

(No Model.)

3 Sheets—Sheet 1.

J. L. BOGERT.
MILLING MACHINE.

No. 542,461.

Patented July 9, 1895.

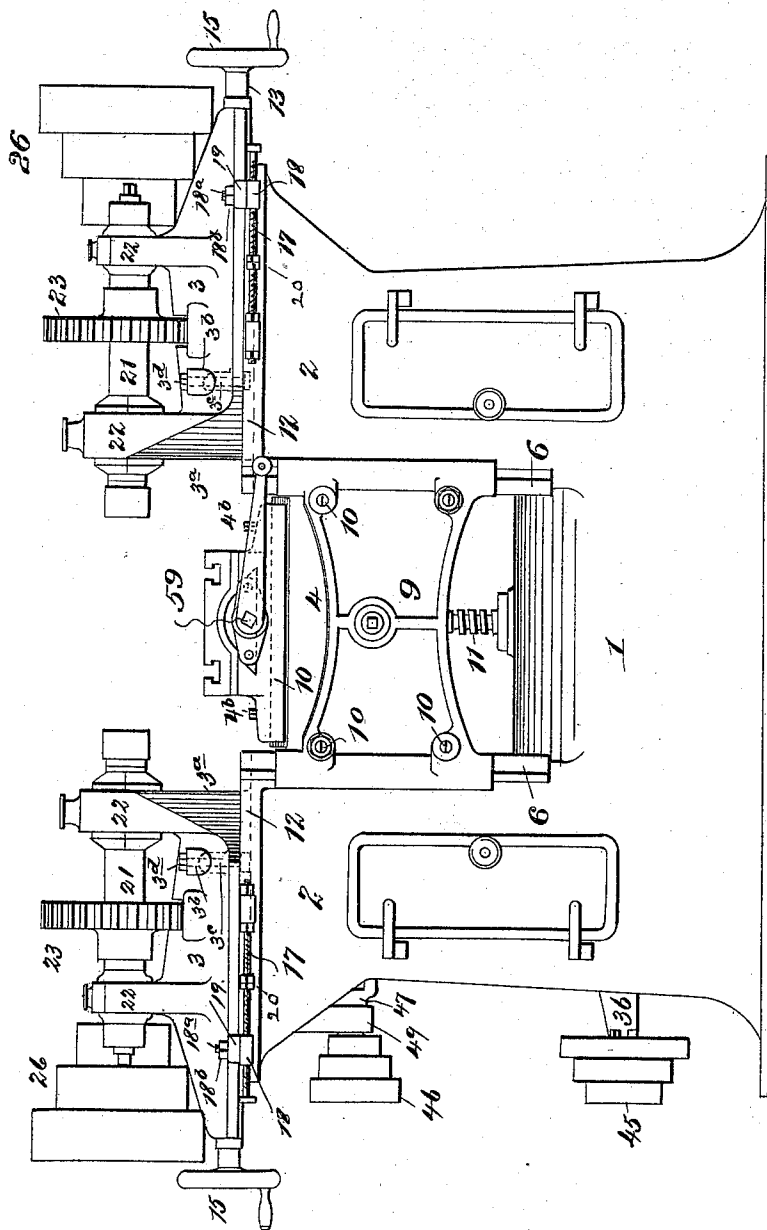


Fig. 1.

