

(No Model.)

4 Sheets—Sheet 1.

A. E. BROWN.
DRIVING DEVICE.

No. 453,617.

Patented June 9, 1891.

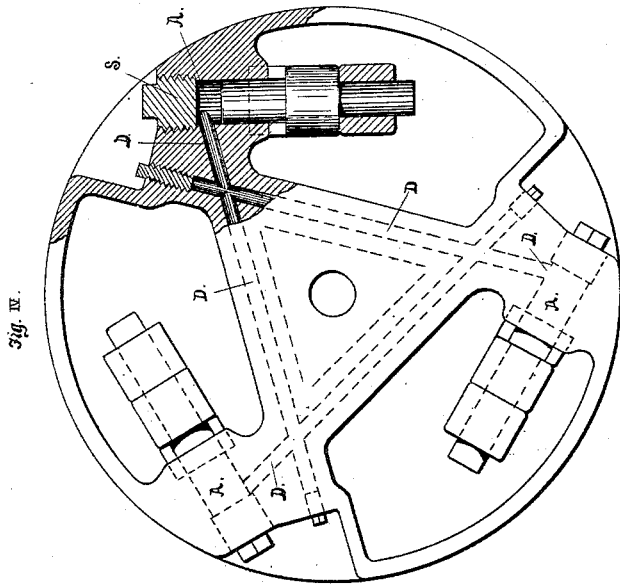


Fig. IV.

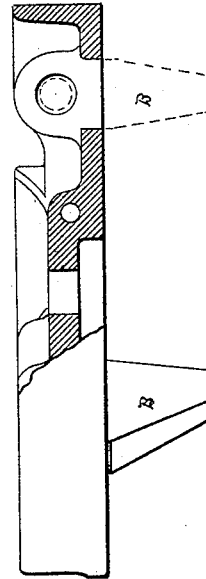


Fig. V.

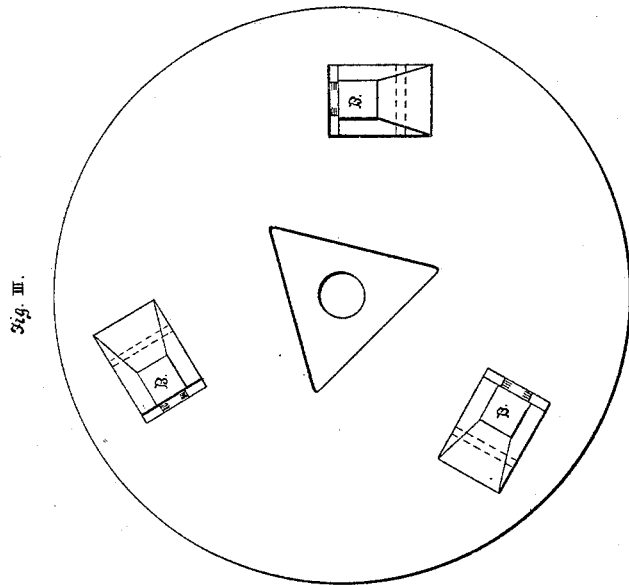


Fig. III.

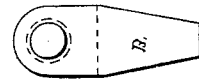


Fig. I.

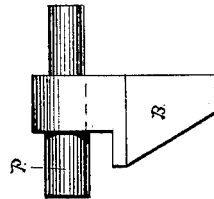


Fig. II.

WITNESSES.

James R. Murray

INVENTOR.

Alexander E. Brown
by *George L. Wing*
his ATTORNEY.

(No Model.)

