No. 627,354. Patented June 20, 1899.

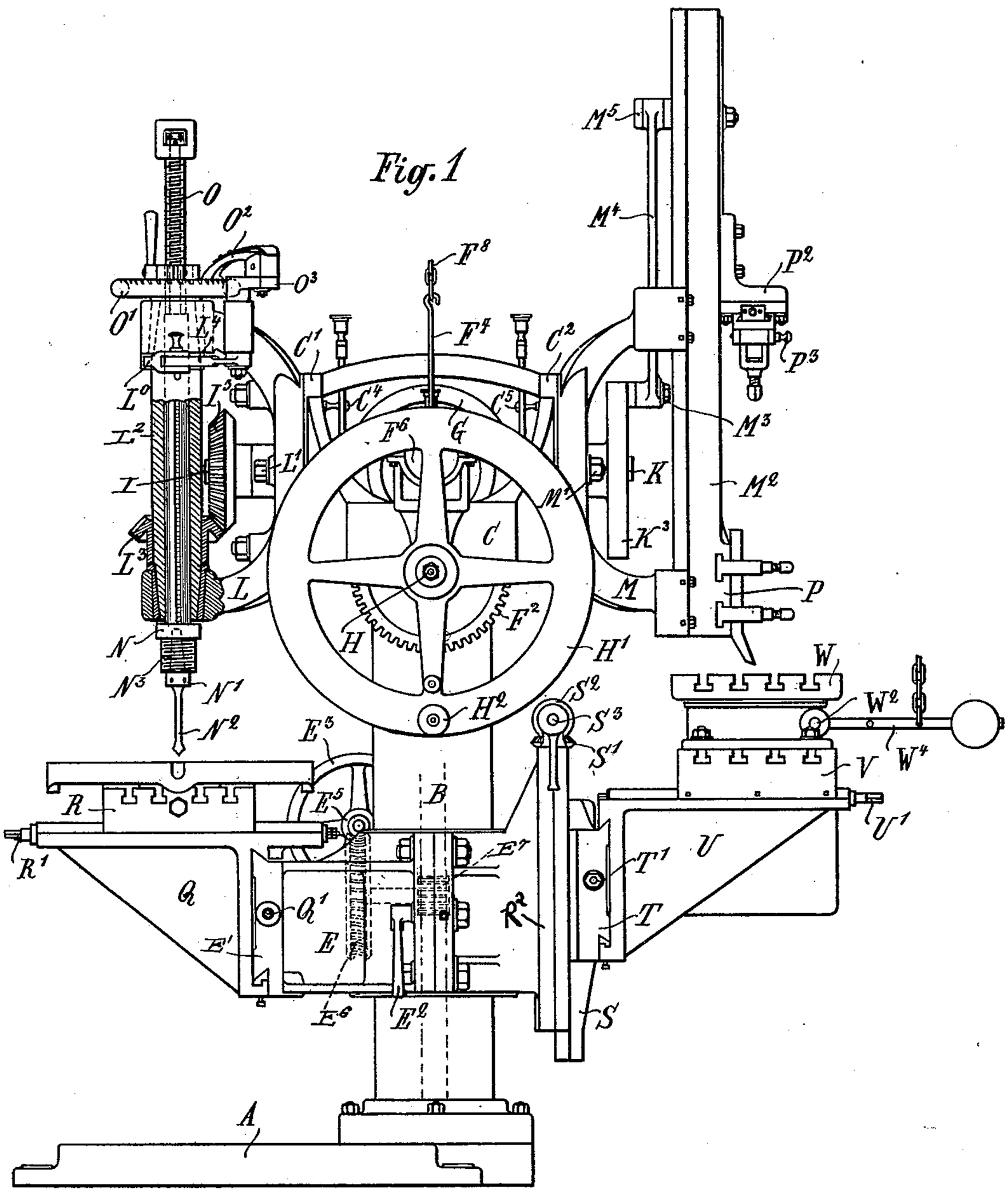
# I. ROEDERER.

