(No Model.) 2 Sheets—Sheet 1.

F. DUBRUL.

METAL DRILLING MACHINE.

No. 264,263. Patented Sept. 12, 1882.

Fig. 1.

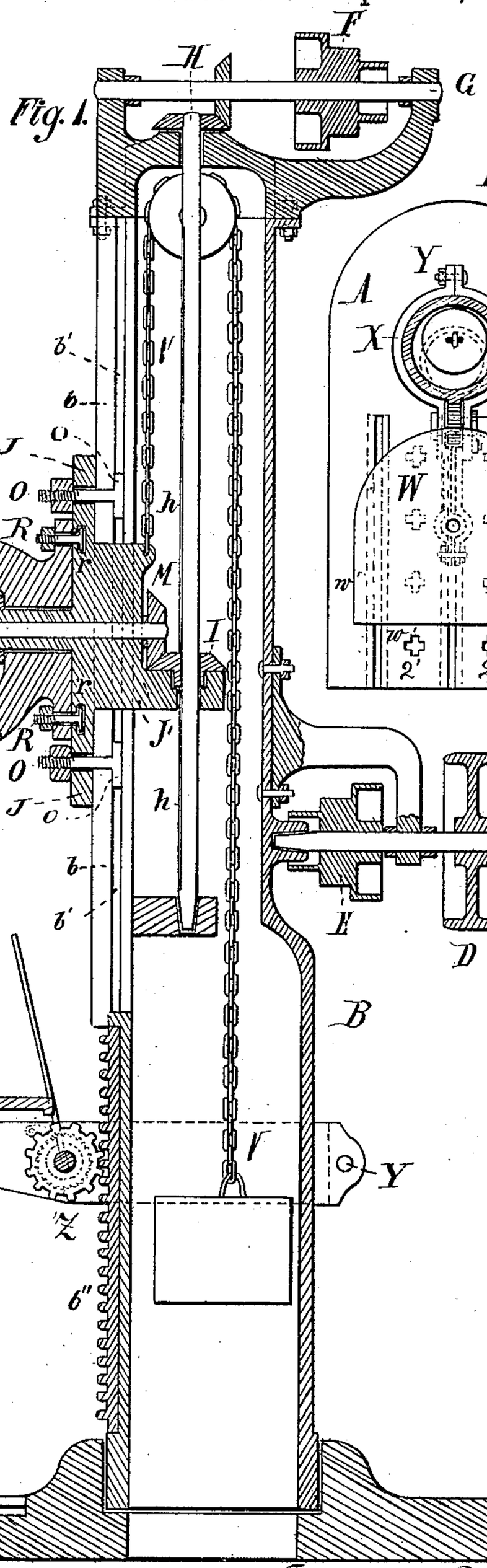

Fig. 2.

