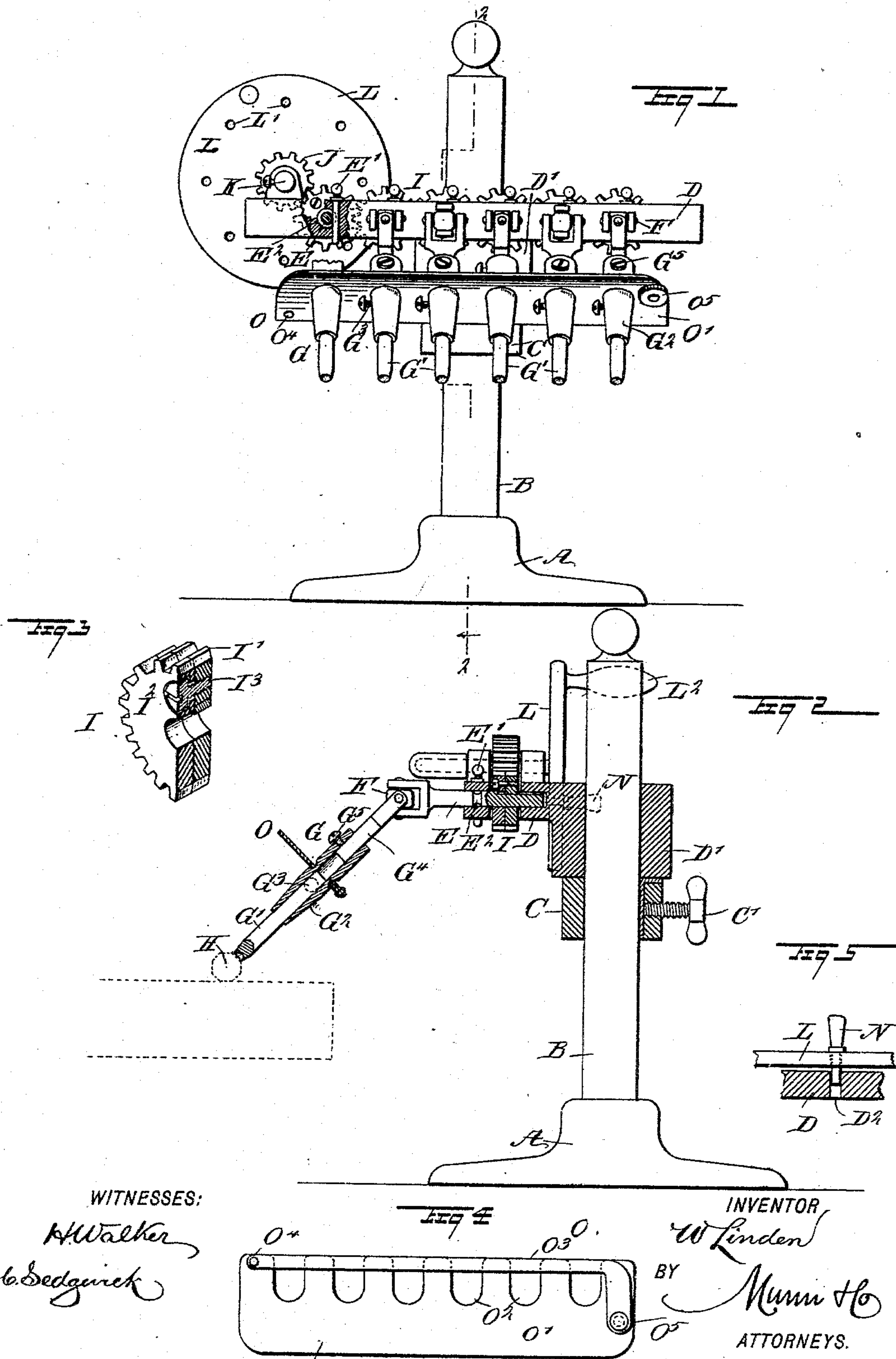


(No Model.)

W. LINDEN.
WORK HOLDER FOR GRINDING MACHINES.

No. 515,595.

