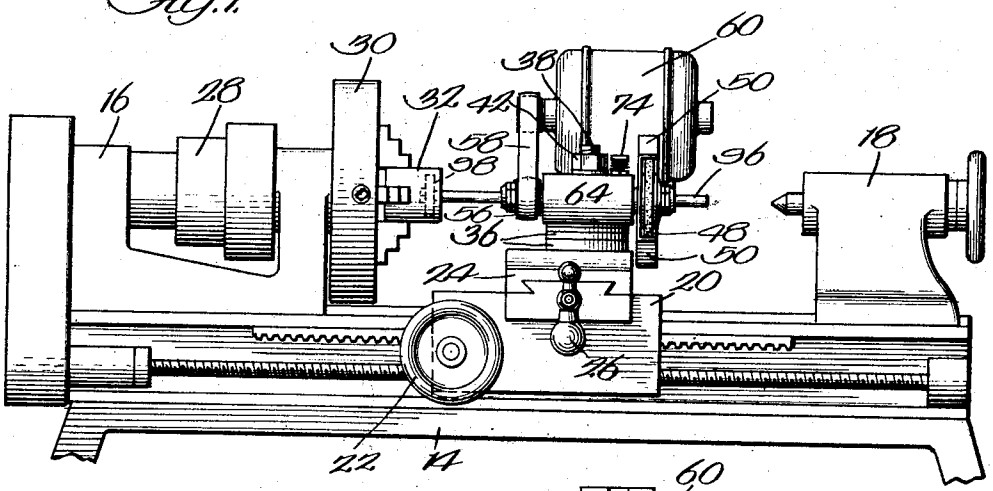


Fig. 2.

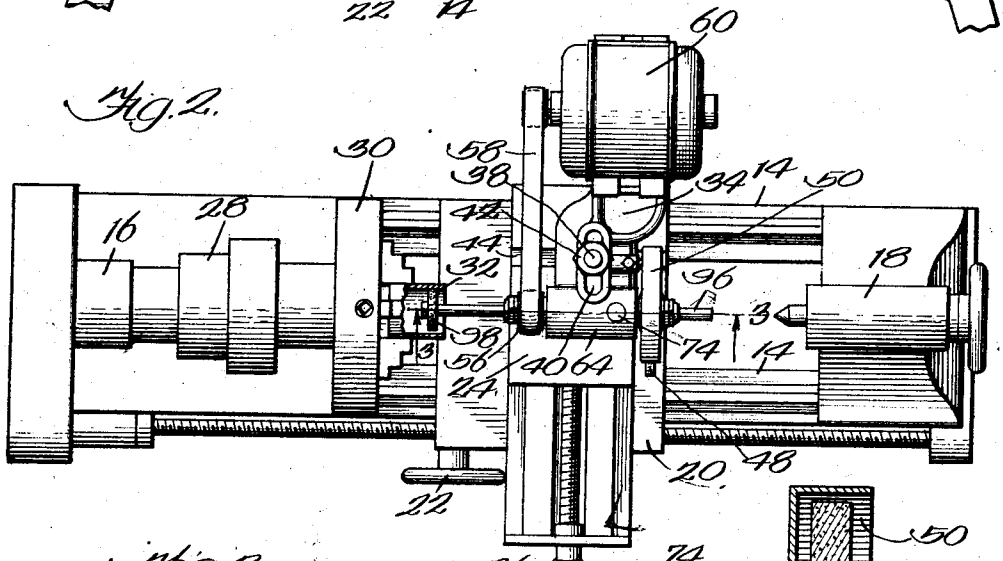


Fig. 3.