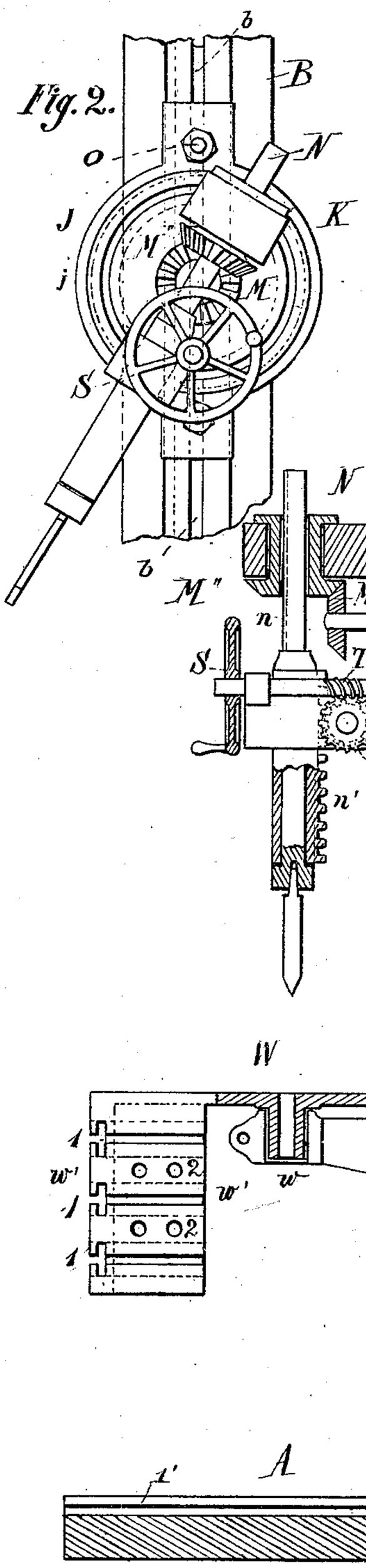

Fig. 3.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