## DOUBLE MACHINE TOOL.

(Application filed Dec. 10, 1897.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1




Witnesses:

Adolph Fischer

Otakar Novák

Inventor:

Ignaz Roederer

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(No Model.) 4 Sheets—Sheet 2.

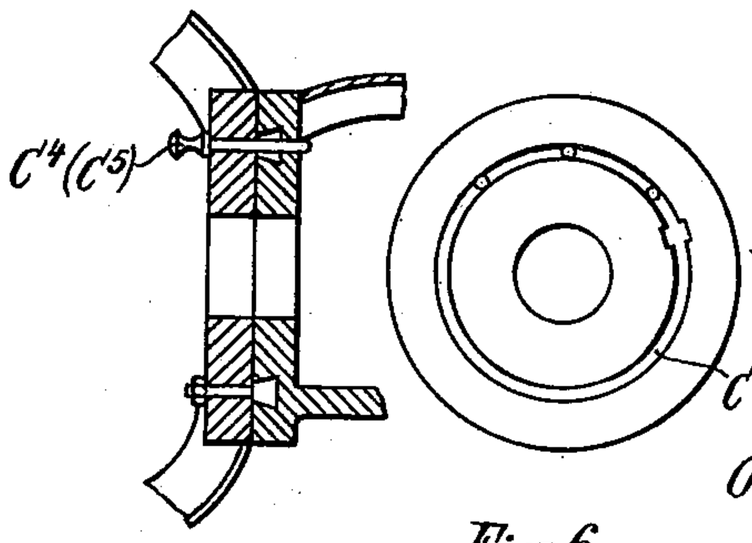


Fig. 5




Fig. 6

Fig. 2

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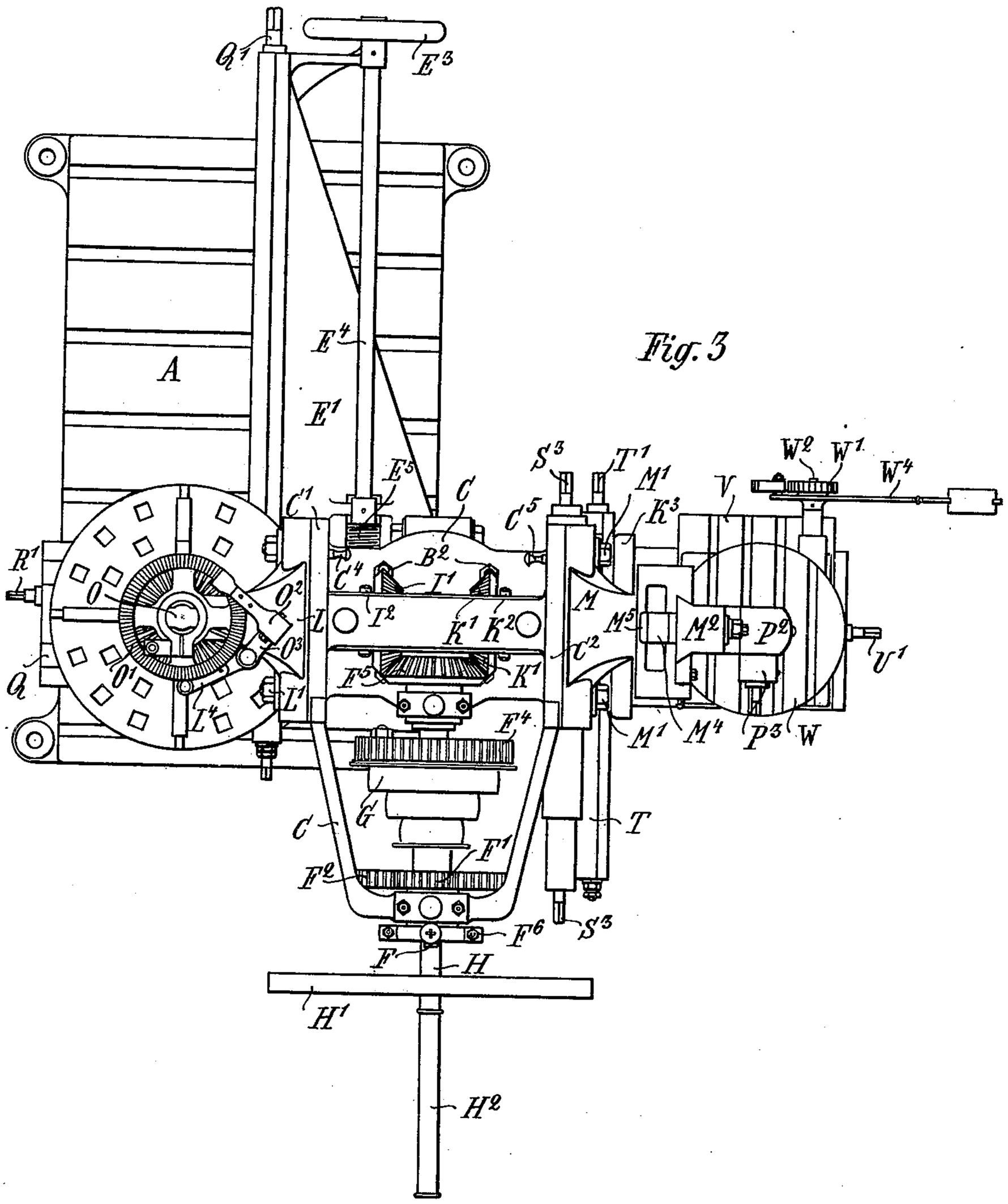
(No Model.)