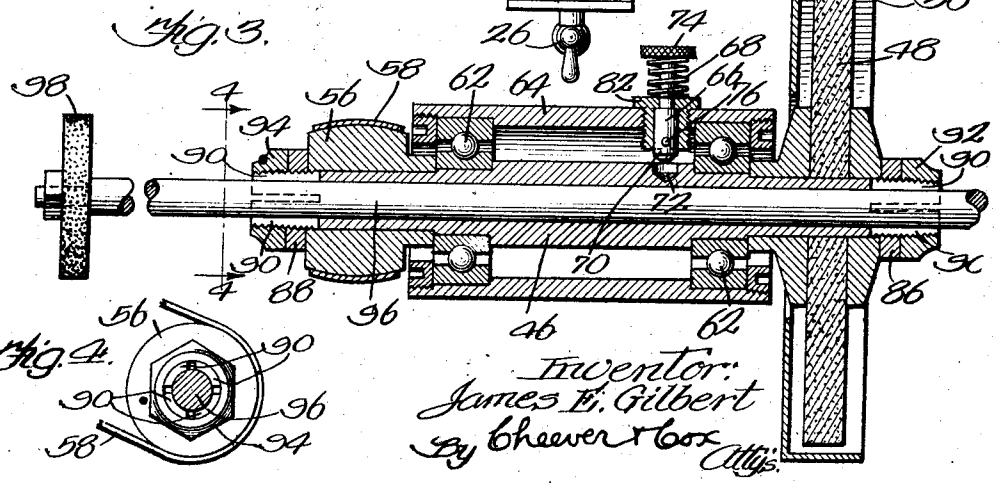


Fig. 4.

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Fig. 5.

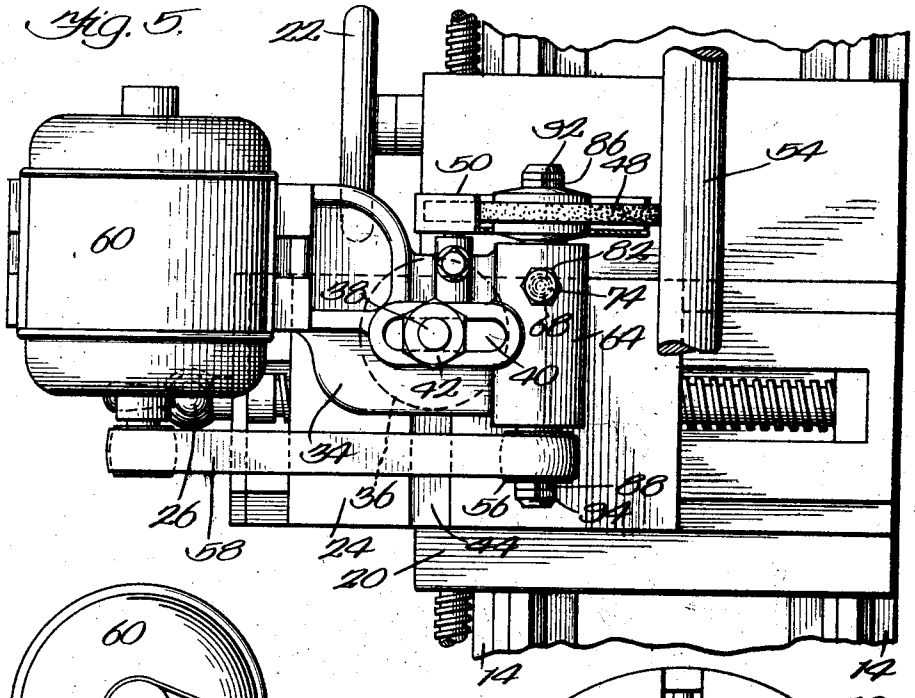
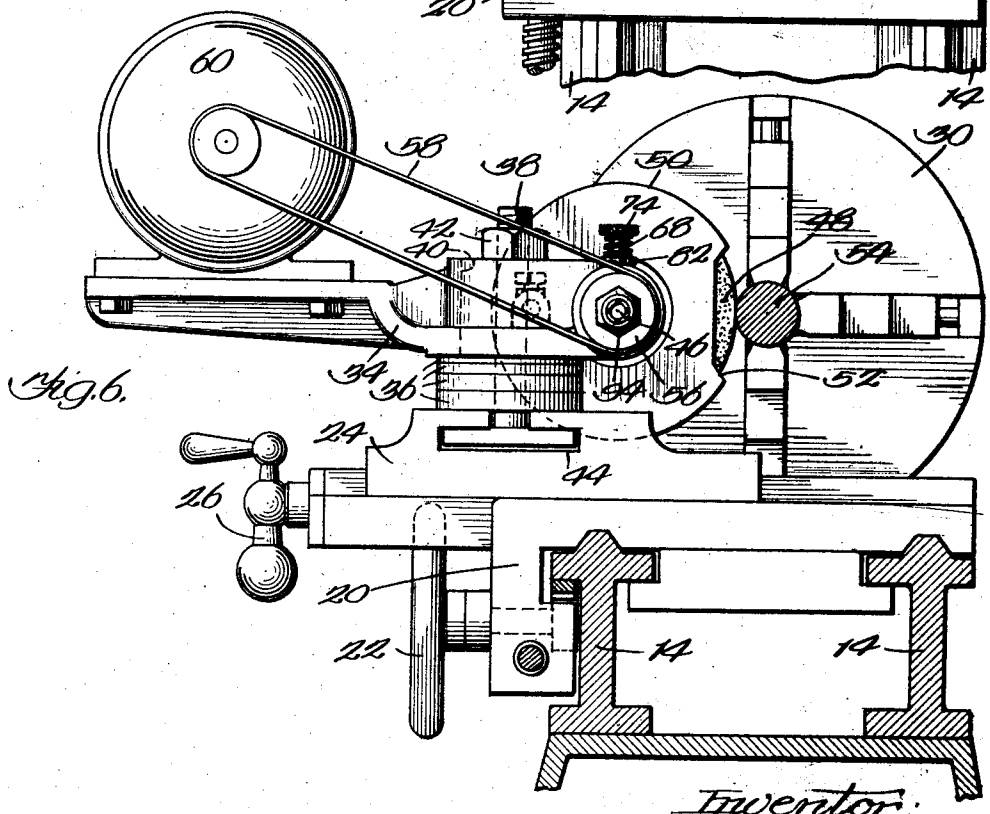


