

No. 675,737.

Patented June 4, 1901.

O. JACOBY.

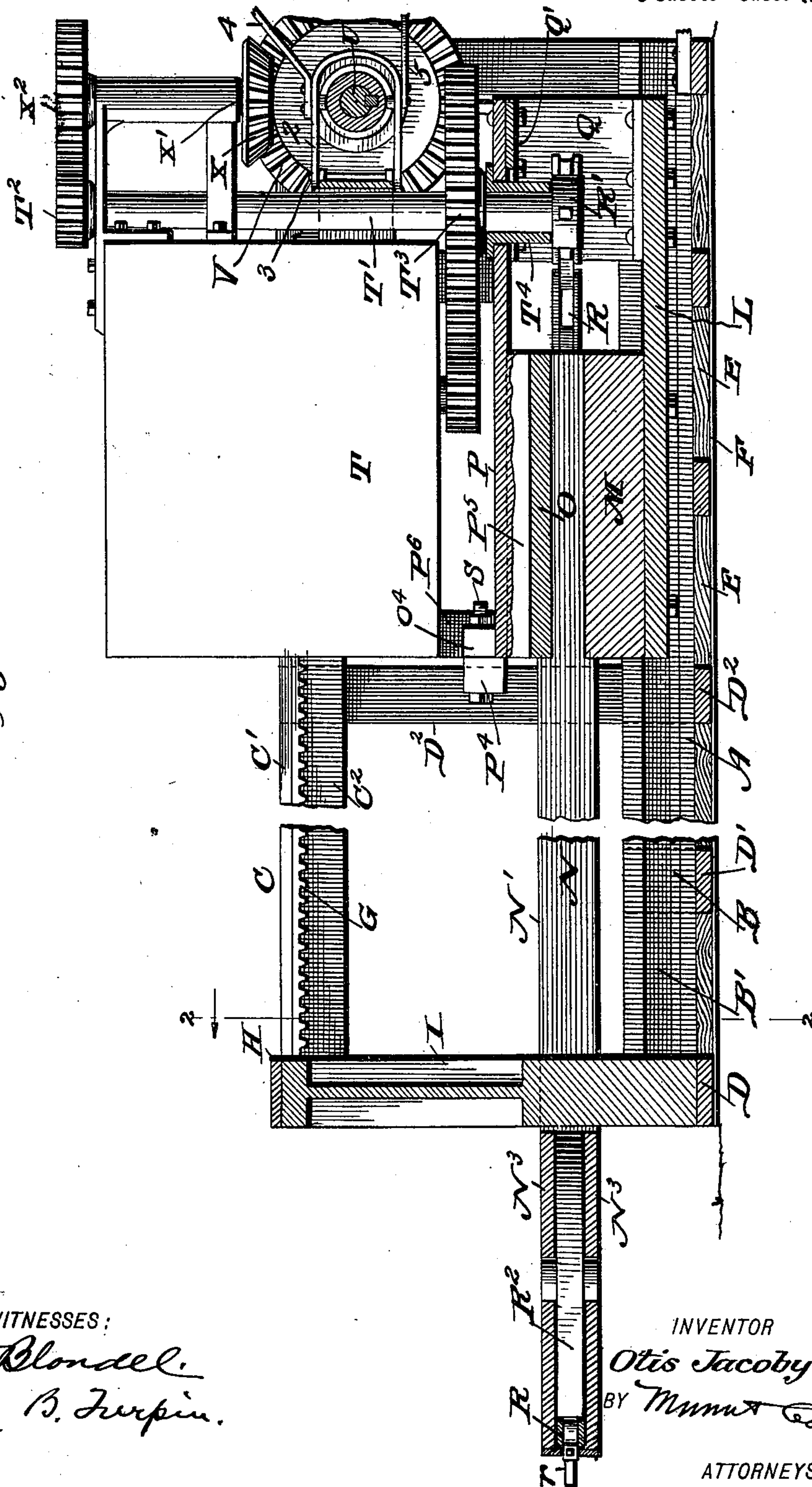
COAL MINING MACHINE.

(Application filed July 31, 1900.)

(No Model.)

8 Sheets—Sheet 1.

Fig. 1.



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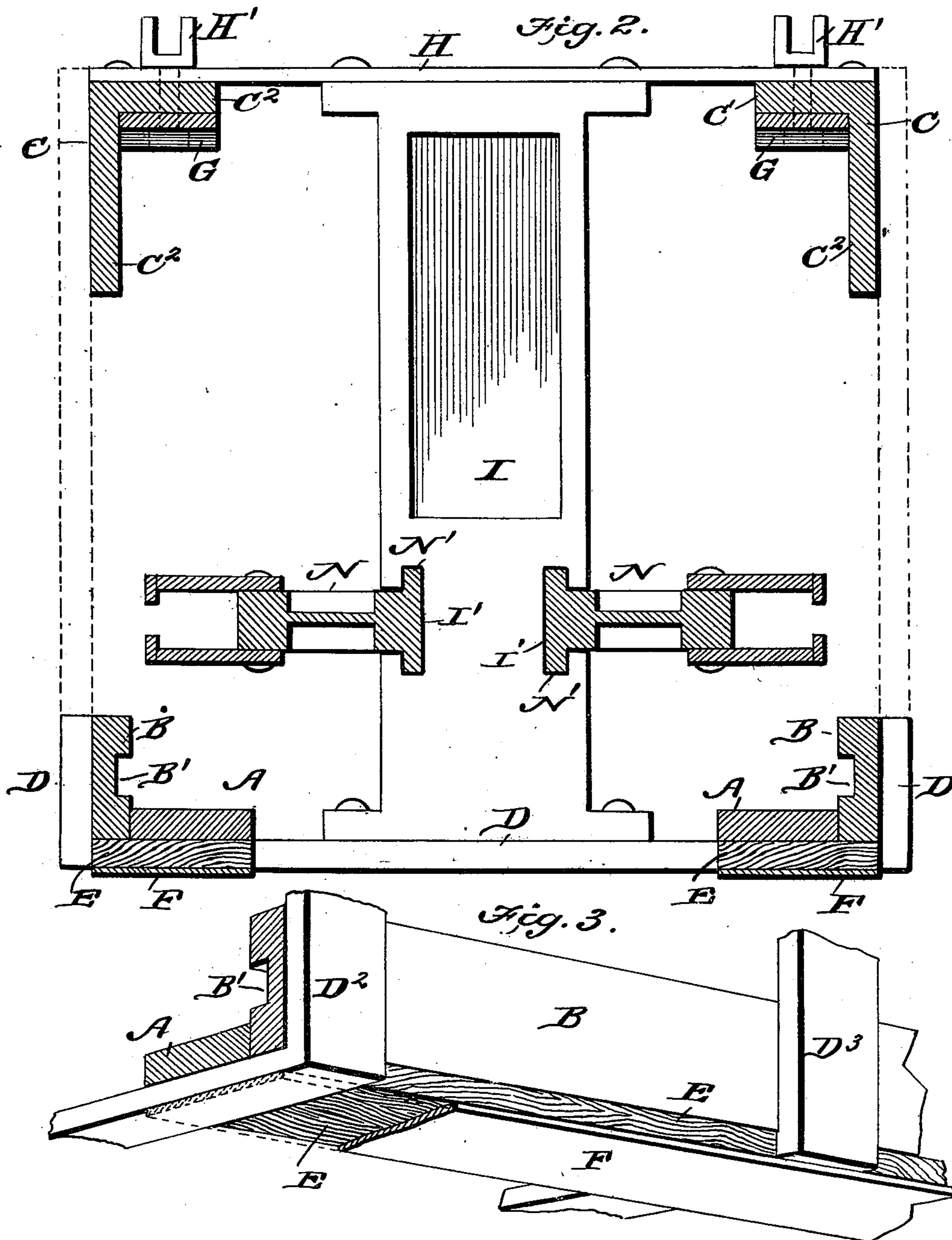
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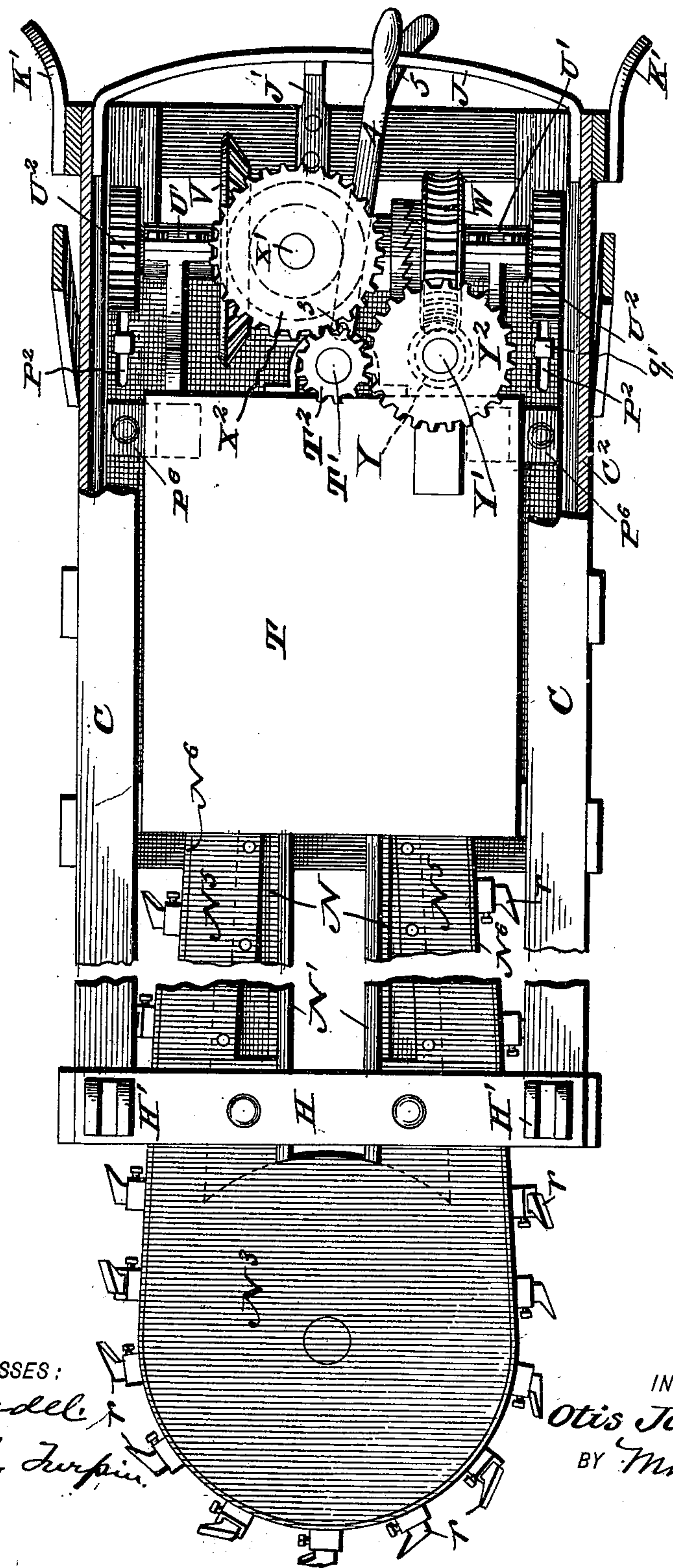
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Fig. 5.