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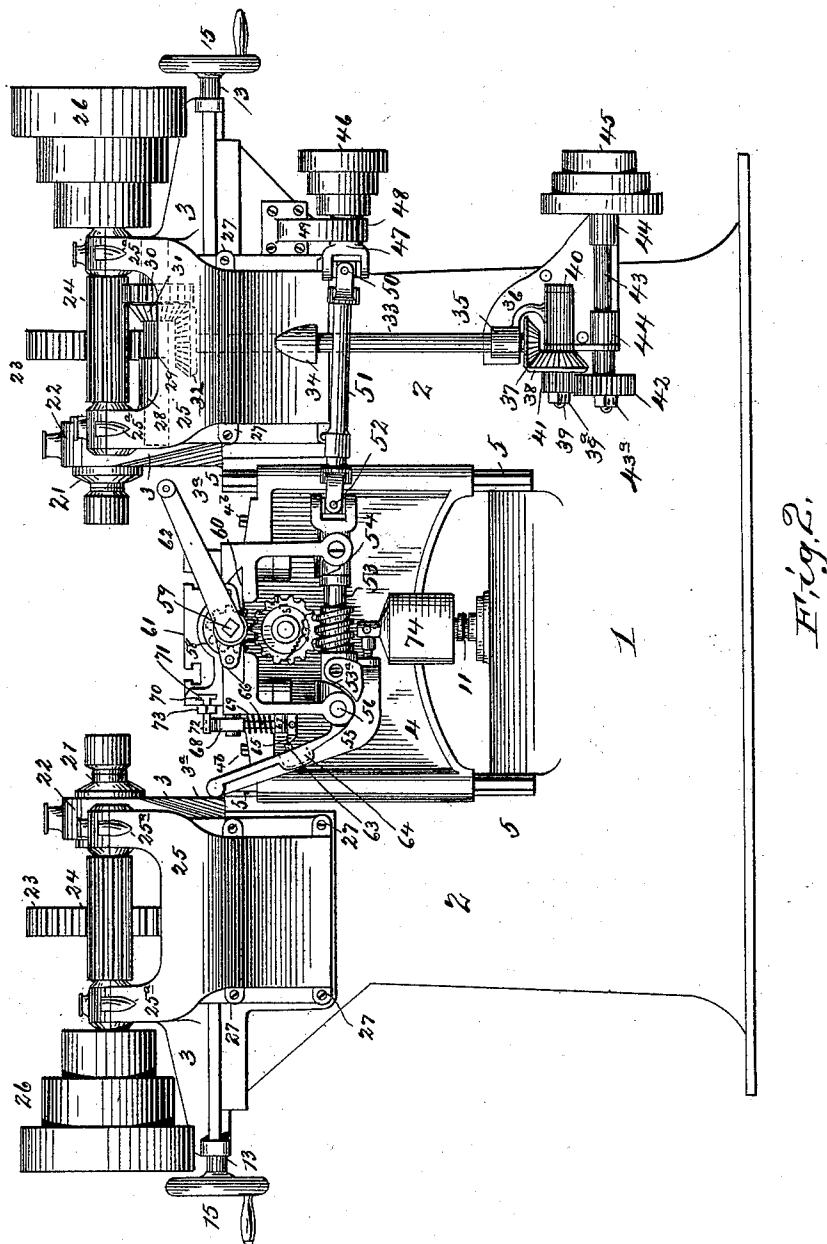
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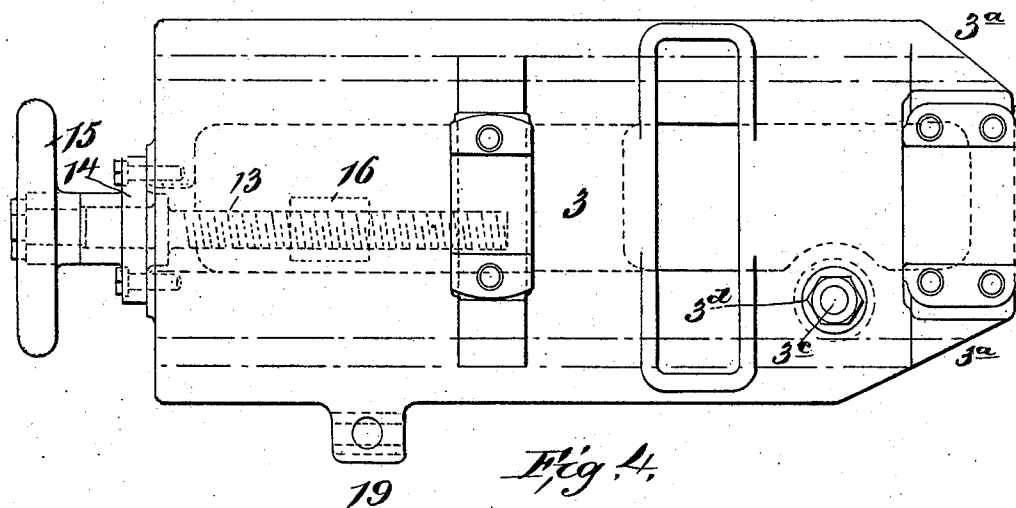
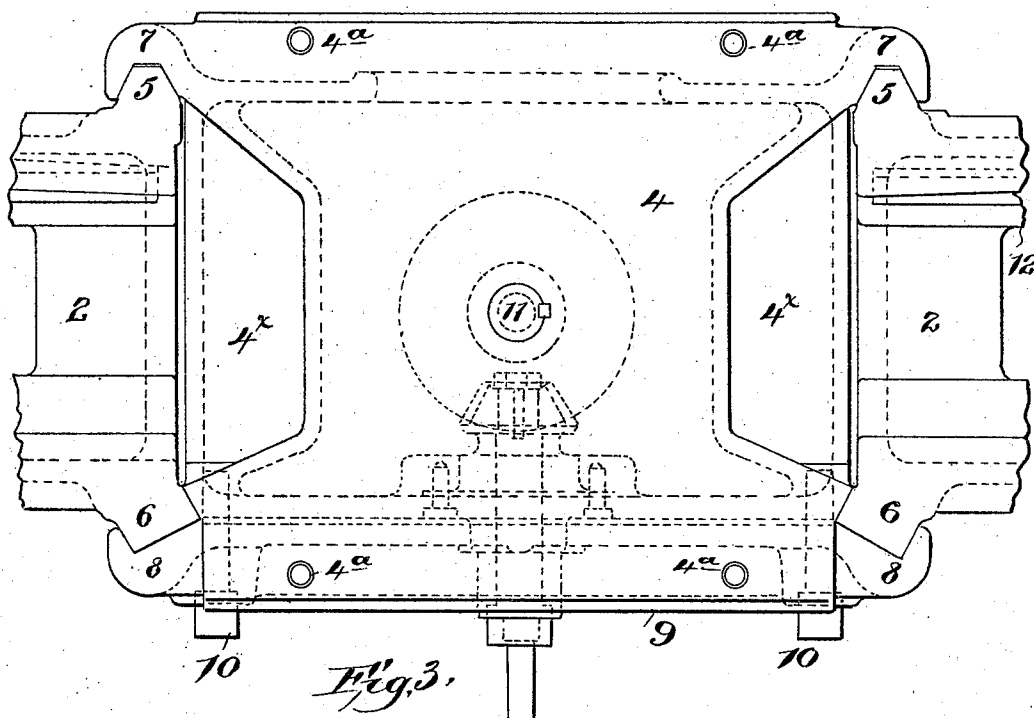
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UNITED STATES PATENT OFFICE.