Fig. 6.



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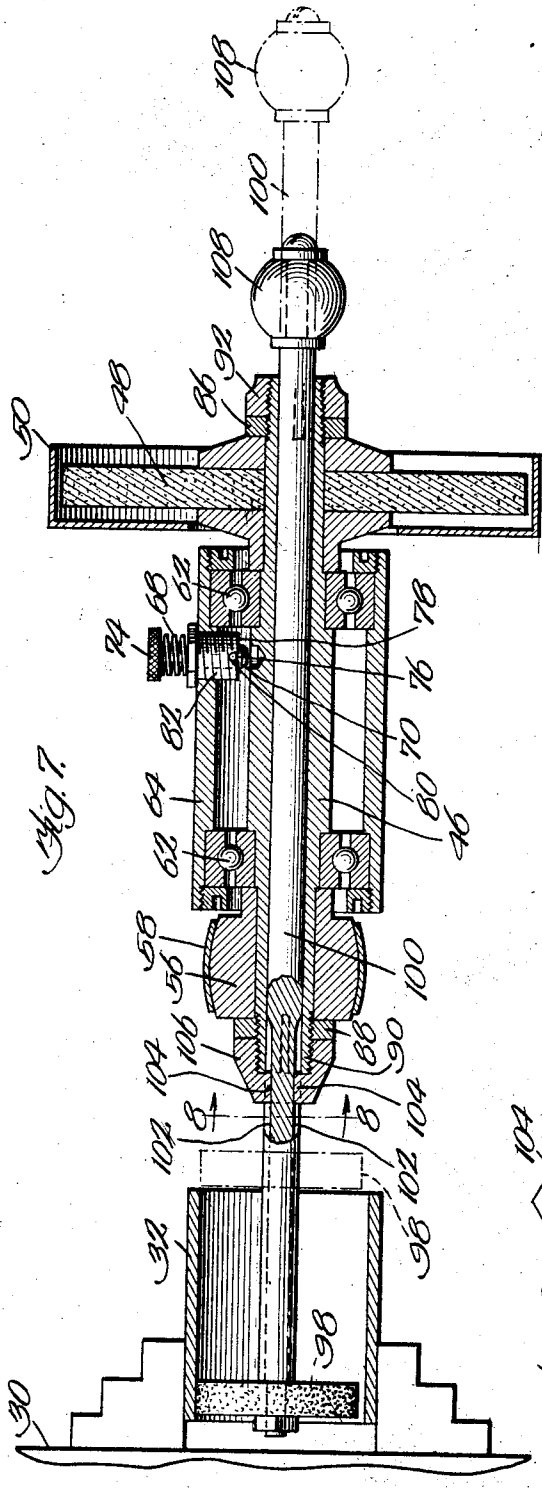


Fig. 7.