4 Sheets—Sheet 2.

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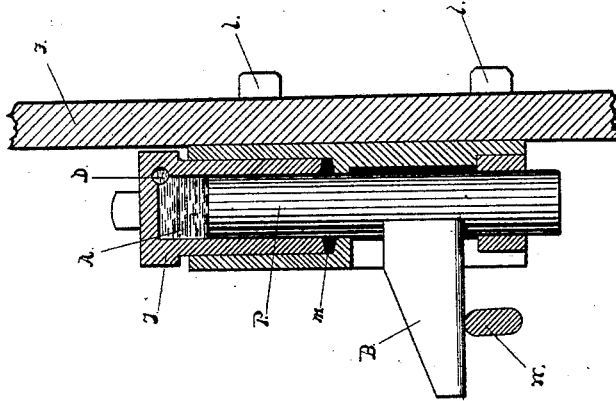


Fig. VI.

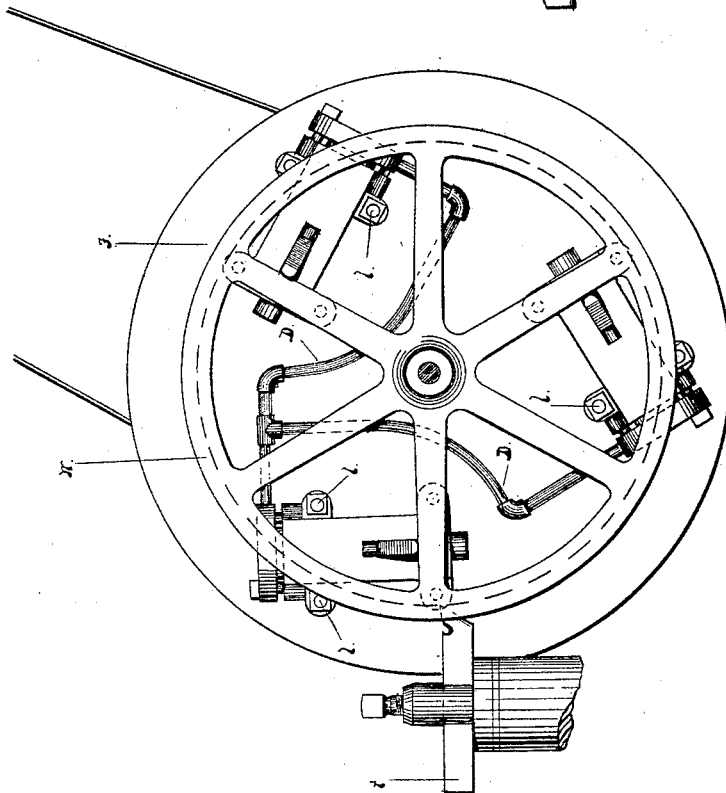


Fig. VII.

WITNESSES.

J. M. Byer
R. H. Hull

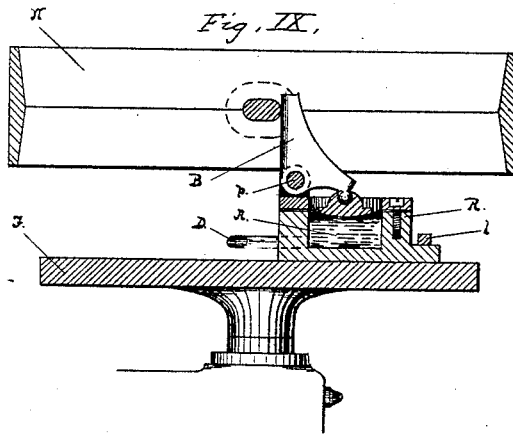
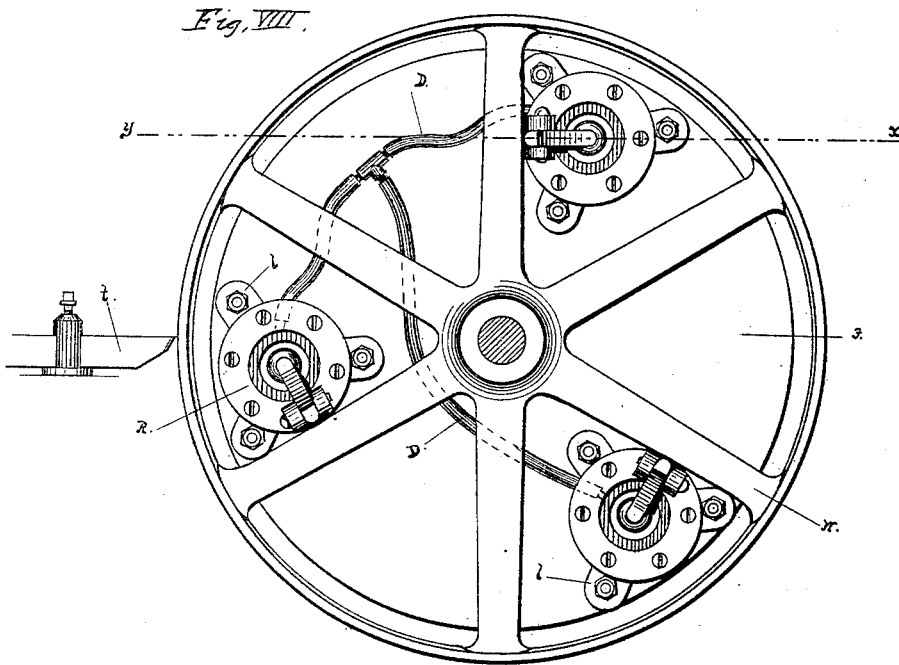
INVENTOR.