Patented Feb. 27, 1894



UNITED STATES PATENT OFFICE.

WILLIAM LINDEN, OF HELENA, MONTANA.

WORK-HOLDER FOR GRINDING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 515,595, dated February 27, 1894.

Application filed October 11, 1893. Serial No. 487,846. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM LINDEN, of Helena, in the county of Lewis and Clarke and State of Montana, have invented a new and Improved Work-Holder for Grinding-Machines, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved work holder, which is simple and durable in construction, very effective in operation, more especially designed for holding precious stones on the abrading face of the lap or other grinding wheel, and arranged to grind a series of stones of various sizes at the same time.

The invention consists principally of a series of shafts adapted to be turned in unison, and drops carrying the work and connected by universal joints with the said shafts.

The invention also consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of the improvement with parts in section. Fig. 2 is a transverse section of the same on the line 2--2 of Fig. 1. Fig. 3 is a sectional perspective view of one of the gear wheels for connecting the shafts with each other. Fig. 4 is a plan view of the guide for the drops, and Fig. 5 is a sectional plan view of the device for locking the indicator wheel in place.

The improved work holder is provided with a base A on which is erected a post B carrying a collar C held adjustable on the said post and adapted to be fastened in place thereon by a set screw C', as will be readily understood by reference to Fig. 2. The post B is loosely engaged by a hub D' resting on top of the collar C, and forming part of the frame D, extending horizontally and adapted to be turned on said post. The said frame forms bearings for a series of horizontally disposed shafts E arranged parallel one to the other, and held in place in their bearings by vertically disposed pins E' engaging annular grooves E² formed in the shafts, as will be

understood by reference to Figs. 1 and 2. The outer ends of the shafts E are connected by universal joints F with drops G adapted to support the work H at their outer lower ends. Each drop G is preferably of the construction shown in the drawings and is provided with a rod G' on the lower end of which is cemented or otherwise fastened, the stone or other article to be ground. This rod G' is held adjustable in a sleeve G² and can be fastened therein by a set screw G³, and the upper end of the sleeve is held adjustable on a rod G⁴ carrying part of the universal joint F for connecting the drop with the respective shaft E. The sleeve G² is fastened in place on the rod G⁴ by a set screw G⁵. By this arrangement the holder can be lengthened or shortened according to the size of the stone or other article H, fastened to the lower end of the rod G'.

On the several shafts E are secured gear wheels I in mesh with one another, one of the outermost gear wheels I being in mesh with a driving gear wheel J secured on a transversely-extending shaft K mounted to turn in suitable bearings erected on the frame D.

On the shaft K is secured an indicator wheel L formed with a series of apertures L' arranged in a circle and placed equi-distant apart, and forming the corners for a polygonal figure corresponding to the shape of the facets to be ground on the stone or other article H. The indicator wheel L is provided with a suitable handle L² for conveniently turning the said wheel, and the latter can be locked in place by means of a pin N passed through one of the apertures L' registering with an aperture D² in the frame D, as will be readily understood by reference to Fig. 5. The several drops G are engaged by a guide O shown in detail in Fig. 4, and preferably made of a light sheet metal plate O' formed at one side with recesses O² adapted to engage annular grooves formed in the sleeves G² of the drops G. A locking arm O³ is pivoted at O⁴ at one end of the plate O' to extend over the entrance openings of the recesses O² so as to hold the several sleeves in place in the said recesses. A set screw O⁵ serves to connect the free end of the bar O³ to the plate O'.