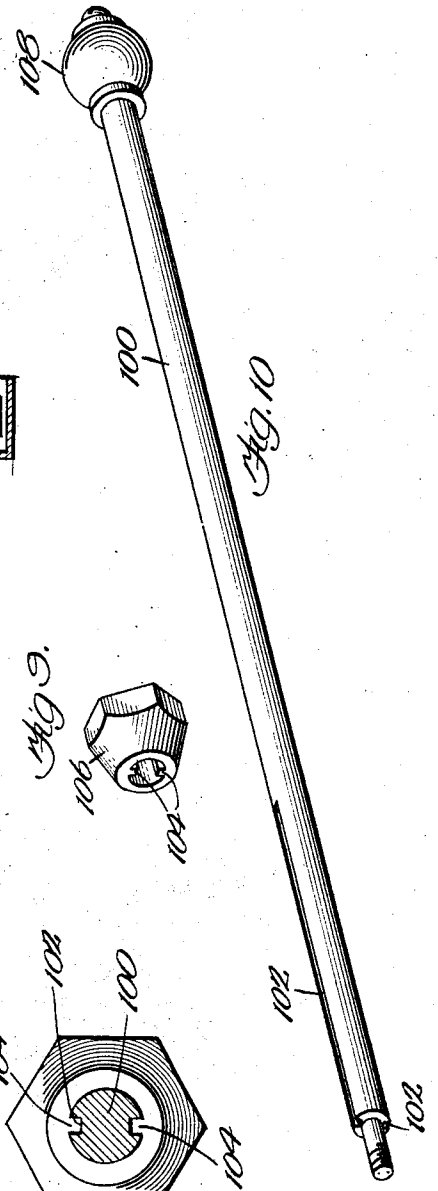


Fig. 10.

Fig. 9.

Fig. 8.

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UNITED STATES PATENT OFFICE.

JAMES E. GILBERT, OF MILWAUKEE, WISCONSIN.

GRINDING MACHINE.

Application filed May 16, 1924. Serial No. 713,652.

To all whom it may concern:

Be it known that I, JAMES E. GILBERT, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Grinding Machines, of which the following is a specification.

This invention relates to grinding machines and particularly to such machines which are readily applicable on standard lathes commonly used in machines shops for working upon various sorts of materials, more particularly metals.

The object of the invention is to build a mechanism of this class, readily attachable and detachable to the lathe, itself, which is so constructed that it may be applied at either side of the lathe and may be used for either internal or external grinding in connection with objects to be operated upon. The further object is to provide means by which the internal grinding tool of the machine may be fed onto the work either entirely independently of the mechanism which operates at or in unison with it, in the latter case being held rigid with reference thereto.

The invention consists in mechanism capable of attaining the foregoing and other objects; which can be easily and comparatively cheaply made; which is satisfactory and efficient in operation and is not readily liable to get out of order.

More particularly, the invention consists in numerous features and details of construction which will be hereafter more fully set forth in the specification and claims.

Referring to the drawings in which like numerals designate the same parts throughout the several views:

Figure 1 is a side and Figure 2 a plan view of a conventional form of metal working lathe, having the device of this invention in its preferred form applied thereto.

Figure 3 is a central, sectional, detail view, taken on the line 3—3 of Figure 2.

Figure 4 is an end, detail view on the line 4—4 of Figure 3.

Figure 5 is an enlarged, plan view of the mechanism of this invention, with special reference to the larger or exterior grinding wheel.

Figure 6 is a side elevation of the device of Fig. 5.

Figure 7 is a central, sectional view, corresponding to that of Figure 3 of a modified form of construction of mounting for the interior grinding tool by the use of which the grinding wheel may be moved laterally of the grinding machine proper, specifically the mechanism which rotates it.

Figures 8 and 9 are end and perspective views of a special form of nut used in the structure of Figure 7, the former view being taken on line 8—8 of Figure 7.

Figure 10 is a perspective view of a reciprocal shaft which slides through the nut of Figures 8 and 9.