4 Sheets—Sheet 3.

Fig. 3

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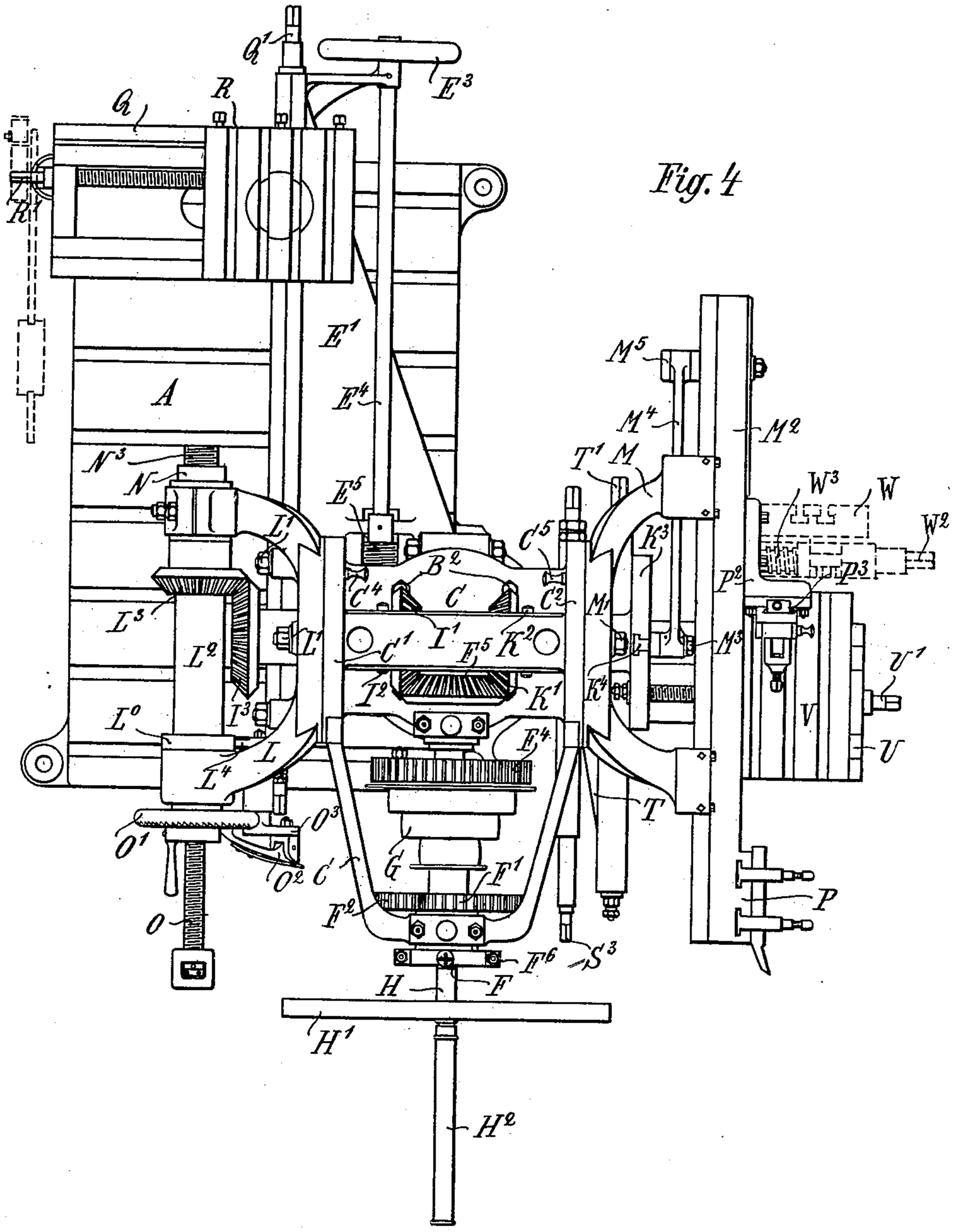
4 Sheets—Sheet 4.