JOHN L. BOGERT, OF FLUSHING, NEW YORK.

MILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 542,461, dated July 9, 1895.

Application filed September 29, 1894. Serial No. 524,424. (No model.)

To all whom it may concern:

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

My invention relates more particularly to double-head milling-machines; and one of the objects of the invention is to permit the head-stocks to be moved longitudinally without reference to the pulleys or means for turning the spindles. This is accomplished by supporting the driving-pulleys and their attached gear independently of the head-stocks and arranging the gears on the head-stocks so that they will be operated by the gears connected with said pulleys in whatever position the head-stocks may be.

A further object of the invention is to permit the head-stocks to advance quite close to each other, so as to enable small work to be operated upon simultaneously by the tools carried by both head-stocks. To permit this action the inner sides or walls of the knee or elevating-slide are provided with pockets or recesses to receive the ends of the head-stocks to enable them to approach near each other when the knee is raised. If the knee were not provided with these pockets the head-stocks when moved inwardly, as set forth, would encounter said knee when it was raised and thus prevent said head-stocks from approaching nearer than the outer lines of the knee.

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 front elevation of a milling-machine embodying my improvements. Fig. 2 is a rear elevation of said machine. Fig. 3 is a plan view of a portion of the machine, clearly showing the pockets or recesses in the knee for receiving the head-stocks when they approach each other; and Fig. 4 is a plan view of one of the head-stocks.

In the accompanying drawings, in which similar numerals of reference indicate corresponding parts in the several views, the nu-

meral 1 indicates the base of a milling-machine, and 2 2 are the columns upon which the head-stocks 3 are mounted to slide to and fro, said base and columns being made in any desired manner. The columns 2 2 are placed at suitable distances apart, and a knee or elevating-slide 4 is located between them so as to have vertical movement. The columns 2 2 carry suitable guides or ways 5 6, which receive corresponding guides or ways 7 8 on the knee 4, whereby said knee is properly guided to have vertical movement between said columns. The guides or ways 8 8 are preferably carried by an anchor or plate 9 removably carried by the knee 4 and held thereto by screws or bolts 10. By adjusting the anchor 9 wear between the several guides or ways may be readily taken up.