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Fig. 6.

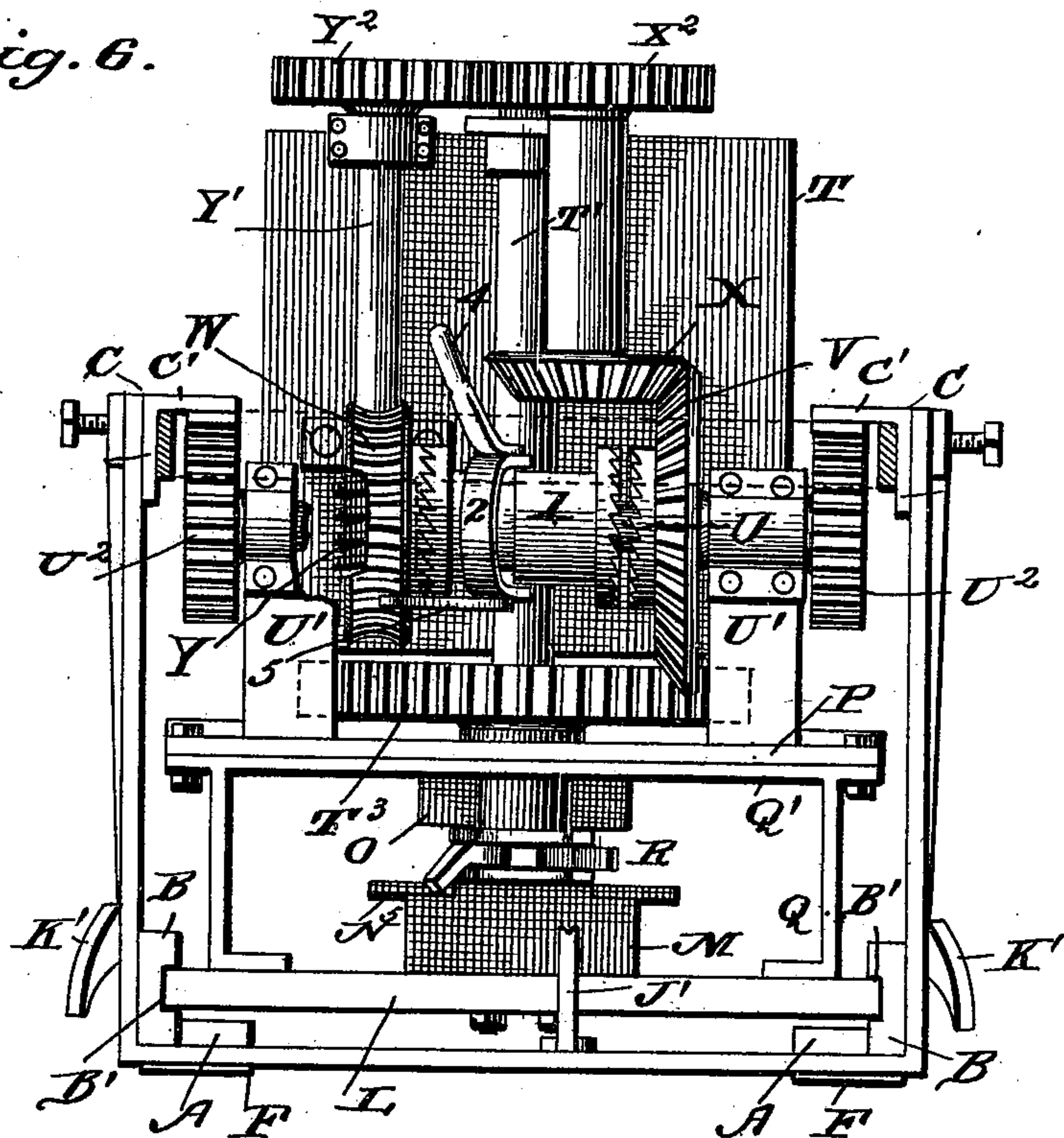


Fig. 7.

