

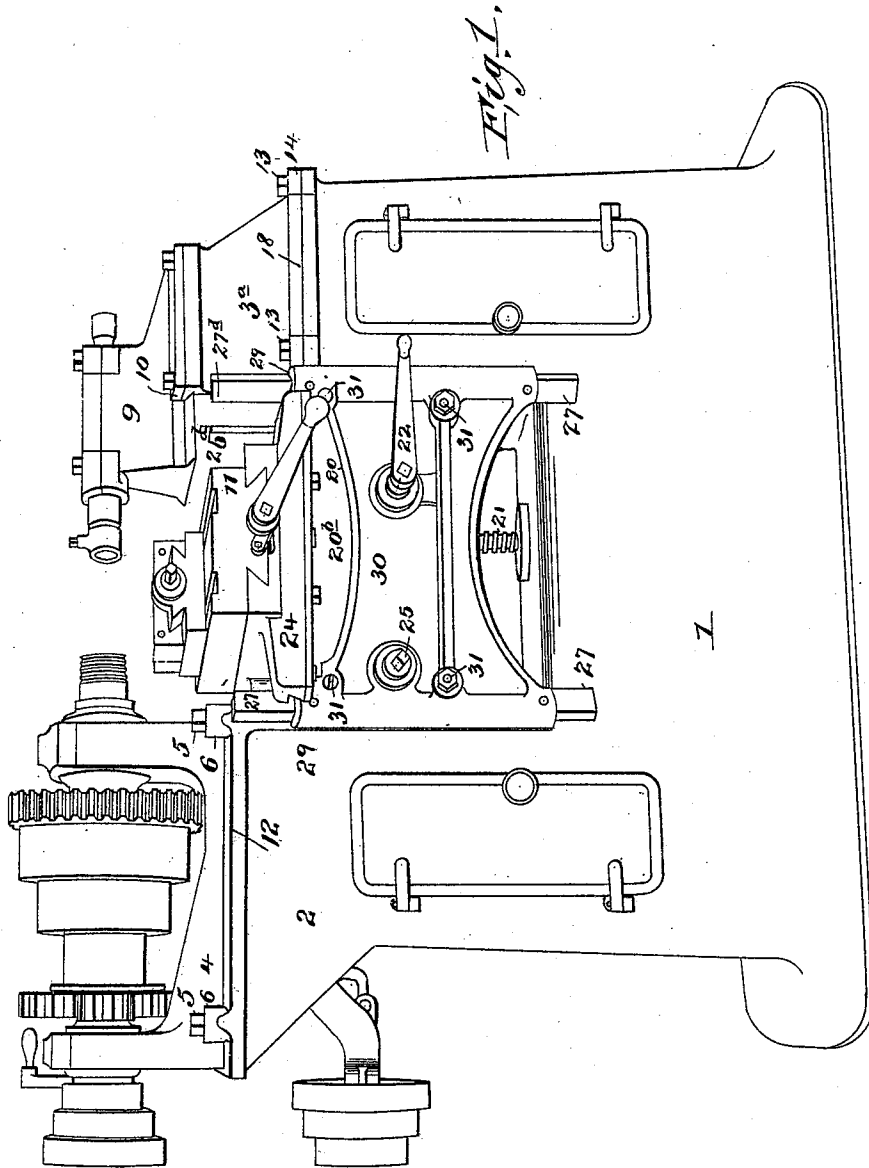
(No Model.)

3 Sheets—Sheet 1.

J. L. BOGERT.
MILLING MACHINE.

No. 536,416.

Patented Mar. 26, 1895.



WITNESSES:

L. W. Benjamin
John W. Pritchard

INVENTOR

John L. Bogert

BY

T. F. Bourne
his ATTORNEY

(No Model.)

3 Sheets—Sheet 2.

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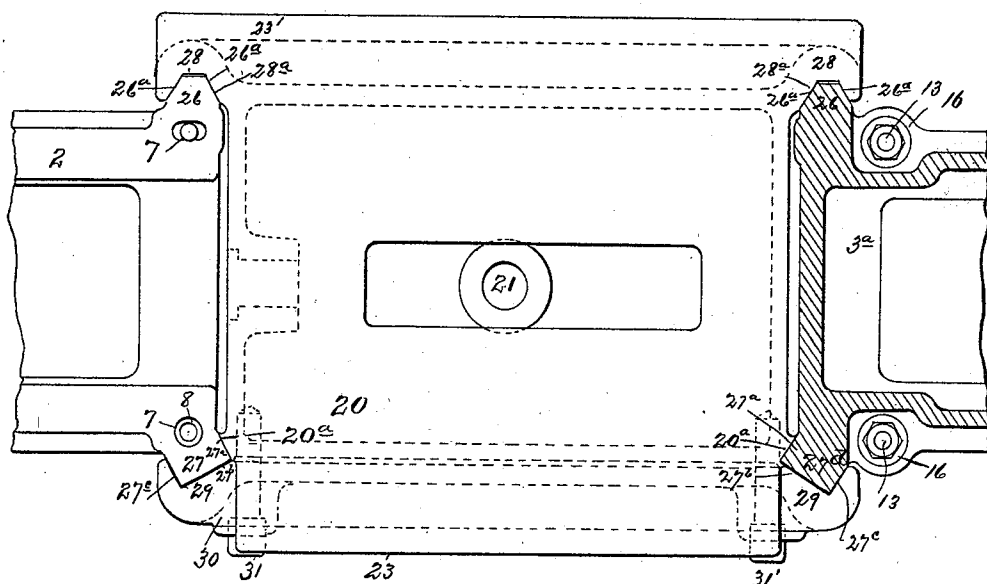