The knee 4 may be raised and lowered by a screw 11, operated by gearing shown in dotted lines in Fig. 3; but it will be understood that the knee 4 may be guided and operated in any suitable manner.

The head-stocks 3 are carried upon the columns 2 in suitable guides or ways 12, so as to slide to and fro along the tops of the columns. The head-stocks 3 are each shown provided with a screw-shaft 13, journaled in suitable bearings 14 on said stocks and provided with hand-wheels 15, the screws 13 working in suitable threaded nuts 16, carried by the columns 2. By turning the screws 13 the head-stocks can be fed toward and from each other, so as to permit the tools to operate on work of different sizes carried on the knee 4. A suitable adjustable stop is also preferably provided for each head-stock to regulate its movement, and for this purpose I have shown screw shafts or rods 17, carried by the columns 2 and receiving apertured lugs or blocks 18, which are carried by the head-stocks 3, and slide freely on the shafts or rods 17.

The blocks 18 may have threaded studs 18^a, adapted to receive nuts 18^b, which studs pass through apertured lugs 19 on the head-stocks 3, whereby said blocks can be adjustably held on the head-stocks.

20 are jam-nuts on the screw shafts or rods 17, arranged to be moved along said shafts or rods to the desired positions and to arrest the movement of the blocks 18, so as to arrest

the head-stocks at the proper point. By adjusting the nuts 20 to the desired position the movement of the head-stock can be accurately gaged.

5 The head-stocks 3 3 are adapted to be moved inwardly toward each other and over the knee or elevating-slide, so as to operate upon small work, and in order that the knee can rise as much as desired while the head-stocks are in
10 their inward positions over said knee the knee on opposite sides is provided with pockets or recesses 4^x, (see Fig. 3,) in which the inner sides or ends of the head-stocks can enter. By this means when the knee rises above
15 the tops of the columns 2 2 the head-stocks can be pushed inwardly into the pockets or recesses 4^x without interfering with the knee. By preference the inner sides or ends 3^a of the head-stocks 3 are beveled forwardly, as
20 indicated in Figs. 1, 2, and 3, and the pockets 4^x in the knee 4 are correspondingly shaped or beveled. (See Fig. 3.) By this means the desired movement of the head-stocks is permitted without sacrificing strength. When it
25 is desired to hold the head-stocks 3 stationary upon the columns 2, said stocks may be provided with side lugs or webs 3^b, having apertures to receive bolts 3^c, provided with heads arranged to bear in the ways 12 on the
30 columns 2, whereby when the nuts 3^d on the bolts 3^c are tightened the head-stocks can be held in any desired position.

In order to permit the head-stocks 3 3 to move freely along the tops of columns 2 without interference from the driving devices or
35 belting, I have arranged the pulleys for driving the head-stock spindles 21 on separate shafts that are carried independently of the head-stocks. For this purpose the spindles 21
40 are journaled in bearings on posts 22 carried by the head-stocks, said spindles being each provided with a gear-wheel 23. The gear-wheels 23 mesh with corresponding pinions
45 24 on shafts journaled in bearings on brackets 25 rigidly secured to the columns 2. (See Fig. 2.) The brackets 25 have two arms 25^a, which carry the bearings for the pinions 24. The
50 pinions 24 are long, so that the gears 23 will remain in mesh during the to-and-fro movement of the head-stocks, said pinions being somewhat longer than the longitudinal movement allowed the head-stocks 3. The shafts
of the pinions 24 carry the cone-pulleys 26 for driving the spindles 21.

55 The brackets 25 are made in suitable shape, preferably of cast metal, and provided with lugs or webs 27 by which they may be bolted or secured upon the columns 2.