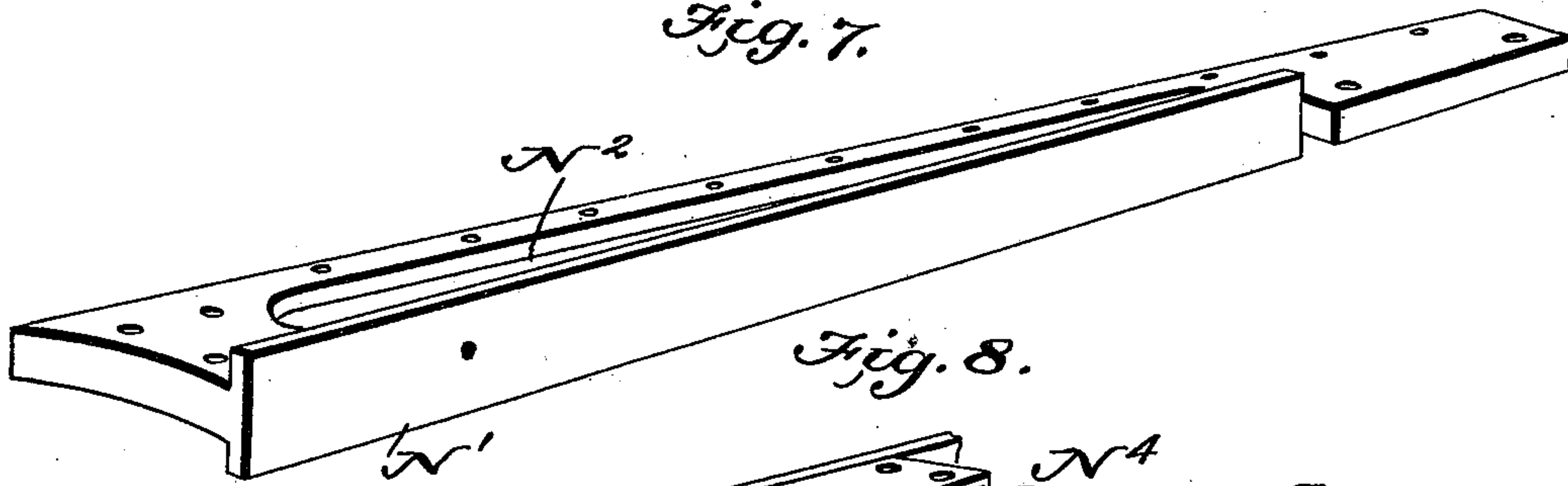
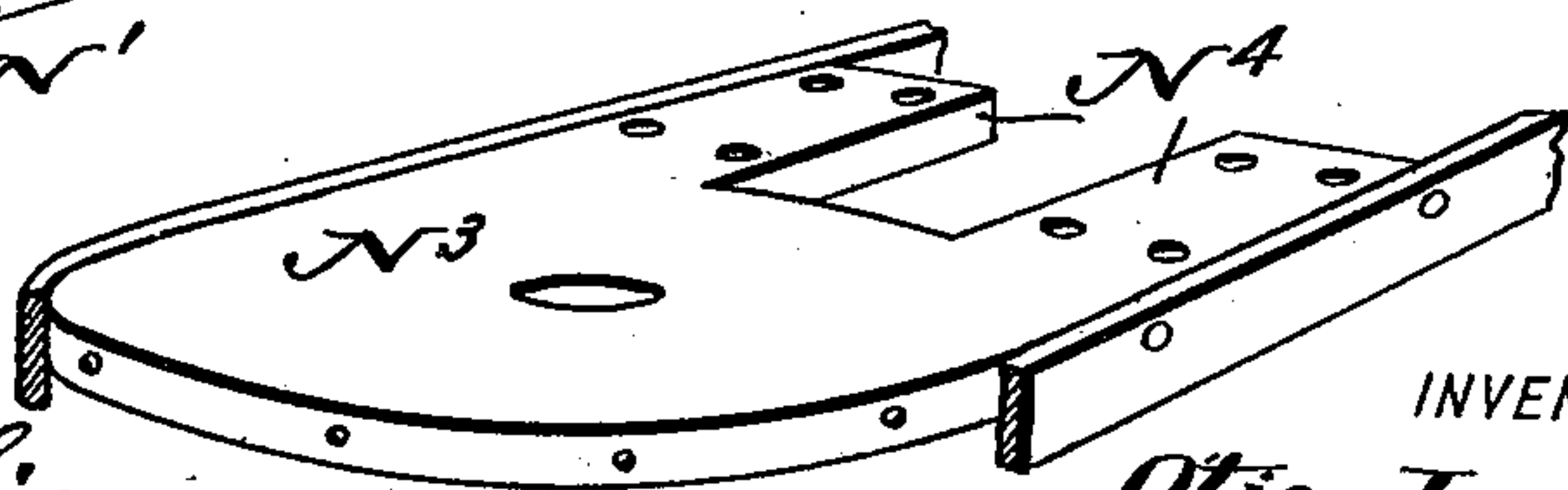


Fig. 8.