Fig. 2.

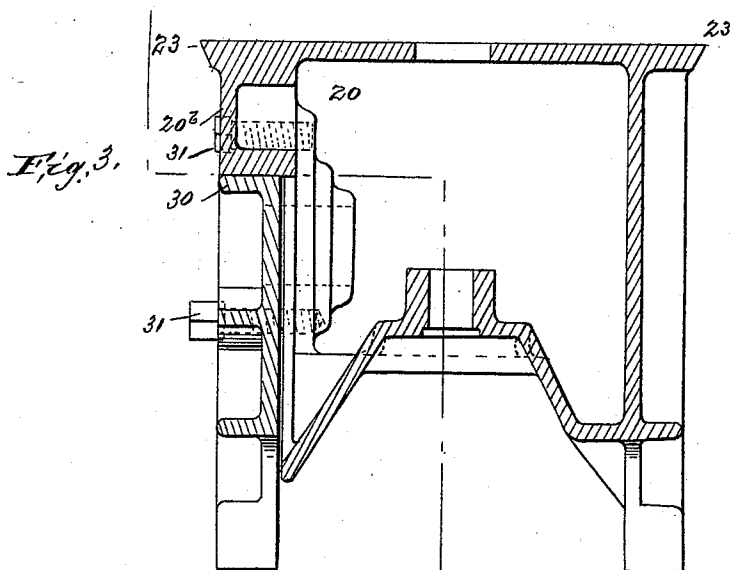


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN L. BOGERT, OF FLUSHING, NEW YORK.

MILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,416, dated March 26, 1895.

Application filed August 30, 1894. Serial No. 521,662. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. BOGERT, a resident of Flushing, Queens county, New York, have invented certain new and useful Improvements in Milling-Machines, of which the following is a specification.

One object of my invention is to so arrange the tail-stock column of a milling machine that the tail-stock can be moved over the table or carriage to bring the tail-stock nearer the head-stock when desired, and this is accomplished by placing the guides or ways on the tail-stock column on a plane above the table or carriage, which permits the tail-stock to be pushed over the latter.

Another object of my invention is to permit large pieces of work to be placed over the tail-stock column, without interference by the tail-stock, so as to be operated upon by the cutter or tool carried by the head-stock. For this purpose the tail-stock column is made in two parts, or in other words a removable portion is placed upon the main lower portion, and the tail stock is carried upon the removable portion. By preference, also, the top of the main portion of the tail-stock column is placed on a lower plane than the top of the head-stock column, so that when the removable portion of the tail-stock column is removed large work can be supported in position for the tool carried by the head-stock to operate on the work. In order to properly guide the knee or elevating slide to the fullest height of its movement the removable portion of the tail-stock column has vertical guides or ways in line with the vertical guides or ways on the lower portion of the tail-stock column.

Another object of my invention is to so arrange the connections between the guides or ways on the head and tail-stock columns, and the guides on the knee or elevating slide, that any looseness that may arise through wear may be readily taken up, so as to insure true and accurate movement of the knee or elevating slide in its guides. I accomplish this result by the novel arrangement of guides and an anchor or take-up guide on the knee as hereinafter fully explained.

The invention further consists in the novel details of improvement and the combinations of parts that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part hereof, wherein—

Figure 1 is a perspective view of a milling machine embodying my improvements. Fig. 2 is a partly sectional plan view of the central portion of the machine, the carriage or saddle being removed. Fig. 3 is a cross section through the knee or elevating slide and its attached anchor. Fig. 4 is a partly broken side elevation of the machine showing the tail-stock and the upper portion of the tail-stock column removed and a large piece of work in position to be operated upon by the cutter or tool, and Fig. 5 is a detail of the tail-stock column hereinafter explained.

In the accompanying drawings, in which similar numerals of reference indicate corresponding parts in the several views, the numeral 1 indicates the base of a milling machine.