For the purposes of illustrating the mounting of the mechanism of this invention, Figures 1 and 2 show a conventional form of lathe having a bed 14, head stock 16, tail stock 18, tool carriage 20, reciprocal by means of hand wheel 22 and tool stock 24 cross-wise of the carriage on proper operation of handle 26. Power is conventionally applied to such a lathe by means of belts, not shown, traversing a selected portion of step pulley 28 driving work chuck 30 which in the drawings is shown as carrying a hollow cylindrical member 32 to be interiorly ground. The grinding tool of this invention is mounted upon an independent, generally flat base or frame 34 adapted to rest upon any selected number of horizontally disposed, superimposed discs or shims 36 placed upon conventional tool post, specifically bolt, 38, rising from tool stock 24 and passing through elongated slot 40 in the base 34, whereby on properly manipulating nut 42 on tool post 38, base 34 and the mechanism carried by it may be adjusted the length of slot 40 in any direction in which the longitudinal axis of the slot may lie. By properly adjusting tool post 38 lengthwise of the conventional slot 44 on tool stock 24 and by adjusting the stock 24 cross-wise of tool carriage 20 in conventional manner, practically every possible desired positioning of the mechanism carried by base 34 with reference to work in the lathe may be obtained.

Suitably journaled in the right hand—hereafter referred to as the front—end of base or frame 34 is hollow shaft 46 carrying at one end a conventional, comparatively large grinding wheel 48, preferably but not necessarily enclosed within a protecting guard 50, open only at 52 to allow a portion of the circumference of wheel 48 to engage a piece of work, specifically, as shown, a

shaft 54 to be ground on its exterior circumference. On the opposite end of hollow shaft 46 is a pulley 56 to which power is communicated by means of a conventional belt 58 driven by a conventional form of electric motor 60 carried at the rear of frame 34, this motor being suitably supplied with current from an outside source by conventional means not entering into this invention and therefore not shown. As shown in considerable detail in Figure 3, the hollow shaft or sleeve 46 is carried on antifriction device, specifically ball bearings 62, contained within a suitable housing 64 rigid on the front of base 34 and this sleeve 46 is selectively securable in non-rotative position by means of a lock or latch 66 reciprocal through said housing 64 against the action of spring 68 from the position shown in Figure 3 to a depressed position in which the lower end portion or point 70 of latch 66 enters recess 72 provided for it in the circumference of sleeve 46. Latch 66 is movable as described by an operator's pressing downward, as shown in Figure 3 on handle 74, provided for the purpose. It is lockable in the depressed position in notch 72 by, in that position, rotating the handle 74 and consequently the latch until pin 76 ceases to be in register with the notch 80 (Fig. 7) provided for it in plug 82 and engages the bottom surface 78 of the plug. The entire locking mechanism is, for convenience of manufacture, mounted in this plug which is, as clearly shown in Figures 3 and 7, screw threaded into an opening provided for it in the exterior wall of housing 64. Grinding wheel 48 is rigidly secured upon hollow shaft 46 by suitably threaded conventional nut 86 and pulley 56 is correspondingly held on the hollow shaft by a similar nut 88. The ends of shaft 46 beyond these nuts 86 and 88 are slotted to form tapering screw threaded fingers 90 engaged by laterally tapered nuts 92 and 94 which, when in the position of Figure 3 compress these fingers 90 together and rigidly lock them upon a central, solid shaft 96 carrying at one end—specifically as shown the left hand end—a small grinding wheel 98, capable of use in grinding the interior of work such as cylinder 32. With the construction just described, grinding wheel 98 and shaft 96 are for practical purposes rigid with hollow shaft 46 and therefore rotate with it when the motor 60 drives the hollow shaft and as shaft 96 is rigid with hollow shaft 46, it is necessary to manipulate the entire tool carriage of the lathe in order to reciprocate wheel 98 lengthwise of the axis of cylinder 32 to be worked upon.