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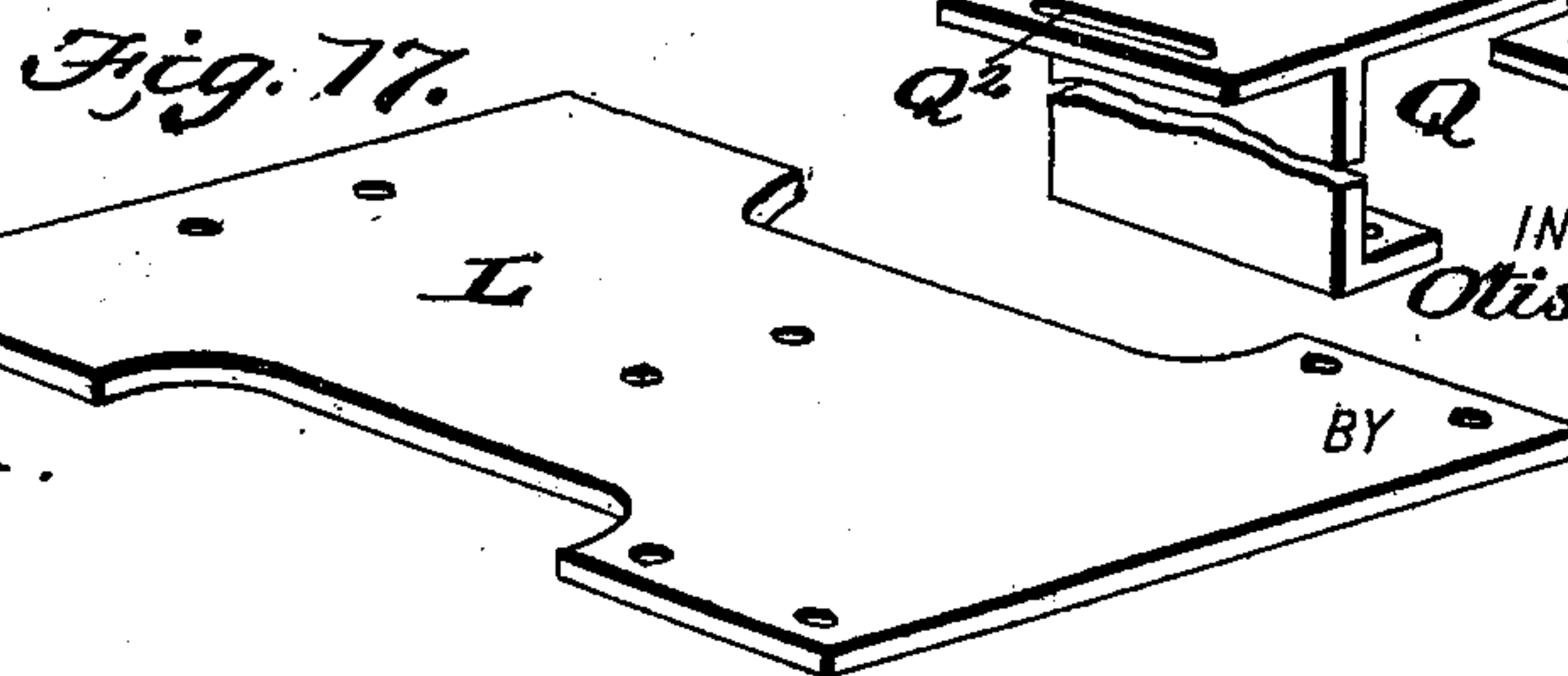
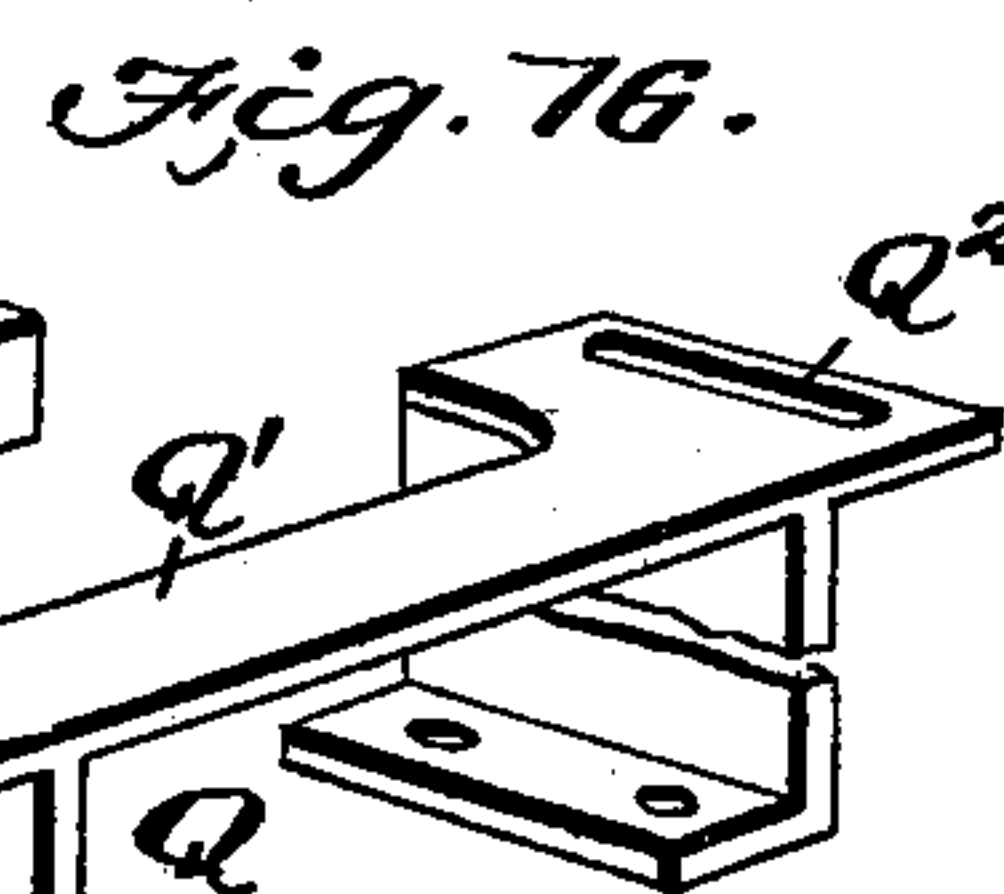
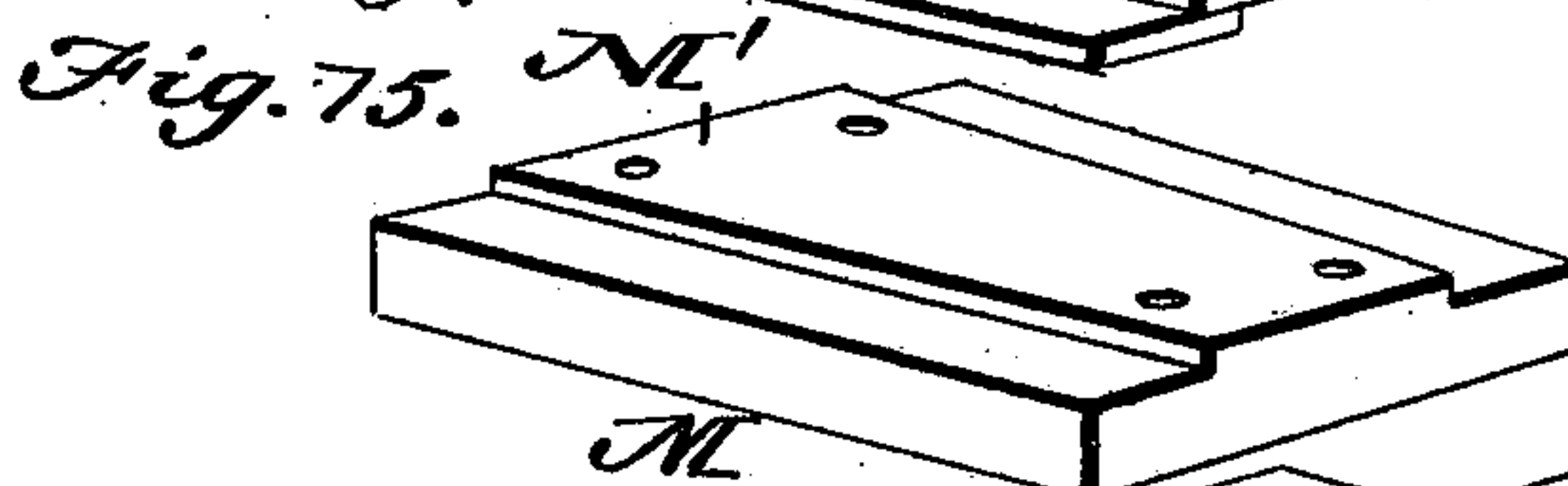
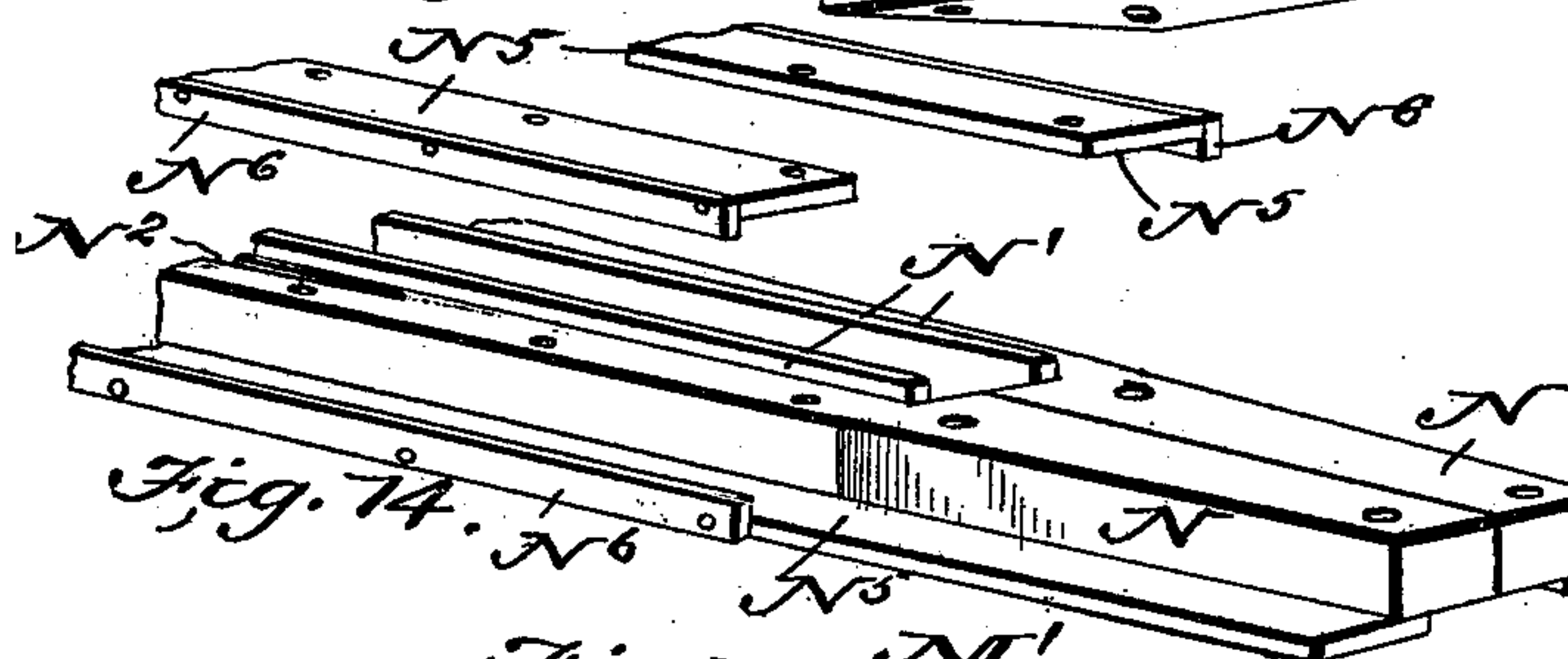
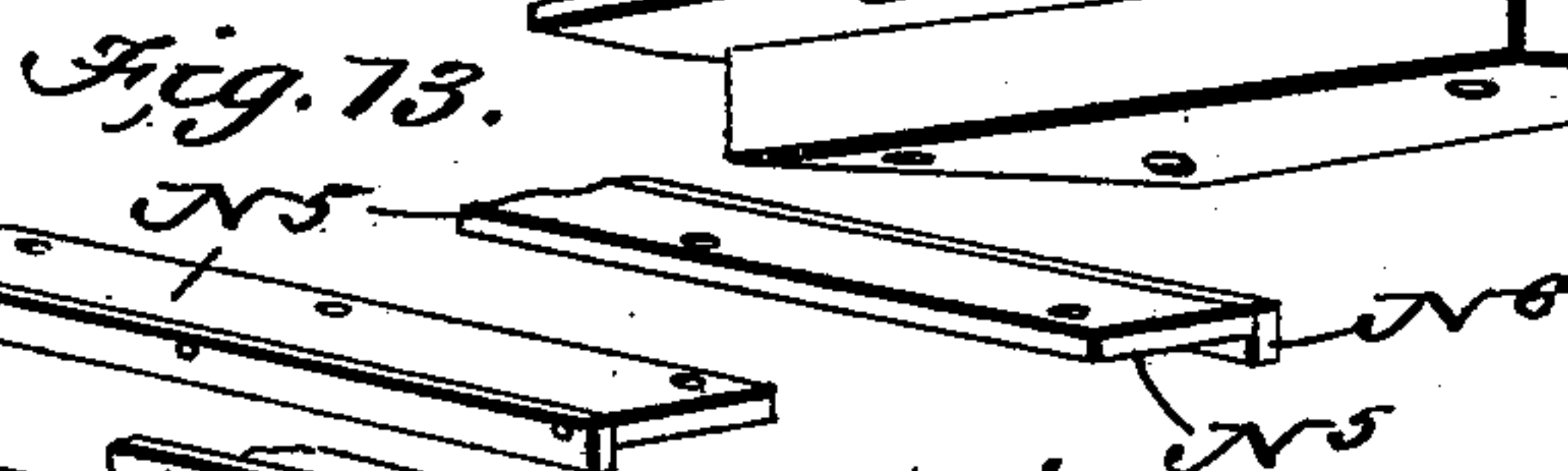