Fig. 4




Witnesses:
Adolph Fischer
Otakar Novák.

Inventor:
Ignaz Roederer

# UNITED STATES PATENT OFFICE.

IGNAZ ROEDERER, OF PRAGUE, AUSTRIA-HUNGARY.

## DOUBLE MACHINE-TOOL.

SPECIFICATION forming part of Letters Patent No. 627,354, dated June 20, 1899.

Application filed December 10, 1897. Serial No. 661,404. (No model.)

*To all whom it may concern:*

Be it known that I, IGNAZ ROEDERER, a subject of the Emperor of Austria-Hungary, residing at Prague, Bohemia, Austria-Hungary, have invented certain Improvements in or Relating to Double Machine-Tools, (for which I have obtained Letters Patent in each of the following countries: Austria, June 22, 1897, No. 47/2,347; France, August 7, 1897, No. 266,172; Belgium, April 30, 1897, No. 127,619; Switzerland, September 15, 1897, No. 14,278, and England, September 23, 1897, No. 9,319,) which are to be described in the following specification and shown on the accompanying drawings.

The object of my invention is to produce a double machine-tool so arranged that from a main driving-shaft the two tools are moved independently of each other and so that the tool on one side of the machine is given a rotative movement while the tool on the other side of the machine is given a reciprocating motion. The tool-frames may be brought into a vertical or horizontal or slanting position, and they are so arranged that different tools may be affixed to them. The machine so arranged is therefore capable of performing all the operations desired, such as boring, turning, cutting, planing, shaping, key-grooving, &c. The same work or blank when once secured may be subjected to a series of various treatments.

The machine may be provided with automatic feed devices for the tools or for the work. It may be arranged to be driven by power as well as by hand. Hence the machine may be utilized for doing work in case the engine is stopped. The double machine-tool may therefore do the same duties as a series of separate machine-tools that occupy more space and require more outlay in capital.

The double machine-tool is illustrated by the accompanying drawings, in which—

Figure 1 is an elevation; Fig. 2, a side view of the machine side with the rotary tool; Fig. 3, a ground plan of the machine with the tool-frames arranged vertically, and Fig. 4 a ground plan of the machine with the tool-frames arranged horizontally, while Figs. 5 and 6 will be referred to later on.