60 From the foregoing it will be seen that the driving-pulleys 26 are carried independently of the head-stocks, and that while the head-stocks can be moved to different positions their spindles will be turned by the engagement of the wheels 23 with the pinions 24 in
65 all positions. By this means the pulleys 26 will always remain in the proper position relatively to their driving-belts. I have also

shown devices for feeding the carriage 60 on the knee or elevating-slide 4, these devices deriving motion from the pinion 24. For this
70 purpose one of the brackets 25 is provided with bearings 28, in which are journaled a shaft 29, carrying a gear-wheel 30, that meshes with the pinion 24. Upon the shaft 29 is also secured a bevel-gear 31, which meshes
75 with a corresponding gear 32 on a vertical shaft 33, that is journaled near its upper end in suitable bearings 34 on the bracket 25 or on the column 2. The lower end of the shaft
80 33 is shown journaled in bearings 35 carried by a bracket 36 suitably secured to the base 1 or column 2. The shaft 33 also carries a bevel-gear 37 that meshes with a similar gear
85 38 carried by a shaft 39 journaled in bearings 40 on the bracket 36. On the shaft 39 is a spur wheel or pinion 41 meshing with a similar wheel 42 on a shaft 43 journaled in bearings
90 44 on the bracket 36, the shaft 43 carrying a cone-pulley 45. The gears 41 and 42 are preferably interchangeable, and for this purpose are detachably connected with the
shafts 39 and 43, and may be held on said shafts by nuts 39^a and 43^a. By interchanging
95 said gears the speed of rotation of shaft 43 may be altered as may be desired. The bracket 36, with the respective bearings 35, 40, and 44, may be made in a single casting to combine rigidity of structure with simplicity
of construction.

46 is a cone-pulley carried by a column 2 in
100 line with the pulley 45, whereby the pulley 45 can drive the pulley 46 when they are connected by a suitable belt. (Not shown.) The pulley 46 is carried by a shaft 47, journaled
105 in suitable bearings 48, carried by a bracket 49, secured on the column 2. The shaft 47 is connected by a suitable universal joint 50 with a telescopic shaft 51, which is connected
by a universal joint 52 with a worm-shaft 53, journaled in pivotal bearings 54 on the back
110 of the knee or elevating-slide 4. The opposite end of worm-shaft 53 is movably connected at 53^a with a lever 55, pivoted at 56 on the knee 4. The worm 53 meshes with a suitable worm-wheel 57, connected with a spur-wheel 57^a,
115 journaled on the knee 4, which wheel 57^a meshes with a pinion or spur-wheel 58, carried upon the feed-screw 59, journaled on the carriage 60 and connected by any suitable gearing with the table 61, which is carried in suitable
120 guides on said carriage, whereby it may be moved to and fro along the latter to adjust the work relatively to the spindles 21 on the head-stocks 3. The screw 59 may be provided with a crank 62 for operating it by hand.
125

The arrangement of the above-described parts is such that when the pinion 24 turns it will transmit motion through the shafts 33 43
130 51 53, worm-wheel 57, and the described gearing, &c., to the shaft 59 to feed the table 61 along the carriage 60. The carriage 60 in this case is held stationary upon the knee 4, and for this purpose said knee may be provided with bolt-holes 4^a (see Fig. 3) to receive bolts 4^b from

the carriage 60. The table 61 can be returned by turning the crank 62, and to permit this and at the same time arrest the feed of the table by the described feeding devices I have provided a throw-out device which is arranged as follows: On the long arm of the lever 55 is a stud 63, located near a recess or opening 64 in said lever, said stud bearing against a toe 65 on a rod or bolt 66, arranged to slide in bearings 67 on the knee 4. The rod or bolt 66 has a head 68, which is rounded or beveled on its upper end, a spring 69, located between the bearing 67 and the head 68, acting to normally hold the rod or bolt 66 elevated, so as to hold the stud 63 against the toe 65. In this position of the parts the lever 55 will be so held that the worm 53 will be in mesh with the gear 57. The table 61 on one side is provided with a groove 70, adapted to receive the head 71 of a rod or bolt 72, provided with a clamping-nut 73 to hold said rod or bolt in position, whereby said rod or bolt can be adjusted along the table 61. The rod or bolt 72 is adapted to engage the head 68 of the rod 66 to depress the latter at the proper time to release the lever 55.