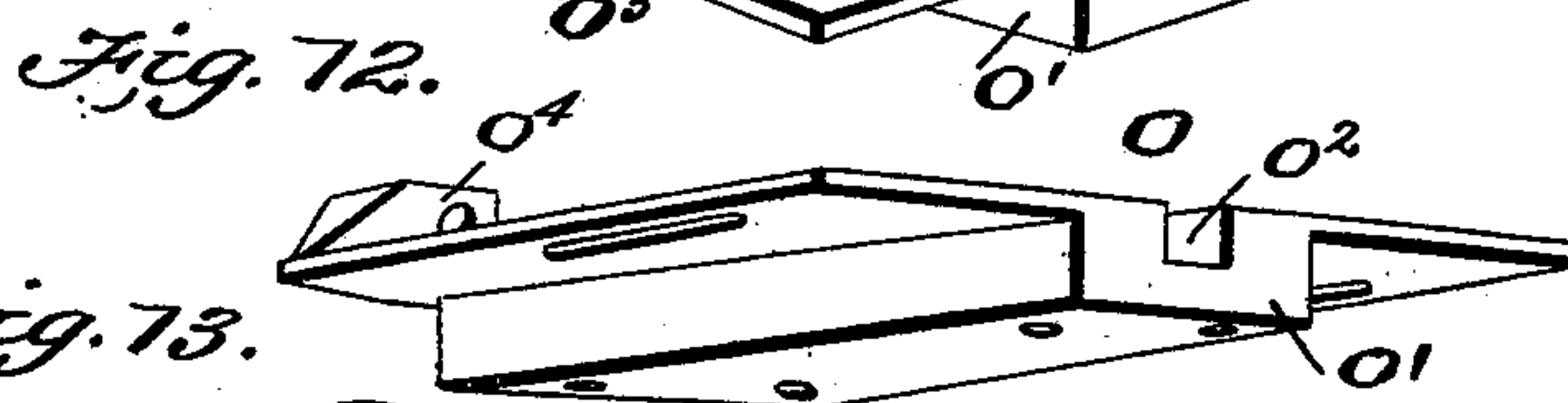
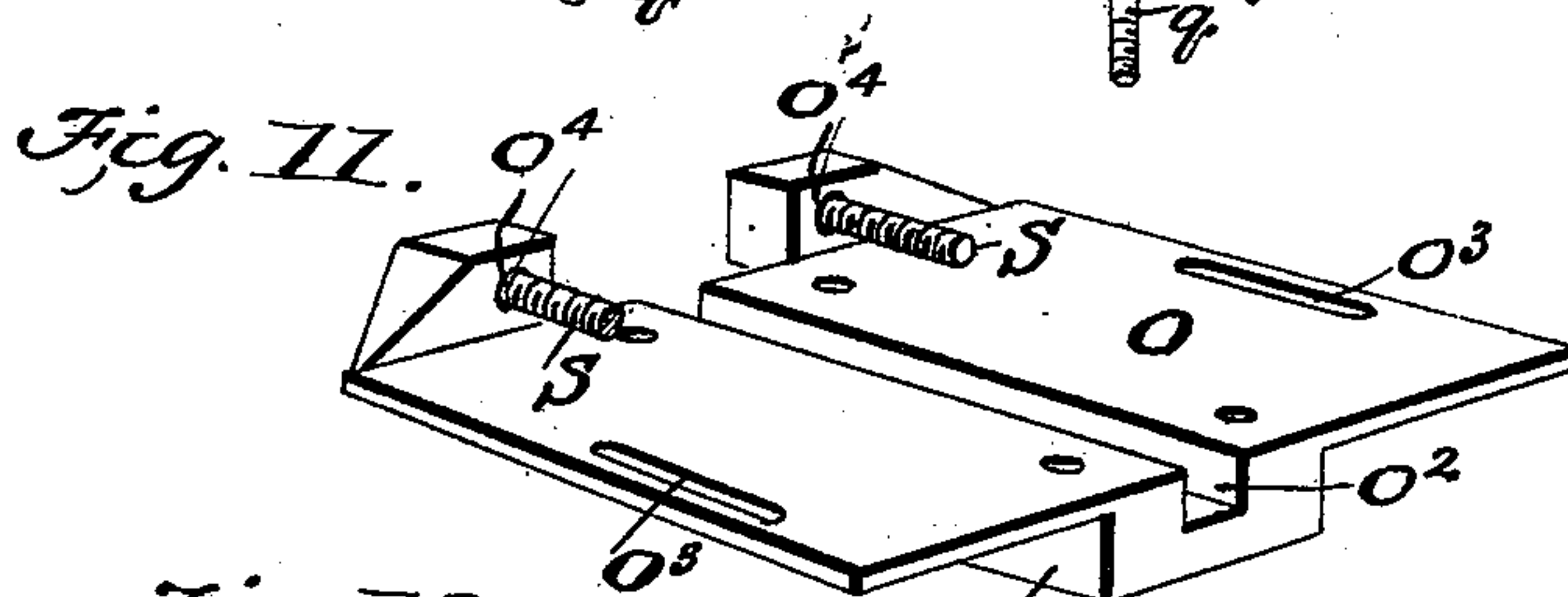
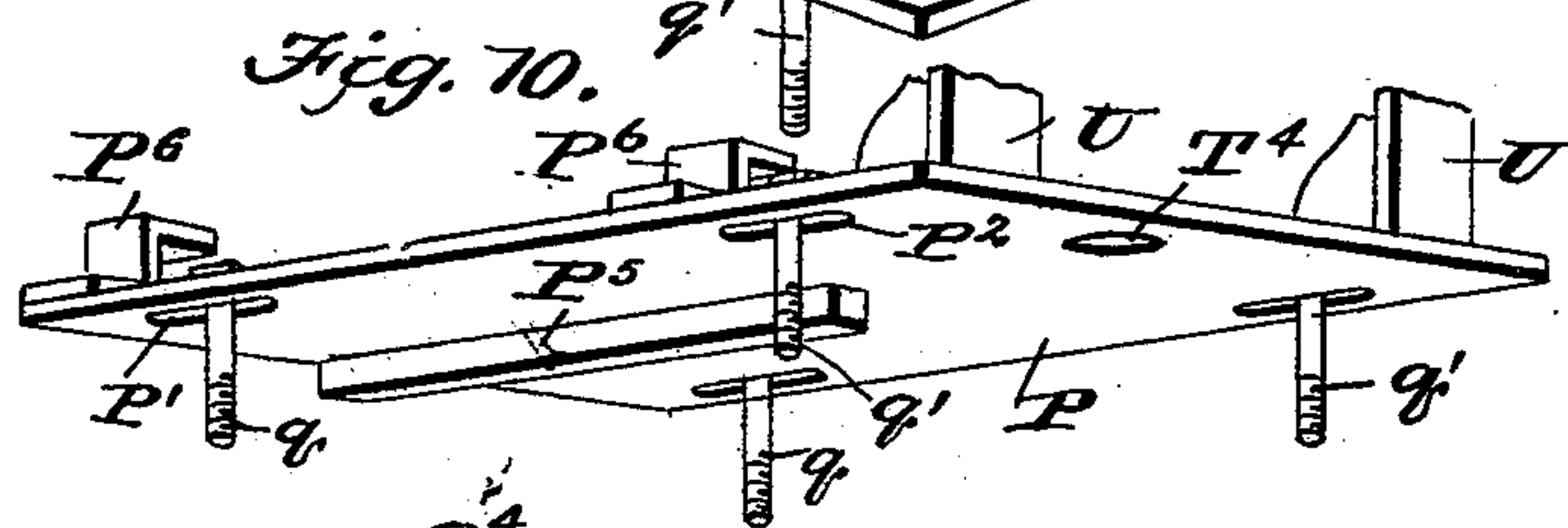
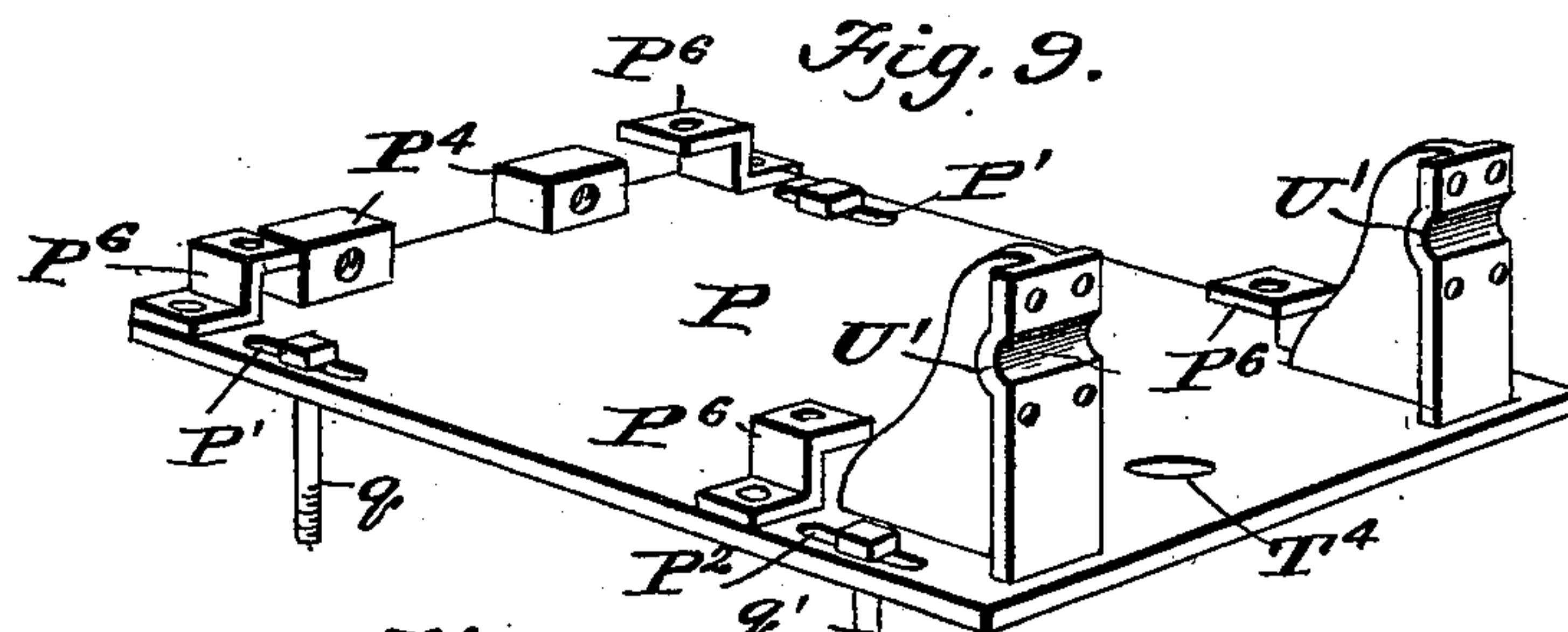
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COAL MINING MACHINE.