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A. E. BROWN.
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WITNESSES.

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Fig. X.

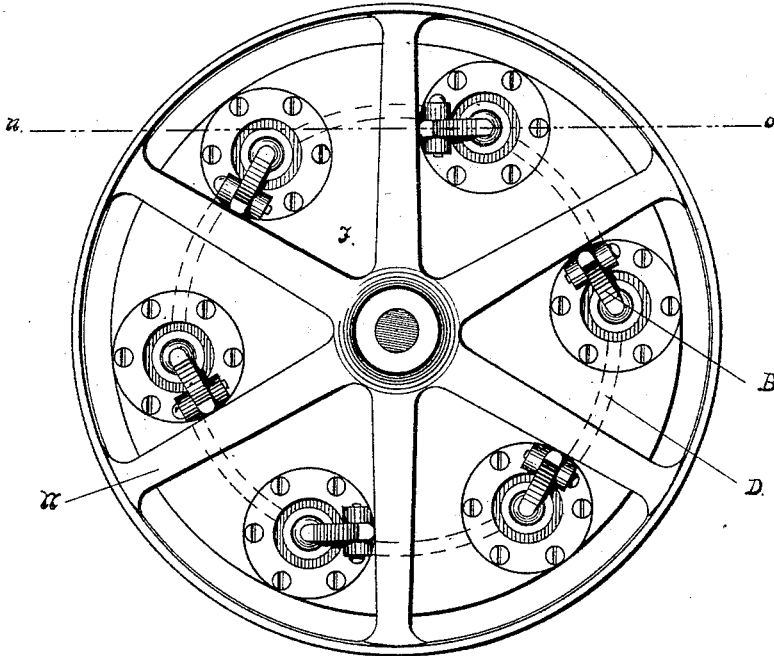
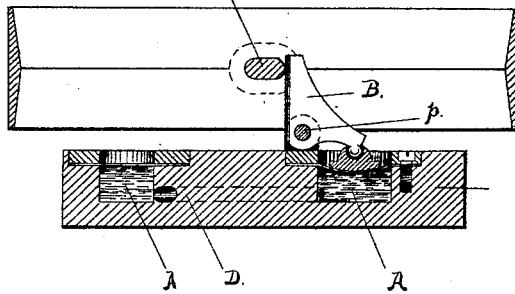


Fig. XI.



WITNESSES.

J. M. ...
R. ...

INVENTOR.

Alexander E. Brown
by George Wing
his ATTORNEY.

UNITED STATES PATENT OFFICE.

ALEXANDER E. BROWN, OF CLEVELAND, OHIO.

DRIVING DEVICE.

SPECIFICATION forming part of Letters Patent No. 453,617, dated June 9, 1891.