The operation is as follows: The rod or bolt 72 is first adjusted to the position desired to throw out the gearing. As the table 61 moves along the carriage, the tools carried by the spindles 21 will operate on the work upon the table 61, and when the rod or bolt 72 encounters the head 68 it will depress the rod or bolt 66. The toe 65 will thereupon be carried below the stud 63, whereupon the lever 55 will be released. A weight 74 attached to said lever will then act to turn it, whereby the worm 53 will be disengaged from the gear 57 and the table 61 will come to rest. The shaft 59 can now be turned by the crank 62, to return the carriage to the normal position. The upper end of lever 55 can next be swung outwardly, which will raise the worm 53 into mesh with the gear 57.

Having now described my invention, what I claim is—

1. In a milling-machine, the combination of a head stock, with a pulley carried independently of said head-stock and gearing between the spindle of the head-stock and said pulley, said head stock being arranged to move parallel to the axis of said pulley, the pinion of said gearing being wholly disconnected from the head stock, the gear wheel carried by the head stock being arranged to travel along said pinion while in mesh, substantially as described.

2. In a milling machine, the combination of a head stock having a spindle and a gear wheel carried thereby, with a pinion along which said gear can move, and a pulley connected with said pinion, said pulley and pinion being carried independently of said head stock and having no supporting connection therewith, so that the head stock and its spindle and gear can move along said pinion without

correspondingly moving said pinion, substantially as described.

3. In a milling machine, the combination of a head stock having a spindle and a gear wheel, said head stock being adapted to move to-and-fro, with a bracket carried independently of the head stock, a long pinion carried thereby to mesh with said gear wheel and a pulley connected with said pinion, the pinion being entirely separate from the head stock, so that the head stock and its spindle and gear can move along said pinion without correspondingly moving said pinion, substantially as described.

4. In a milling machine, the combination of a column having ways and a head stock mounted thereon and having a spindle and a gear wheel, with a bracket secured to said column, said bracket having extensions 25^a, a long pinion journaled between said extensions and a pulley connected with said pinion, whereby when the head-stock moves along said ways said wheel and pinion will remain in mesh, substantially as described.

5. In a milling machine, the combination of a column and a head stock adapted to move along the same, with a knee or elevating slide carried independently of the head stock and having a recess or pocket to receive said head-stock, and ways or guides between the inner corners of the column and the knee as and for the purposes specified.

6. In a milling machine, the combination of a column and a head-stock adapted to be moved along the same, the side or end of said head stock being beveled inwardly, with a knee having a pocket or recess also beveled to receive said head stock, substantially as described.

7. In a milling machine, the combination of a base, and two columns, and a head stock adapted to be moved along said columns, with a knee located between said columns and guided thereby and carried independently of the head stock by ways on the inner corners of said column and knee, said knee having pockets or recesses at its sides to receive said head stock, as and for the purposes set forth.

8. In a milling machine, the combination of a pulley and a pinion, and a bracket carrying the same, with a shaft carried by said bracket, a gear wheel and a bevel wheel carried by said shaft, another shaft 33 carrying a bevel wheel to mesh with the first mentioned bevel wheel, a shaft 43 having a pulley and gearing between said shafts, a shaft 51, a pulley connected therewith by a universal joint and a worm shaft connected with the shaft 51 by a universal joint, substantially as described.

9. The combination of two parallel shafts 39, 43 and a shaft 33 at right angles thereto, intermeshing miter gears on the shafts 33 and 39, and intermeshing spur wheels 41, 42 on the shafts 39 and 43, and means for detachably connecting said gears with said shafts 39 and 43, substantially as described.

10. In a milling machine, the combination of
a knee and a table supported thereby, with
gearing 57, 57^a 58 and 59 to move said table,
a worm to mesh with the worm 57^a, means
5 for operating said worm, a lever to disengage
said worm from said worm 57^a and means for
holding and releasing said lever, as and for
the purposes specified.

11. In a milling machine the combination of
10 a knee, a table carried thereby, gearing to
move said table and a worm to operate said
gearing, with a weighted lever to move said
worm into and out of mesh with said gear, a
sliding rod to hold said lever in its normal
15 position, and means connected with said table
to operate said rod, substantially as described.

12. In a milling machine the combination of
a knee, a table carried thereby and gearing
to operate said table, with a worm to turn
said gearing, a lever pivoted on said knee and 20
movably connected with said worm, a stud on
said lever, a rod having a toe to engage said
stud, a head on said rod, a spring to move
said rod, and an adjustable rod or bolt car-
ried by said table to operate said headed rod 25
or bolt to release said lever, substantially as
described.

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