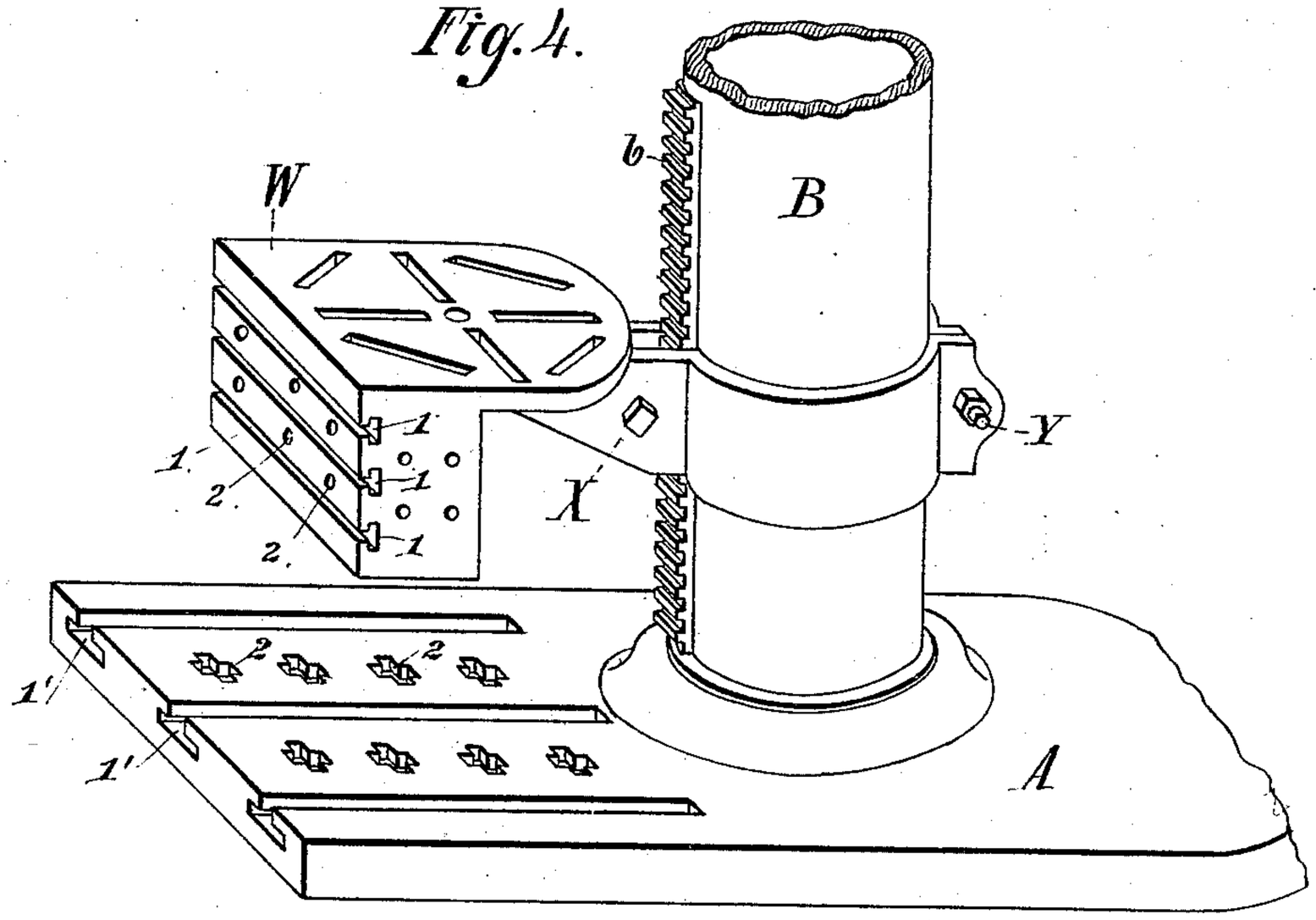
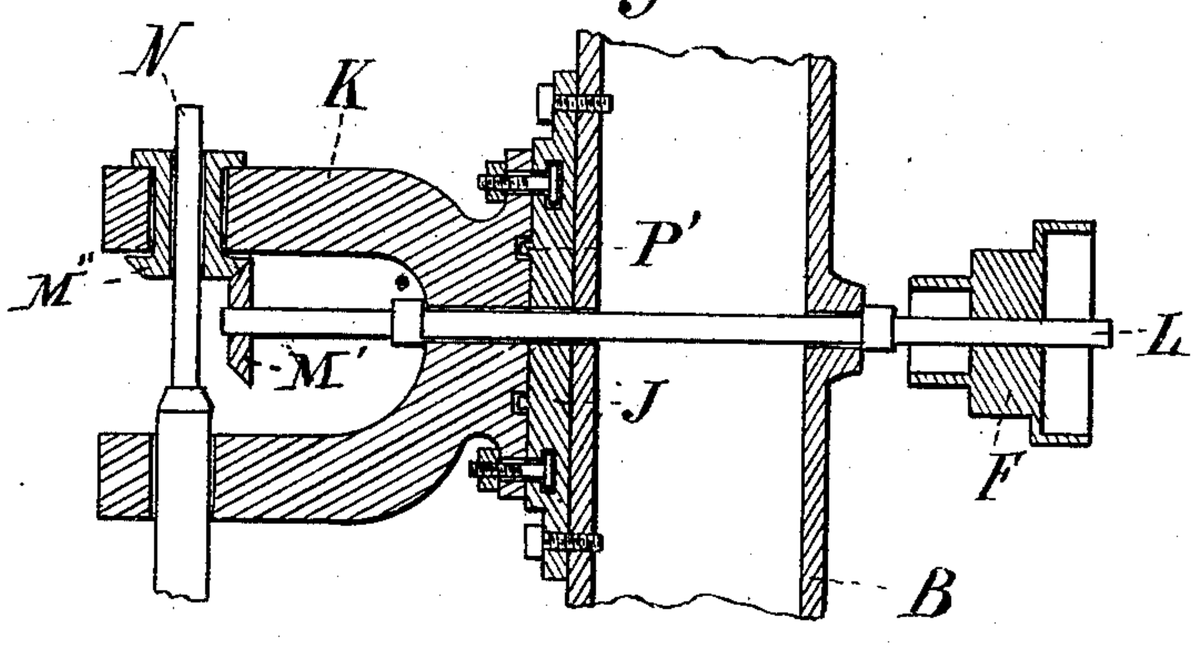