Application filed January 31, 1891. Serial No. 379,840. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER E. BROWN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Machine, of which the following is a specification.

My invention relates to that class of shop tools and appliances by which wheels, sheaves, pulleys, and similar work when placed for treatment upon the plate or table of a lathe or planer are afforded the requisite support against the strain of the cutting-tool; and the object of my invention may be said to be to provide a series of drivers adapted for use in situations and for the purposes above indicated, which drivers, first, will simultaneously arrange themselves in the same degree of contact with the piece to be operated upon relatively to each other as soon as such piece is brought into bearing with the several drivers, and, second, will maintain such relative degree of contact, however often or considerably the resistance at one or more of the driving-points may vary.

In an application filed by me under date of March 23, 1889, and bearing Serial No. 304,559, I have shown and described its drawings and specifications, for the most part identical with those hereof. On said application, however, I founded and declared a generic claim (covering the invention involved broadly) and also two specific claims, which latter include the special forms or varieties of devices shown and described, wherein plungers and pistons are operating and distinguishing features. Accordingly all matter which is herein shown and described, but not claimed, and which also is claimed in my said application dated March 23, 1889, and serially numbered 304,559, is hereby disclaimed in favor of said former application and as forming no part of the invention sought to be secured by the present application.

The only driver in use in the shops or, so far as I am aware, which has yet been devised, except by my invention, is essentially an arm or bar which either pierces the base-plate or table or travels in the ordinary T-slots therein, and is designed to be made to meet the work under treatment at various points after successive independent manipu-

lations, and to be then and there firmly secured in position. The use of these drivers, however, is consequently attended with certain well-recognized disadvantages, of which, perhaps, the principal disadvantage is the inability to secure such a resultant bearing among all the drivers employed as will equally and certainly divide up the resistance incurred at the particular point where a cut is being made.

In the prevailing method of securing work upon a face-plate the first driver is fastened upon or through said plate, and the work is then turned about on the mandrels until pressed into close contact with the same. The operator then locates the second and additional drivers at other parts of the plate and into such bearing relations as appear to him at the moment to be as nearly as practicable identical with the contact or bearing degree of the first driver. The preliminary stages of the operation of placing these drivers are obviously largely dependent, so far as satisfactory results are concerned, upon the skill, care, and particular experience of the individual operator; and yet, however capable is the latter, there are certain to occur, during his necessary movement in testing and securing the second and successive drivers, sufficient jars, variations, or relaxations from the original bearings to develop in the ultimate bearings of each separate driver, and in spite of every precaution a wide difference in the degree of contact sought and that actually attained. The plain consequence of such inequality in driving contact is that the resistance to the cutting-tool, instead of being taken up at the point of application and evenly distributed throughout all points of support, is thrown upon but two or more of the drivers, and the strain unduly concentrated upon a few, instead of the many, points of the work under treatment.

A well-known result of the mode of fastening work just described is a frequent and undesirable "chatter" of the same under the tool, and also, in the reduction of frail pieces, either a wasteful percentage of breakage or such a necessary diminution of speed or cut as equally enhances the cost of turning and reducing the articles in question. It is the design of the constructions herein shown and

described to avoid the defects and disadvantages of the character above referred to, and at the same time to provide appliances in their especial departments which present corresponding merits of exceptional importance and value. I attain these objects by the devices illustrated in the accompanying drawings, wherein appear several forms embodying my invention or constituting modifications thereof.