On the ground-plate A the cylindrical pillar B is fixed, which carries the frame C and is provided with a rack D for raising and lowering the double table-carrier E. In the frame C the main driving-shaft F, with the cone G, the counter-shaft H, and the two side driving-shafts I and K, is fitted to run. When the counter-shaft H is put into gear in any usual manner while the cone G is disconnected from the gear-wheel $F^4$, the cone G will transmit its motion through the gear-wheels F′ $F^2$, the counter-shaft H, and the gear-wheels $F^3$ $F^4$ to the main driving-shaft F. The latter drives, through its bevel-wheel $F^5$, the two bevel-wheels I′ and K′, which are loose on the side driving-shafts I and K and may at pleasure be coupled with these by feathers or pins $I^2$ and $K^2$, respectively. In case the cone G is coupled with the gear-wheel $F^4$ and the counter-shaft H is put out of gear in the usual manner, the cone G will drive the main driving-shaft F directly. The frame or tool-support C has two flanges C′ and $C^2$, on which the two tool frames or heads L and M are arranged to revolve and to be fastened in any position. On the machine shown the heads of the holding-screws L′ and M′ fit into the annular grooves $C^3$ of the dovetailed section, Figs. 5 and 6, so that they can be shifted and allow of the tool-frames being turned around the axes of the side driving-shafts I and K. To secure the tool-frames L and M in their exact vertical or horizontal or slanting positions, pins, such as $C^4$ and $C^5$, provided in the tool-frames and in the flanges C′ $C^2$, respectively, may be employed, which are put into holes of suitable size. In a similar manner the frame C on the top flange B′ of the pillar B may be arranged to revolve and to be fastened, its holding-screws $B^2$ having heads engaging an annular groove.

One tool-frame L carries a hollow spindle $L^2$, which receives a rotary motion from the side driving-shaft I by means of the bevel-wheels $I^3$ $L^3$. The other tool-frame M carries a slide $M^2$, which receives a reciprocating motion from the side driving-shaft K by means of the crank-disk $K^3$, the crank-pin $M^3$, adjusted in the groove $K^4$ of said disk, the connecting-rod $M^4$, and the pin $M^5$.

The hollow spindle $L^2$ serves in a well-known manner as a guide for the boring-spindle N, which is raised and lowered by the screw-spindle O, connected with it. The latter is

prevented from turning by a feather and may be shifted by hand through the hand-wheel O′, screwing on the spindle O. In case the pawl $O^2$ engages the teeth at the periphery of the hand-wheel O′, the screw-spindle O will thereby be fed automatically, since an eccentric X, arranged on the hollow spindle $L^2$, imparts a rocking motion to the pawl $O^2$ through the medium of the eccentric-rod $L^0$, lever $L^4$, and lever $O^3$.

The slide $M^2$ has at its one end a slot $M^6$, in which the pin $M^5$ may be shifted and adjusted. At the other end the slide $M^2$ is provided with a tool-holder P of the kind used with key-grooving machines. Besides this the slide $M^2$ carries about at its center an angular support $P^2$ for a second tool-holder $P^3$, which may be arranged to swing around an axle in the well-known manner. Thus the advantage is attained that the pressure of the tool is about in the middle between the two guides of the slide $M^2$, so that these guides need not be subjected to unequal wear and tear.

For driving the machine-tool by hand the fly-wheel H′, having a handle $H^2$, is put on the counter-shaft H.

At the end of the main driving-shaft F an eccentric $F^6$ is keyed on for feeding by rod $F^7$ and chain $F^8$ certain screw-spindles, to be referred to later on.

The table-carrier E is made in two halves, so that it may be fitted around the pillar B, and it is preferably so arranged that it may be swung around at pleasure, so that the work when once secured on one table may be treated first with the rotary tool on one side of the machine and afterward with the reciprocating tool on the other side of the machine when desired. For securing the table-carrier E a lever $E^2$ is employed, with which a screw connecting the two carrier-halves is tightened up. By means of the hand-wheel $E^3$, its shaft $E^4$, the worm $E^5$, a worm-wheel $E^6$, meshing into it, and a pinion $E^7$, engaging the rack D at the pillar B, the table-carrier E may be raised and lowered. As shown in Figs. 1, 2, and 3, the table-carrier E has on the one side an arm E′, with a dovetailed guide for the table Q, and on the other side a vertical dovetailed guide $R^2$ for the slide S. The table Q may be moved along the arm E′ by hand through the screw-spindle Q′ and a crank. It may also be fed automatically from the eccentric $F^6$ by means of a ratchet-wheel, such as W′, (see Fig. 3,) and a lever with a pawl, such as $W^4$, put on the end of screw-spindle Q′, the said lever being connected to said eccentric $F^6$ by a chain $F^8$, led over rolls.