Fig. 5.



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UNITED STATES PATENT OFFICE.

FERDINAND DUBRUL, OF CINCINNATI, OHIO.

METAL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 264,263, dated September 12, 1882.

Application filed March 10, 1882. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND DUBRUL, of Cincinnati, Hamilton county, Ohio, have invented a new and useful Improvement in Drilling-Machines, of which the following is a specification.

My invention has for its object a compact form of drilling-machine capable of drilling either vertical to the face of the stuff or at any desired angle. With means for such purpose there are associated, in the most complete form of my improvement, devices to facilitate the support and clamping of the work to be operated upon and means for the optional elevation or depression of the drill-stock.

In the accompanying drawings, Figure 1 is a vertical section of a drilling-machine embodying my improvements. Fig. 2 is a front view of the spindle-carrier. Fig. 3 is a plan, and Fig. 4 a perspective view, of the turn-table and attachments thereof. Fig. 5 represents a modification of my device, in which the spindle-carrier head is bolted fast to the column, and in which the drive-shaft of the drill-spindle passes rearward through the column and itself carries the cone-pulley.

A suitable cast-iron base, A, affords support and attachment to a vertical cast-iron column, B. Journaled in rear of column B is the counter-shaft C, having customary fast and loose pulleys, D D′, and a stepped or cone pulley, E, having the usual belted connection with a corresponding pulley, F, whose shaft G has bevel-gear connection with a shaft, H, journaled vertically within the column. The shaft H is grooved at *h* for a correspondingly-feathered sliding bevel-wheel, I, which is journaled in the sliding head J, that supports my spindle-carrier K. A shaft, L, that passes out horizontally through the head J, has bevel-gear connection M M′ M″ with the bevel-gear wheel I and with the drill-spindle N, which spindle is grooved at *n*, so as to compel its rotation with, while permitting its longitudinal sliding within, the correspondingly-feathered gear M″. The head J is capable of being shifted upward or downward within the column, and is guided to its proper vertical path by the rearward projection, J′, which occupies the slot or groove *b* in said column. Bolts O, also occupying said slot, and having heads which occupy side grooves, *b′*, in same, enable the secure attachment, for the time being, of the said sliding head to whatever level it is adjusted. The gravity of the said sliding head is balanced by a weighted chain, V, within the column.

The spindle-carrier K is supported and centered upon a stud, P, that extends horizontally from the front wall of the head J, and is secured to its place upon said projection by a nut, Q.

This mode of attachment permits the drill-stock to be placed at any desired height and angle. The said spindle-carrier is capable of being fixed at whatever angle it may be adjusted by means of bolts R, whose heads *r* occupy an annular T-groove, *j*, in said head.

The drill-spindle N is capable of being adjusted to any desired longitudinal position in the drill-stock K, and thus of being fed into or withdrawn from the work by means of the represented hand-wheel S, worm and pinion gear T U, and spindle-rack *n′*.

To support and secure the work I provide a turn-table, W, which is pivoted, as at *w*, in an arm or bracket, X, which, embracing the column at any desired part of its height, is clamped loosely thereto by bolts Y. Said bracket X is preferably so fixed, as shown, as that both it and the rack *b″* may be swung to right or left upon the column B to facilitate the proper presentation of the work. The height of said bracket X is determined and adjusted, at discretion of the user, by ratchet-pinion Z on the said bracket, which gears in rack *b″* on the column-face. The turn-table W has one or more flat vertical sides, *w′*, which may have T-grooves 1 and sockets 2 for the heads of the clamps by which the work is held. That portion of the base A in front of the column may have similar grooves, 1′, and sockets 2′ for cylinders and such other bulky castings as are preferably clamped directly to the base, after the temporary removal for that purpose of the turn-table and its supporting-bracket.

The above-described preferred form of my improvement may be modified in some particulars. For example, the machine may be constructed, as in Fig. 5, so that the horizontal shaft L will extend back through the column to receive the stepped pulley F, in which case

the head J may be either cast in one piece with the column or constitute, as in Fig. 5, a distinct casting, and be bolted to the column; and instead of central stud, P, an annular flange, P′, occupying a corresponding groove in the rear face of the drill-stock, may serve to center and support the latter member. With such arrangement of parts the spindle-carrier K would retain its capacity for angular adjustment, although no longer variable in height.

The above-described means of placing the drill at any desired obliquity are of great advantage, because, while equally applicable for vertical boring to presses whose drill is incapable of angular change of presentation, it can with great ease and expedition be set with the greatest accuracy to any oblique presentation without canting or otherwise disturbing the position of the piece to be drilled. These advantages will be apparent to any practical mechanic.

The described downward projection or projections of the turn-table constitute an important feature of novelty and render my drill far more desirable than those without such provision, because a great variety of work can be held to very much more advantage, and more accurate work be done in less time than without such provision. The downward projection may be made in a circle, in conformity with a round table, or in one or more flat portions, as at *w′*, Figs. 3 and 4; but at no time do I make such downward projection to go clear around the table. On the contrary, I make only a section or part of the table's circumference with downward projections, and thus leave the remainder free, so as to enable me to partly revolve the table upon the arm X, which arm, with its rack *b″*, is, when the work requires it, capable of being revolved in a horizontal plane around the column.

I claim as new and of my invention—

1. In a drilling-machine, the combination of the arm X with the table or rest W, pivoted upon vertical spindle, and having downward projection W′, as and for the purpose set forth.

2. In a drilling-machine, a spindle-carrier, K, supported and centered upon stud P, and having bolts R, which occupy annular segmental grooves *j* in the head J, as and for the purposes set forth.

In testimony of which invention I hereunto set my hand.

FERDINAND DUBRUL.

Attest:

GEO. H. KNIGHT,

SAML. S. CARPENTER.