Figure I is a face or front view of a driving-arm adapted to be carried and actuated by a plunger device hereinafter specified. Fig. II is a side view of the same driving-arm mounted on its plunger. Fig. III is a side view of the front face of a specially-constructed chuck or plate, through which a set or series of three of my driving-arms project. Fig. IV is the reverse view of the same plate, showing through broken or dotted lines the essential connections of such a series, and a detail view of the novel operating parts thereof. Fig. V is a semi-transverse vertical section of a plate or body especially constructed as a convenient mode of presenting a set of drivers in a compact though somewhat restricted form. Fig. VI is a transverse vertical section in detail of a modification of my invention adapted to be bolted or otherwise affixed to an ordinary chuck or face-plate in sets of two or more. An especially-constructed plate, as appears in the preceding figures, is not an essential requisite to the use of the device here shown. Fig. VII represents the device last described affixed, in a full operative series, to a face-plate having the component members thereof connected by independent tubing D D. Fig. VIII illustrates a further adaptation of my general invention in the form of a set or series of drivers actuated, not by the plungers, as is the case in Figs. I to VII, but by and upon a diaphragm in a manner hereinafter more fully explained, and displaying the peculiarities which are the subject of the specific inventions covered by the claims of this application. In the said series separate and independent tubular connections D D are employed between the several driver-carriages and their chambers A A, and similarly with the series shown in Fig. VII, the device is adapted to be fixed at will to an ordinary face-plate or working-table. Fig. IX is a detail transverse vertical section of one of the drivers shown in Fig. VIII through the line xy thereof. Fig. X is another variety of the special forms of my driving device to which those shown in Figs. VIII and IX likewise pertain. The drivers, however, which in the devices of the latter figures appear as appendant to separate bodies or carriages, are in Fig. X permanently located at definite points or portions of a single frame or form, and the ducts for intercommunication with the several chambers A A, beneath said drivers, are fixed and integral with said form. The latter is not necessarily restricted to other peculiarities of contour or

structure. Fig. XI is a transverse vertical section through said form (shown in Fig. X) through the line no .

Pointing out now more particularly the various features shown and designated in the drawings, the operation and scope of the invention herein claimed will at the same time readily appear. It will be observed that in every instance B B designates the driving-arm, which, in actual operation, is to bear directly against either the work in hand or the dog affixed thereto. In Figs. I to VII the arms B B are mounted upon the plungers P P, which latter are adapted to reciprocate chambers A A, and also to close the said chambers against the escape of the oil or other fluid within. A form of construction is readily conceived wherein the outer extremities of said plunger, either themselves constitute the drivers by bearing directly and immediately upon the work in the line of their centers, or where said plungers instead of being mounted by are so bent as to perform the functions of the driving-arms B B, thereby dispensing with the latter parts either wholly or as separate details. In Figs. I to V said plungers carry the driving-arms B B, and to gain in firmness of action are preferably extended to enter an exterior guide.

The distinguishing feature of the devices shown in Figs. VIII to XI, as compared with those shown in the remaining figures of the drawings herewith, is that in the former class the plungers P P, as distinct details, are dispensed with, and the office thereof is performed by a flexible or elastic diaphragm of any material suitable. Said diaphragm closes the chambers A A and is actuated by and upon the driving-arms B B. When this variety of construction is adopted, the said driving-arms B B may take any form deemed most convenient—as that, for instance, shown in the said drawings, Figs. VIII to XI—and may be pivoted or otherwise fitted to turn about a fixed point, as at p , when exposed to resistance at either extremity. In every form of construction the several chambers A A are connected by intercommunicating channels or ducts D D, terminating, respectively, at points within the said chambers A A. Where, however, as in one possible form of construction, a single common chamber is substituted for a series of two or more, the necessity of said channels or ducts is correspondingly diminished. To regulate the space for the contained fluid and to admit the same, a reciprocating plug may be located at any convenient and suitable point, as at S in Fig. IV. In the devices illustrated in the drawings herein from Figs. I to V, inclusive, the said intercommunicating channels D D, and also the chambers A A, into which the plungers P P are there shown as reciprocating, are integral with a face-plate or chuck, which admits the said driving-arms B B to pass through orifices in said plate and appear at points on the reverse face thereof, as in Fig. III, and there

serve as bearings for the spokes of a wheel, the dogs on a shaft, or other work in the process of turning or planing. Said orifices are of course sufficiently commodious to permit the arms B B to play therein, according as their several plungers advance or retreat. The devices appearing in Figs. VI and VII, on the other hand, are especially characterized by the fact that the chambers into which the said plungers reciprocate are within and a part of as many cylindrically-hollow plunger-carriages, each of which is wholly separate and distinct from the other plunger-carriages of the series, save in the feature of the inter-connecting ducts. The latter, as in the devices shown, may themselves be entirely independent of a special frame or integral construction.