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(No Model.)

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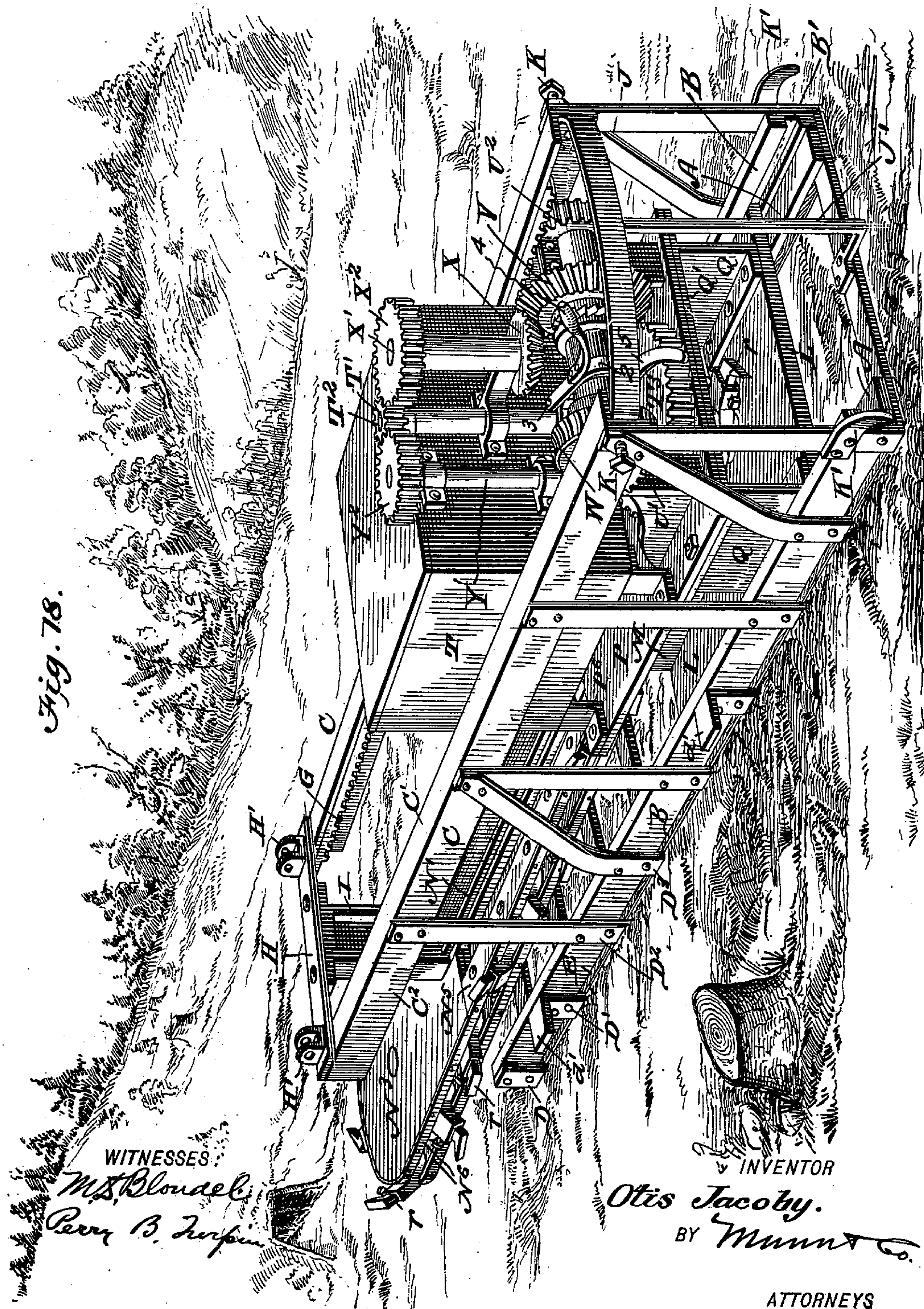
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COAL MINING MACHINE.

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(Application filed July 31, 1900.)

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Fig. 78.



No. 675,737.

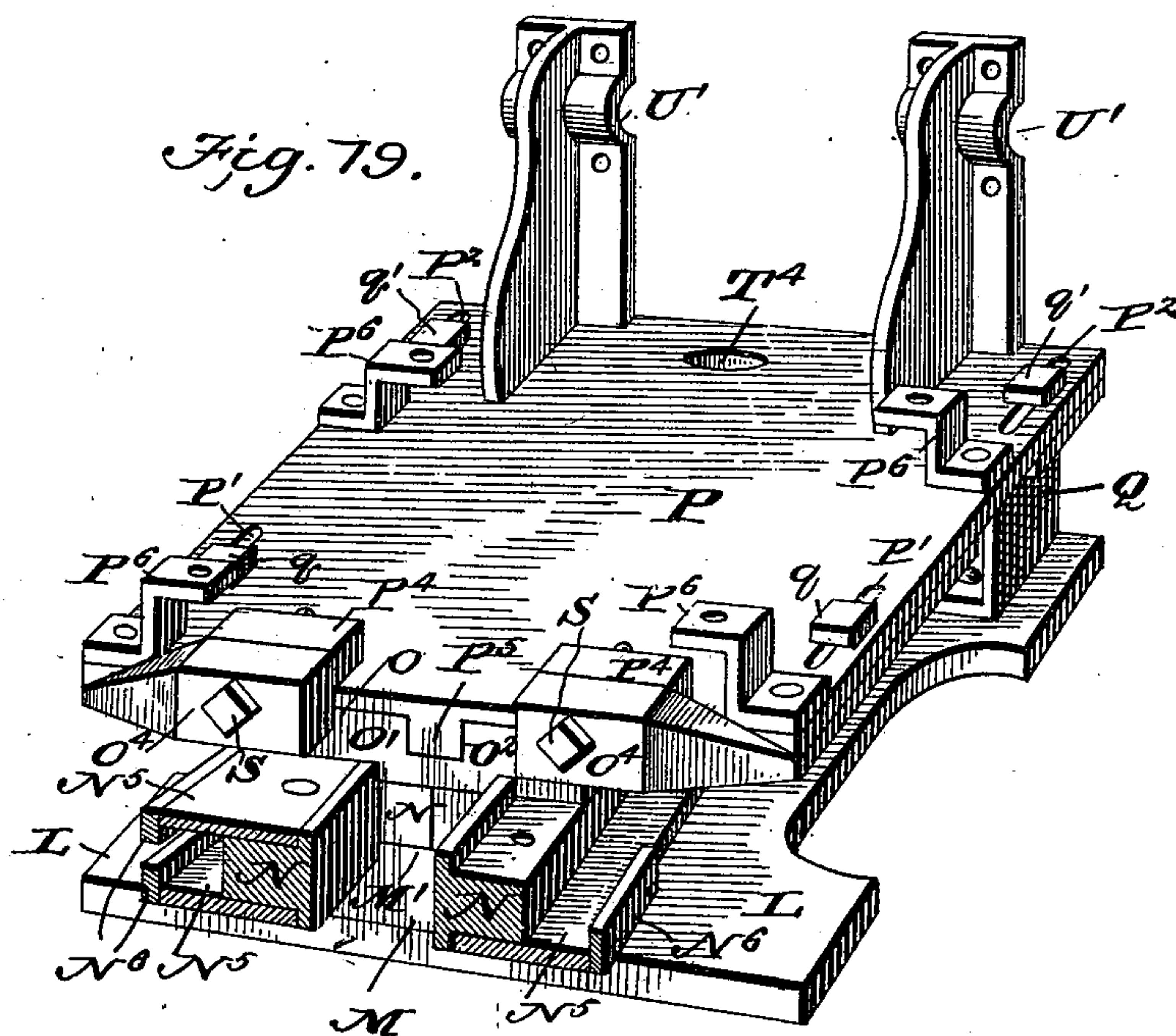
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UNITED STATES PATENT OFFICE.