On the table Q the slide R is arranged for being shifted by hand through the screw-spindle R′ or fed automatically in the manner indicated by the dotted lines in Fig. 4. The slide S may be raised and lowered by hand through a vertical screw-spindle fitted in the table-carrier E, the bevel-wheels $S' S^2$, and the shaft $S^3$ by means of a crank. Along the slide S the slide T may be shifted by the screw-spindle T′. It carries the slide U, which may be moved by the screw-spindle T″. On the slide U the angular slide V, having ⊥-grooves in its horizontal and vertical faces, may be shifted by the screw-spindle U′. Thus the circular table W may, with its bottom plate, be secured either on the top face or to the side face of the slide V, so that the work-piece placed and fixed on the table W may be turned around a vertical or a horizontal axis, as the case may be. The table W may be fed around its axis automatically from the eccentric $F^6$, the lever $W^4$ being connected with the chain $F^8$ and its pawl engaging in the ratchet-wheel W′, whereby through the shaft $W^2$ and the worm $W^3$ the worm-wheel on the table W is turned.

For boring purposes a chuck N′, with the drill $N^2$, is fitted, as usual, into the boring-spindle N. Then the tool-frame L is brought into the vertical position, Fig. 1. Instead of the drill $N^2$ a boring-rod may be inserted.

For turning purposes the tool-frame L is brought into the horizontal position, Fig. 4. Then a chuck-plate may be screwed on the threaded part $N^3$ of the spindle N. For holding the tool any suitable support is placed on the slide R after the arm E′ of the table-carrier E has been propped up with a screw-jack.

For milling purposes the tool-frame L may be brought into the horizontal, vertical, or slanting position, as the case may be, and a shaft carrying the cutter is put into the boring-spindle N.

For key-grooving purposes the tool-frame M is brought into the vertical position, Fig. 1, and the tool is secured in the tool-holder P. For planing or shaping purposes the tool-frame M is brought into the slanting or horizontal position, Fig. 4, and the tool is secured in the tool-holder $P^3$.

In the double machine-tool so far described the different parts illustrated may be modified in various ways. The mode of securing the tool-frames L and M on the flanges C′ and $C^2$ of the frame C may be varied. The frame C may be shaped in any other style, being cast hollow or otherwise. The hollow spindle $L^2$ may be dispensed with, in which case the bevel-wheel $L^3$ will be provided with a feather to engage in a key-groove of the boring-spindle N. The teeth on the hand-wheel O′ may be replaced by a separate ratchet-wheel, and the automatic feed-gear described may be replaced by any other automatic feed motion. The arrangement for feeding the various table screw-spindles from the eccentric $F^6$ may be replaced by other arrangements. The groove $K^4$ of the crank-disk $K^3$ may be omitted, in which case the pin $M^3$ is rigidly affixed to said disk. The spindle N may be provided with other tool or work-holding devices, according to the nature of the work to be done. The arrangements for securing the tools and the work-pieces may be altered according to the purposes, the size, and shape of the work, and also to other circumstances.

Having fully described and specified this my invention, I declare that what I claim is—

The combination of the central standard, a tool-support comprising heads extending from the standard in diametrically opposite directions and carrying bearings at approximately equal distances from the axis of the standard, said heads being mounted to turn about an axis perpendicular to that of the standard, the bearings of each arm alining in a direction perpendicular to the axis about which the heads are mounted to turn, a rotatable tool-holder journaled in the bearings of one of said heads, a reciprocating tool-holder mounted to slide in the bearings of the other head, drive-shafts each operatively connected with one of said tool-holders, the axis of said shafts coinciding with the axis about which said heads are mounted to turn, and the work-holder arranged to hold the blank in registry with the respective tool-holders, the work-holder and tool-support being so mounted that one of them is capable of a pivotal movement about the axis of the standard, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

IGNAZ ROEDERER.

Witnesses:
ADOLPH FISCHER,
OTAKAR NOVAK.