2 is the head-stock column.

3 is the tail-stock column, and 4 is the head-stock which may be of suitable construction and provided with a spindle, pulleys and gears arranged in any desired manner. The head-stock 4 may be secured on the column 2 by screws 5 passing through lugs or webs 6 on the head-stock and screwing into tapped recesses or holes 7 in the column 2, or otherwise arranged. By preference the head-stock 4 is adjustably carried on the column 2, and for this purpose I have provided a button-dowel 8 which fits into the recess or hole 7 at one inner corner of the head-stock so that the latter may turn or swivel thereon, the corresponding screw 5 passing through said button. The recesses or holes in the lugs or webs 6 at the opposite corners of the head-stock are suitably elongated or enlarged to permit movement on the corresponding screws 5 (see Fig. 2), whereby when the head-stock is turned on the button-dowel 8, as a pivot, the screws 5 can be drawn tight to hold the head-stock in the desired position. By this adjustment the head-stock can be turned to enable a cutter to fully clear the work on the back stroke.

9 is the tail-stock which may be of suitable construction and it is supported by the column 3. The guides or ways 10 for the tail-stock are located on a plane above the table 11, as well as above the plane of the top 12 of

the head-stock column 2. By this means the tail-stock 9 can be pushed over the table 11 so that the tail-stock can be brought nearer to the head-stock to more rigidly support small pieces of work. In order to permit of this elevating of the tail-stock and at the same time provide space on the tail-stock column to receive large pieces of work said column is made in two parts, the lower main part 3 and an upper removable part 3^a, which carries the guides or ways 10 for the tail-stock. The removable part 3^a is held upon the part 3 by screws 13 passing through lugs or webs 14 on part 3^a and entering threaded recesses or holes 15 in the part 3. By preference button-dowels 16 are placed in recesses 17 between the parts 3 and 3^a at the forward or inner portion, through which the corresponding screws 13 pass, whereby the part 3^a is rigidly held upon the part 3 to prevent side movement of part 3^a. The top or upper surface 18 of the rigid part 3 of the tail-stock column is shown on a lower plane than the top 12 of the head-stock column, by which means large pieces of work may be supported so as to be operated upon by the tool on the head-stock.

In Fig. 4 the tail-stock 9 and the part 3^a of the tail-stock column have been removed, and a suitable fixture 19 placed on the table 11, its outer end resting upon a block placed on the top 18 of column 3. Space is thus provided for a large piece of work; but it is evident that large work may be supported in any suitable manner when the part 3^a is removed. 20 is the knee or elevating slide that supports the carriage or table, and which is located between the columns 2 and 3, 3^a, and guided thereby so as to have vertical movement, suitable means being provided, such as screw 21 and gearing (not shown) operated by a handle 22, to raise and lower said knee or slide. The knee or slide 20 is shown provided with guides or ways 23 upon which is mounted a saddle or carriage, of suitable construction, and provided with appropriate means operated by a shaft or screw 25, for moving it along the guides 23.

The inner edges or corners of the columns 2, 3, are provided with guides or ways 26 and 27, which receive correspondingly-shaped guides or ways 28, 29, carried by the knee or slide 20. (See Fig. 2.) The guides or ways 26, 27 project outwardly from the columns 2, 3, as shown. The outer sides 26^a of the guides or ways 26 are placed at suitable angles, preferably acute angles, the ways 28 being similarly shaped forming a true fit against the sides 26^a. (See Fig. 2.) The guides or ways 28 are preferably cast integral with the knee 20, and placed to fit the guides 26. The guides or ways 27 have their wearing faces or sides placed at right angles to each other. The knee 20 has guiding edges 20^a beveled to lie parallel with, and arranged to fit against, the face or side 27^a of the guides 27. The faces or sides 26^a and 27^a, of the guides 26, 27, are exactly parallel, as are the faces 28^a of the

guides 28 and the faces 20^a of the knee or slide 20 respectively, whereby when the knee 20 is drawn toward the guides or ways 26 the faces 26^a and 28^a as well as the faces 20^a, 27^a, will be uniformly pressed together. By this means any wear that takes place between the guides can be accurately taken up, and a true fit between the parts can be maintained.

In order to conveniently draw the faces 26^a, 28^a and 20^a, 27^a together and maintain them in proper position, as well as to afford a rigid movable guide for the knee 20, I provide the latter, on the side opposite the ways 26, with an anchor or plate 30, which is adapted to be fastened on the side of the knee 20, as by screws or bolts 31, that pass through the anchor 30 and screw or fit in the knee 20, or otherwise as desired.