The various constructions just described, as well as those appearing in Figs. VIII and IX, are provided with bolts or other suitable means for fastening them at points on the surface of the plate F desired. A preferable detail of construction is shown in Fig. VI, where to complete the chamber A, a concentric tubular cap T enters the original chamber-cavity and into bearing upon the packing *m*.

Figs. VIII and IX are further specific forms of my invention and of the particular variety last above referred to. The peculiarity of the latter forms, as regards especially the forms shown in the prior figures, as has been explained above, is the substitution of a metallic or other vibratory diaphragm for the said plungers P P. Said diaphragm is firmly seated across and so as to securely close the outer orifice of the said chamber A, which orifice, in the drawings, is through the upper horizontal surface of the plunger-carriage, instead of in a vertical face thereof, as in the devices of Figs. VI and VII. A series of three of said plunger-carriages is represented in the drawings as supporting a wheel W, against which the cutting-tool *t* is applied in the usual posture.

It is perhaps needless to add that in none of the devices hereinbefore described and shown is the precise number of drivers constituting a series material, but that such detail is determined entirely by the preference of individual operators.

To operate said devices, the intercommunicating channels D D and the chambers A A are filled with oil, water, glycerine, or any other suitable liquid or mobile fluid. When the separate forms are employed independent of a connecting or common frame or chuck, as in Figs. III, IV, V, and X, the plunger-carriages are so located that the face of the driving-arms upon their plungers are each in operative proximity to the work to be handled at whatsoever points resistance is desired. In such positions said carriages are firmly bolted

or otherwise secured to the face-plate or working-table. Of course the external form and surface of said carriages are such as to admit of their resting upon and being firmly fixed to the front face of the said plate, as described, or so that, if preferred, the said appliances may be located upon the reverse of the base or face plate with the driving-arms B B projecting through suitable openings therein in the manner indicated in the especially-constructed false face-plate in Fig. III. The work to be treated having been forced closely upon the drivers by the resistance of the cutting-tool upon the work itself, it is apparent that the plungers of said drivers, each now pressing within its chamber A against a common and unyielding fluid, have simultaneously and instantly adjusted themselves to such position that the said driving-arms have the same degree of bearing contact one as the other. It is further apparent that after this uniform initial degree of bearing contact has so been secured there will be no subsequent yielding at any of the bearings, but whatever strain is cast upon any one in the course of the treatment to which the supported work is subjected will, by means of the common unelastic fluid through the ducts D D and the chambers A A, be instantaneously communicated to and shared by all the others.

What I claim as new, and desire on this application to secure by Letters Patent, is—

1. In an equalizing driving apparatus for the purpose specified, the combination of a series of two or more drivers or driving-arms, each in operative contact with a flexible diaphragm, a suitable plate or frame adapted to be secured to a lathe, boring-mill, or other machine-tool supporting the same, and a fluid body confined in a common chamber or a series of intercommunicating chambers by said flexible diaphragms, against the common pressure of which the said drivers or driving-arms and diaphragms act and are resisted.

2. In an equalizing driving apparatus for the purpose specified, the combination of a series of two or more drivers or driving-arms, each in operative contact with a flexible diaphragm, a series of two or more suitable bodies or frames adapted to be secured to the face-plate of a lathe, boring-mill, or other machine-tool, each supporting one of said drivers or driving-arms and its flexible diaphragm, and a fluid body confined in intercommunicating chambers by said flexible diaphragms, against the common pressure of which the said drivers or driving-arms and diaphragms act and are resisted.

ALEX. E. BROWN.

Witnesses:

M. MILLARD,
GEO. C. WING.