OTIS JACOBY, OF SANDRUN, OHIO.

COAL-MINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 675,737, dated June 4, 1901.

Application filed July 31, 1900. Serial No. 25,376. (No model.)

To all whom it may concern:

Be it known that I, OTIS JACOBY, residing at Sandrun, in the county of Hocking and State of Ohio, have made certain new and
5 useful Improvements in Coal-Mining Machines, of which the following is a specification.

My invention is an improvement in mining-machines, and is especially designed for use
10 in the mining of coal.

The invention has for an object, among others, to provide a novel form of main frame which will be strong and rigid and will efficiently resist the tendency to lateral vibration and displacement common in machines
15 of this class; further, to provide a novel construction of carriage for the cutter-band and to provide improvements in the operating devices.

20 The invention consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a vertical longitudinal section of a machine embodying
25 my invention. Fig. 2 is a cross-sectional view on about line 2 2 of Fig. 1. Fig. 3 is a detail sectional perspective view illustrating one side of the base of the main frame. Fig. 4 is a detail perspective view of the main
30 frame, the operating parts being removed. Fig. 5 is a top plan view of the machine, parts being removed and others shown in section. Fig. 6 is an end view of the machine with parts broken away. Fig. 7 is a detail perspective
35 view of one of the slide-sections of the carriage. Fig. 8 is a detail perspective view of one of the sections of the cutter-head. Figs. 9 and 10 are perspective views showing, respectively, the upper and under sides of the
40 foundation or base plate for the engine or motor mechanism. Figs. 11 and 12 are detail perspective views showing, respectively, the upper and under sides of the seat-plate for the engine-foundation. Fig. 13 is a detail
45 view showing portions of the flanged guides for the cutter-band. Fig. 14 is a detail perspective view, partly broken away, showing the rear ends of the two slide-sections of the carriage. Fig. 15 is a detail perspective view
50 of the step-block which underlies the slide-sections. Fig. 16 is a detail perspective view, partly broken away, of the back stand for

supporting the rear end of the foundation-plate. Fig. 17 is a detail perspective view of the base-plate of the carriage. Fig. 18 is a
55 perspective view of the machine; and Fig. 19 is a detail perspective view showing the frame of the carriage, the cutter-head sections being shown in section.

My machine includes a main frame, which
60 is best shown in Fig. 4, and a carriage which supports the cutting devices and the engine or motor mechanism and is movable back and forth in the main frame, so the cutting devices can be properly projected and operate
65 to cut in the bank of coal when the machine is operated. It is of importance in machines of this character to provide a main frame which will possess great strength to resist the vibration and lateral strain incident to
70 the cutters meeting an unyielding obstruction, and I provide a special construction of main frame which will be best understood on reference to Fig. 4, in which the main frame is shown in detail, the operating parts
75 being removed.

In constructing the main frame I employ base-bars A, which form sills and fit, edge-wise along the outer sides of the base-bars A, the guide-bars B, which are provided in their
80 inner faces above the bars A with longitudinal grooves B', in which slide the opposite edges of the base-plate of the carriage as the carriage is moved longitudinally to advance and retract the cutting devices. At the top
85 of the main frame, at its opposite sides, I provide the top bars C, made of angle-iron, with the top wings C' and the depending wings C² at the outer sides of the wing C' and in a plane with the guide-plates B. In connection
90 with the sill-bars and the top bars I provide yokes D, D', D², and D³, whose cross-bars extend between and beneath the base or sill bars A and whose upright bars extend upward alongside the plates B, as shown in Fig.
95 4. These yokes are somewhat differently constructed in their upright portions. Thus the yokes D and D' are stub-yokes, the yoke D terminating at its upper end about in line with the upper edge of the guide-plate B,
100 while the yoke D' has its upright portion carried to an equal height with that of the yoke D and then extended laterally outward, forming a projecting lug d', beneath which a crow-

bar may be engaged in shifting the machine whenever desired. As shown, I employ two of the stub-yokes with the lugs d' ; but manifestly the number may be varied as desired or necessary. The upright portions of the yokes D^2 extend upward and are bolted firmly to the flanges C^2 of the top bars C, forming upright supports for said top bars, as shown in Fig. 4. The yokes D^3 extend upward alongside the guide-bars B, are bolted to said guide-bars, and then extend at an angle above the guide-bars B upward and lap alongside the upper ends of the adjacent yokes D^2 , being bolted with said yokes to the wings C^2 , as best shown in Fig. 4. The upright portions of the yoke D^3 thus form struts for bracing the main frame in a longitudinal direction, as will be understood from Figs. 4 and 18. It will be noticed that the lower edges of the guide-bars B stand above the under side of the cross-bars of the yoke. This space underlying the sill-bars A between the adjacent yokes I fill with blocks or beams E of heavy wood, such as oak, making the base of the blocks E flush with the under sides of the cross-bars of the yokes. I then extend runner-plates F longitudinally from end to end of the machine and below the yokes and blocks E, forming runners on which the machine may be slid longitudinally, as desired. The rack-bars G, which are engaged by the feed-pinions of the carriage, extend beneath and are secured to the horizontal wings C' of the top plates C and aid in giving rigidity to the framing. At its front end or end from which the cutting devices are movable I connect the top bars C by a cross-bar H, secured at its ends to the horizontal wings of the top bar, and upon the cross-bar overlying the wings C' , I secure the lugged brackets H' , in which the jacks for securing the machine in place are pivoted and secured. Between the cross-bar H and the cross-bar of the yoke D I secure the front guide-frame I, firmly bolted in place, located midway between the sides of the frame, and provided in its opposite edges with the undercut slots or recesses I' , in which are movable the slide-sections of the carriage, as presently described.

At the rear end of the machine I connect the opposite top bars by a bar J, which is arched rearwardly, as shown in Fig. 4, is securely held to the top bars at their rear ends, and supports the upper end of a central upright bar J' , which operates to throw the operating mechanism out of gear at the rear end of the stroke of the machine.

Headed studs K project laterally from the upper rear corners of the main frame and form pivots for the jacks, which secure the rear end of the machine in place. At this end of the machine, near the base thereof, I provide short bars K' , which project rearwardly and curve outward and downward, as shown. These bars K' form bearings for engagement by crowbars used for shifting the machine whenever desired.

By the before-described construction I provide a main frame of great strength and rigidity which is adapted to be securely jacked in position in a mine and for being readily shifted whenever desired. In this frame the carriage and cutting devices are held and movable longitudinally, so the cutting devices can be projected and retracted in the operation of the machine.

The carriage is shown in place in the main frame in Figs. 1, 5, 6, and 18, and such carriage is shown in detail, with its several parts detached, in Figs. 9 to 17, inclusive, and will be now described.

The carriage, as shown, is composed of the base-plate L, the step-block M, bolted centrally on the base-plate L at the forward end of the latter, the slide-sections N, secured side by side at their rear ends upon the step-block M, the seat-plate O, secured upon the rear ends of the slide-sections over or above the step-block M, and the foundation-plate P, which is secured upon the seat-plate O and can be adjusted back and forth thereon. The carriage also has a back stand Q, which is secured upon the rear end of the base-plate L and extends up past the said block M, the sections N, and the seat-plate O and lies under and supports the rear end of the foundation-plate P, as will be understood from Figs. 9 to 17, inclusive, and Figs. 1 and 18.