In the alternative construction of Figure 7, shaft 100, corresponding in many respects with shaft 96, is provided at its left-hand or working end, as viewed in Figure 7, with key ways 102, slidable upon inwardly projecting keys 104 on the interior of special nut 106 substituted for nut 94 of the preferred construction. In the construction of Figure 7, nut 92 is left so loose that it does not cause fingers 90 to grip shaft 100, or this nut may be entirely omitted without departing from the invention. Shaft 100 is provided at its right hand end, as shown in the drawings, with a conventional form of handle 108 by means of which the operator may, while hollow shaft 46 is rotating, and the lathe tool carriage is standing still, reciprocate the shaft 100 through hollow shaft 46, thereby moving grinding wheel 98, being simultaneously rotated through the agency of hollow shaft 46 and keys 104, forward and backward along the length of work case 32.

The key ways 102 in the solid shaft are wholly unnecessary when the mechanism is to be operated as described in connection with Figure 3 but they may be provided, as indicated in Figure 3 in shaft 96 without departing from the invention and, when this is done, all that is necessary to convert the device from one construction to the other is to substitute nut 106 for nut 94 and provide a handle corresponding in function to handle 108 on shaft 96—this while simultaneously loosening or removing nut 92.

It is obvious that by loosening nuts 92 and 94, the operator may reciprocate shaft 96 through hollow shaft 46 to any position desired for wheel 98 and then by tightening the nuts 92 and 94, secure the parts in a new position.

From the foregoing, it will be seen that this invention provides a grinding tool which is practically universally adjustable with reference to the tool carriage of a lathe or the like; that it carries a large wheel for external grinding; a small wheel for internal grinding; that the latter wheel may be reciprocated while rotating lengthwise of the work being treated either by moving the entire grinding mechanism carried by the tool carriage of the lathe, or by manipulating the grinding wheel itself alone with reference to the driving mechanism. By using the latch 66, the tubular shaft 46 is held stationary so that nuts 88, 94, 86 and 92 may be readily tightened or loosened for the purposes heretofore described. In actual practice one grinding wheel is wholly removed from the machine while the other is in use; this because their working uses require different speeds and the large wheel would not stand the speed of the smaller wheel without going to pieces.

The shaft 96 is reversible through hollow shaft 46 so wheel 98 may be used at either side of the machine.

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

1. In mechanism of the class described, a support, a hollow tool carrying shaft rotatably journaled in said support, a second tool carrying shaft within and longitudinally movable with respect to said hollow shaft to adjust the position of the tool carried thereby with respect to said support and with respect to the tool carried by said hollow shaft, means carried by and movable with respect to said hollow shaft for securing the two shafts together whereby they may be rotated in unison, and means to lock said hollow shaft against movement to facilitate manipulation of the means for securing the shafts together.

2. In mechanism of the class described, a support, a hollow tool carrying shaft rotatably journaled in said support, a second tool carrying shaft within and longitudinally movable with respect to said hollow shaft to adjust the position of the tool carried thereby with respect to said support and with respect to the tool carried by said hollow shaft, means carried by and rotatable with respect to said hollow shaft for securing the two shafts together whereby they may be rotated in unison, and means to lock said hollow shaft against rotation to facilitate manipulation of the means for securing the shafts together.

3. In mechanism of the class described, a support, a hollow tool carrying shaft rotatably journaled in said support, a second tool carrying shaft within and longitudinally movable with respect to said hollow shaft to adjust the position of the tool carried thereby with respect to said support and with respect to the tool carried by said hollow shaft, means carried by and movable with respect to said hollow shaft for securing the two shafts together whereby they may be rotated in unison, a pin movable into engagement with said hollow shaft to lock the same against movement to facilitate manipulation of the means for securing the shafts together, a spring constantly tending to move said pin out of engagement with said shaft, and means to latch said pin in engagement with said shaft, said pin, said spring and said latch means all being carried by a member detachably carried by said support.

4. In mechanism of the class described, a support, a hollow tool carrying shaft rotatably journaled in said support, a second tool carrying shaft within and longitudinally movable with respect to said hollow shaft to adjust the position of the tool carried thereby with respect to said support and with respect to the tool carried by said hollow shaft, means engaging and movable with respect to one of said shafts for securing the two shafts together whereby they may be rotated in unison, and means to lock said shaft against movement to facilitate manipulation of the means for securing the shafts together.

In witness whereof, I have hereunto subscribed my name.

JAMES E. GILBERT.