The knee 20 may be of suitable shape and may consist of a hollow casting, having a strengthening web 20^b on one side, beneath which the anchor 30 fits, as in Fig. 3. The anchor 30 carries the guides or ways 29, which are shaped to fit the faces 27^b, 27^c of the guides or ways 27, so as to move accurately against them. With this construction when the bolts or screws 31 are drawn up the guides 29 will press against the guides 27, causing the knee or slide 20 to move toward the anchor 30, whereby the faces 20^a and 28^a will be drawn toward the corresponding faces 27^a and 26^a, by which means any wear that may have occurred between said faces will be taken up. By means of these removable guides 29 the ways can be conveniently reached in order to properly plane and shape them, and thereby an accurate fit between all the corresponding guide faces can be made. This is an essential feature because if all the guides or ways were rigid with parts that carry them it would be difficult to so shape them that they would run as true and accurate as desired.

The removable part 3^a of the column 3 is also provided with guides or ways 26^d, 27^d, which are so placed as to be exactly in line with the guides or ways 26, 27, on the column 3, so that the guides 28, 29, can move accurately as the knee 20 is raised to its full height. The button-dowels 16 are useful in this connection in holding the guides 26, 26^d, and 27, 27^d, in proper alignment and preventing said guides from moving out of line when the knee rises.

Of course it will be understood that ordinary parts of the machine can be arranged as found most convenient or desirable, and I do not limit my invention to the details of construction herein set forth, as they may be varied without departing from the spirit of my invention.

Having now described my invention, what I claim is—

1. In a milling machine, the combination of a base, a head-stock column and a head-stock, with a tail-stock column and a tail stock, the top of the tail-stock column being located on a plane above the top of the head-stock col-

umn to enable the tail-stock to be pushed toward the head-stock over a table, and an elevating knee or slide located between said columns and adapted to carry the table, substantially as described.

2. A milling machine having a head stock column, a tail stock column and an elevating knee and table between said columns, the tail stock column being made in two parts, the lower part being constructed so that its top will be below the top of the table when the knee is in its lowest position, substantially as described.

3. A milling machine having a head stock column, a tail stock column made in two parts, the upper part being removably connected with the lower part, and a tail stock carried in guides on the removable part of the tail stock column, and an elevating knee and table between said columns, the lower part of the tail stock column being constructed so that its top will be below the top of the table when the knee is in its lowest position, substantially as described.

4. In a milling machine, the combination of a head-stock column, with a tail-stock column made in two parts, the top of the lower portion of the tail-stock column being on a lower plane than the top of the head stock column, and an elevating knee located between said columns, substantially as described.

5. In a milling machine, the combination of a base, a head-stock column and a tail-stock column made in two parts one removably attached to the other, said columns carrying vertical guides or ways, the removable portion of the tail-stock column having guides or ways normally aligned with the guides or ways on the part of the column beneath it, with a knee or elevating slide having guides or ways to engage the guides or ways on said columns, substantially as described.

6. In a milling machine, the combination of a head-stock column and a tail-stock column both having guides or ways, with a knee or elevating slide having guides or ways, and an adjustable anchor or guide carried by said knee to engage guides on said columns, substantially as described.

7. In a milling machine, the combination of head and tail-stock columns having guides or ways, with a knee or elevating slide hav-

ing guides or ways, and an adjustable anchor or plate extended across the face of said knee and having guides or ways to engage guides or ways on said columns, substantially as described.

8. In a milling machine, the combination of head and tail-stock columns having guides or ways 26, 27, the guides 26 having faces placed at angles, with a knee or elevating slide having guides or ways to engage the guides or ways 26, and an adjustable anchor to engage the guides or ways 27, substantially as described.

9. In a milling machine, the combination of head and tail-stock columns having guides or ways 26, 27, the guides 26 having faces placed at angles, the guides 27 each having a face 27^a parallel with the face of the corresponding guide 26, with a knee or elevating slide having guides corresponding to the guides 26, and faces 20^a to engage the faces 27^a, and an adjustable anchor carried by the knee or slide and having guides or ways to engage the guides 27, substantially as described.

10. In a milling machine, the combination of head and tail-stock columns having guides 26, 27, the guides 26 having faces placed at angles, the guides 27 having faces placed at right angles, with a knee having guides or ways to engage the guides 26, and an anchor adjustably carried by said knee or slide and having guides or ways to engage the guides 27, substantially as described.

11. In a milling machine, the combination of head and tail-stock columns having guides or ways 26, 27, the guides 26 having faces placed at angles, the guides 27 having faces placed at right angles, the faces 27^a being parallel with the corresponding faces 26^a, with a knee or elevating slide having guides 28 to engage guides 26, and faces 20^a to engage faces 27^a, and an anchor or plate adjustably carried by said knee and having guides corresponding to guides 27, and means for detachably connecting said anchor with said knee or elevating slide, substantially as described.

JOHN L. BOGERT.

Witnesses:

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C. W. BENJAMIN.