The base-plate L fits and slides at its opposite edges in the grooves B' of the guide-bars B and forms a steady support for the step-block M and the back stand Q. The step-block M is provided with a longitudinally-extended raised portion M' , which tapers from end to end, gradually widening toward its forward end, as shown in Fig. 15. The slide-plates N gradually widen toward their forward ends, as shown in Fig. 7, lap on opposite sides of the guide-frame I, and are provided on their inner adjacent edges with ribs N' , which fit in the ways I' of the guide-frame I and hold the side sections to the said guide-frame and at the same time permit the longitudinal movement of the slide-sections along the guide-frame, as will be understood from Fig. 2. The ribs N' , it should be understood, are parallel, while the outer sides of the slide-plates N taper or flare outwardly toward their forward ends where they unite with the sections of the cutter-head, as shown in Fig. 8. The slide-sections are recessed at N^2 for lightness, and the sections N^3 of the cutter-head are provided at their rear ends with lugs or extensions N^4 , which fit upon and beneath the front ends of the slide-sections on opposite sides of the ribs N' and operate to support the front curved portion of the cutter-band in the operation of the machine. Upon the upper and lower faces of the slide-sections I secure the plates N^5 , which project outwardly and form between them a guideway for the cutter-band, flanges N^6 being provided at the outer edges of the plates N^5 for a portion of their length

to brace and support the cutters of the cutter-band during a portion of its movement. The cutter-band R fits around the slide-sections, passes at its rear end around the drive-pulley R', which is suitably driven, as shown in Fig. 1 and hereinafter described, and also passes around a guide-pulley R², supported between the sections N³ of the cutter-head, as shown in Fig. 1. The band R has suitable cutters r and operates to cut a channel in the bank of coal when operated, as presently described. From the foregoing description it will be noticed the cutter-band gradually widens toward the cutter-head, providing a broad cutting surface at the front end of the cutter, as shown in Fig. 5. The elevated portion M' of the step-block M fits between the guide-plates N⁵, at the rear ends of the latter. The seat-plate O is provided centrally with a longitudinally-extended depressed portion O', conforming generally to the shape of the elevated portion M' of the block M, and this depressed portion O' fits between the upper guide-plates N⁵, and, together with the seat-block M, is firmly bolted to the slide-plates N and to the base-plate L, so the parts L, M, N, and O are rigidly united together. A groove O² is formed longitudinally in the upper side of the seat-plate O, and such plate has near its outer edges the longitudinally-elongated slots O³ and is provided at O⁴ with bearings for the adjusting devices which operate to set the foundation-plate P back and forth, as presently described.

The back stand Q is bolted at its lower end upon the base-plate L and extends upwardly, so that its top plate Q' is in the same horizontal plane with the seat-plate O, and this top plate is provided with slots Q², elongated in the direction of length of the carriage and parallel with each other, and with the slots O³ of the seat-plate.

The foundation-plate P rests at its front end upon the seat-plate O and at its rear end upon the back stand Q and is provided with slots P' and P², which register, respectively, with the slots O³ and Q² of the seat-plate and back stand, so bolts q and q' can be passed through said slots to secure the foundation-plate firmly upon its supports and yet permit its adjustment back and forth, as may be desired. This adjustment of the plate P back and forth is effected by means of the bolts S, which preferably journal in the bearings O⁴ of the seat-plate O and threaded in the bearings P⁴ of the foundation-plate P, so such bolts can be turned to adjust the foundation-plate back and forth, as may be desired, in order to properly tighten the cutter-band or for any other desired purpose. On its under side the foundation-plate is provided with a longitudinal rib P⁵, which fits in the groove O² of the seat-plate and braces the foundation-plate against lateral vibration or displacement, as will be readily understood from the drawings.

Brackets P⁶ are mounted upon the foundation-plate and support the motor T, which may be an electric motor or other suitable form, and has the drive-shaft T', provided at its upper end with the pinion T² and at its lower end with a drive-wheel R' for the cutter-band. This drive-shaft T' is suitably geared at T³ with the main shaft of the motor, so it is driven therefrom. The shaft T' is journaled in a bearing T⁴ in the foundation-plate P, and the horizontal shaft U for feeding the carriage back and forth is journaled in bearings U⁷ on the foundation-plate P and is provided at its end with pinions U², which mesh with the racks G of the main frame, so the turning of the shaft U in one direction will feed the carriage forward and in the other direction will feed the carriage back. Upon the shaft U, I fit loosely a bevel gear-wheel V and a worm-wheel W, which are meshed, respectively, by a bevel-pinion X and a worm Y, supported on shafts X' and Y', which are provided with pinions X² and Y², which are meshed with the pinion T², so the gear X and the worm Y will operate to constantly drive the gear V and the worm W.

As before stated, the gear V and worm W are loose upon the shaft U, and I provide means for clutching them to the shaft alternately, so the worm W may be keyed to the shaft in order to feed the cutter-band into the bank at the desired speed, and the gear V can then be keyed to the shaft in order to more rapidly retract the carriage to draw the cutter-band out of the bank. To this end I provide a clutch-sleeve 1, which is keyed on and movable along the shaft U between the gear V and the worm W and has at its ends clutch portions which engage with corresponding clutch portions on the parts V and W to feed the carriage into the bank and retract the same. For adjusting the clutch-section I employ a lever 2, pivoted at 3, having a handle 4 and a rearwardly-projecting cam extension 5, which is curved to engage with the bar J' at the end of the rearward stroke or movement of the carriage and throw the clutch-section at such time automatically out of engagement with the bevel-gear V to stop the machine. As will be noticed from Fig. 5, the arrangement of the bar J' and the cam extensions 5 is such that while said parts disengage the clutch from the gear V they will not throw the clutch into mesh with the worm W; but such operation must be positively effected by the operator.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a mining-machine the combination of the carriage provided with slide-sections having at their inner edges parallel guiding-ribs and widening gradually toward their front ends, the cutter-head sections provided with lugs secured to the front end of the slide-sections, the guide-pulley between the cutter-head sections, the cutter-band, the main

frame, the guide-frame having in its opposite edges ways for the ribs of the slide-sections, and the operating devices substantially as set forth.

5 2. In a mining-machine, the combination with the main frame having along its inner sides the longitudinally-grooved guides, the guide-frame held in said main frame and provided at its edges with the undercut guide-
10 ways, the carriage provided with devices for supporting the cutter-band and between its ends with an opening fitted over the guide-frame and having at the edges of said opening portions fitting the undercut guideways
15 of the guide-frame, said carriage being also provided with means sliding in the grooved guides of the main frame, and the cutter-band and operating devices substantially as set forth.

20 3. In a mining-machine the combination of the main frame, base-bars, the yokes having cross-bars underlying said base-bars and uprights extending up alongside the same, the beams or blocks fitted below the base-bars
25 and between the adjacent yokes, and the runner-plates underlying the yokes and the said blocks substantially as set forth.

4. In a mining-machine the combination of the main frame having opposite top bars of
30 angle metal with top and side wings, the front cross-bar secured to the top wings, the guide-frame secured at its upper end to the said cross-bar, the base bars or sills, the cross-yokes secured to said base-bars and having
35 uprights secured to the side wings of the top bars, the grooved guide-bars fitted along the outer edges of the base bars or sills and the carriage having portions fitting in the grooves
40 of the guide-bars and also having slide-sections fitting on opposite sides of and engaged with the guide-frame substantially as set forth.

5. In a mining-machine the carriage having the engine foundation-plate provided on its
45 under side with a longitudinal depending rib, the seat-plate having a groove receiving said

rib, bolts connecting said foundation and seat plates, slots being provided for the passage of said bolts to permit the adjustment of the foundation-plate, and means for adjusting
50 the foundation-plate longitudinally substantially as set forth.

6. In a carriage for mining-machines the combination with the base-plate, the step-block on the front end thereof the slide-sections upon said step-block, the seat-plate
55 upon the slide-sections, the foundation-plate mounted at its front end upon the seat-plate, and the back stand mounted on the base-plate in rear of the step-block and extending
60 upward in rear of the said block, slide-plates and seat-plate and supporting the rear end of the foundation-plate, the latter being adjustable lengthwise upon the seat-plate and
65 back stand substantially as set forth.

7. In a carriage for mining-machines the combination of the engine foundation-plate provided with longitudinally-elongated bolt holes or slots and having the rib extended
70 longitudinally on its under side, the seat-plate having a groove receiving said rib and slots in coincidence with the slots in the foundation-plate, and the back stand supporting the rear end of the foundation-plate
75 and having slots coinciding with those in said plate, the connecting-bolts, and the adjusting devices substantially as set forth.

8. In a carriage for mining-machines the combination of the slide-sections lapped side by side, the guide-plates secured to the upper and lower faces of said sections and spaced
80 apart at the rear ends of the slide-sections and the step-block and seat-plate secured respectively to the under and upper sides of the slide-sections and each having projecting portions
85 which fit between the adjacent edges of the guide-plates secured to said slide-sections substantially as set forth.

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