The operation is as follows: When the sev-

eral parts are in the position, as illustrated in Fig. 2, then the drops G are inclined downwardly and forwardly, so that the work H held on each drop rests on the top abrading face of the lap or other grinding wheel, as indicated in dotted lines in the said Fig. 2. Now, as the lap revolves, a facet is ground on the stone in each drop G, and after the facets are finished, the operator removes the pin N from the registering apertures D² and L' and then turns the wheel L until the next aperture L' is brought to register with the aperture D², after which the pin N is again inserted in the two registering apertures to lock the indicator wheel L in place. In turning the latter a rotary motion is given to the shaft K, and the gear wheel J meshing in one gear wheel I all the said wheels are rotated in unison and a like motion is given to the shafts E, which transmit their motion by the universal joints F to the drops G, so that all the drops are given a like turn and a new surface of the work is presented to the abrading face of the lap. As illustrated in Fig. 1, eight apertures L' are arranged in the indicator wheel L, so that eight facets will be ground on the work held on each drop, it being understood that the indicator wheel is shifted whenever a facet has been ground, until a complete revolution has been made by each drop. While grinding the facets the operator takes hold of the guide O and slides the same sidewise a short distance so as to move the work continuously onto different places on the abrading face to insure a uniform grinding of the face of the work.

In order to avoid lost motion in the gear wheels I in mesh with each other, I prefer to make each of the said gear wheels in two parts I' and I² connected with each other by a set screw I³ screwing in the section I' and having its head and part of the shank passing loosely through a slot in the other section I². By this arrangement the two sections I' and I² can be set in such a manner as to bring the sectional teeth out of alignment, to take up lost motion caused by wear or other reasons. By raising and lowering the frame D and adjusting the collar C, various angles can be given to the drops G relative to the lap and according to the facets to be ground on the stones. In case one facet is finished before the other facets, then the operator opens the bar O³ and swings the drop holding the work with the finished facet, upward to carry the work out of engagement with the lap. The remaining drops are still in engagement with the lap and remain so until their facets are finished. When this has been done, the drop previously swung up is moved back to its normal position, and then the indicator wheel L is turned to bring new surfaces to be ground in contact with the abrading face of the lap. It will be seen that by this arrangement any desired number of stones may be cut simultaneously, irrespective of the size of the stones in the different drops.

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

1. A device of the class described, comprising a series of shafts adapted to be turned in unison, and drops carrying the work and connected by universal joints with the said shafts, substantially as shown and described.

2. A device of the class described, comprising a series of inclined and lengthwise adjustable drops adapted to be rotated in unison, substantially as shown and described.

3. A device of the class described, comprising a vertically adjustable frame adapted to be turned, a series of shafts mounted to turn in unison in the said frame, and drops carrying the work and connected by universal joints with the said shafts, substantially as shown and described.

4. A device of the class described, comprising a vertically adjustable frame adapted to be turned, a series of shafts mounted to turn in unison in the said frame, and drops carrying the work and connected by universal joints with the said shafts, each of the said drops being made adjustable, for lengthening and shortening the same, substantially as shown and described.

5. A device of the class described, comprising a vertically adjustable frame adapted to be turned, a series of shafts mounted to turn in unison in the said frame, drops carrying the work and connected by universal joints with the said shafts, gear wheels secured on the said shafts and in mesh with each other, and an indicator wheel connected with the said gear wheel to turn the same, substantially as shown and described.

6. A device of the class described, comprising a vertically adjustable frame adapted to be turned, a series of shafts mounted to turn in unison in the said frame, drops carrying the work and connected by universal joints with the said shafts, gear wheels secured on the said shafts and in mesh with each other, an indicator wheel connected with the said gear wheel to turn the same, and intermediate mechanism for connecting the said indicator wheel with the said gear wheels to rotate the latter in unison, substantially as shown and described.

7. A device of the class described, comprising a vertically adjustable frame adapted to be turned, a series of shafts mounted to turn in unison in the said frame, drops carrying the work and connected by universal joints with the said shafts, gear wheels secured on the said shafts and in mesh with each other, an indicator wheel connected with the said gear wheel to turn the same, intermediate mechanism for connecting the said indicator wheel with the said gear wheels to rotate the latter in unison, and a locking mechanism for the said indicator wheel, as set forth.

8. In a device of the class described, the combination with a series of shafts geared together, and drops carrying the work and

connected with the said shafts, of an indicator wheel geared with one of the said shafts, substantially as described.

5 9. A device of the class described, comprising a series of drops carrying the work and adapted to move sidewise, and a guide secured to the said drops for moving the same

simultaneously sidewise, substantially as shown and described.

WILLIAM LINDEN.

Witnesses:

ALBERT ZIEGER,
CHARLES J. GEIER.