4 Sheets—Sheet 1.

M. F. BAHSE & P. E. HAENDEL.

MACHINES FOR CUTTING DOVETAILS.

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Fig. 4.

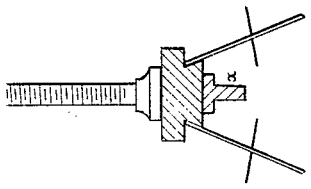


Fig. 3.

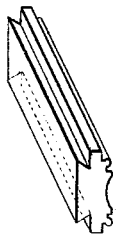


Fig. 2.

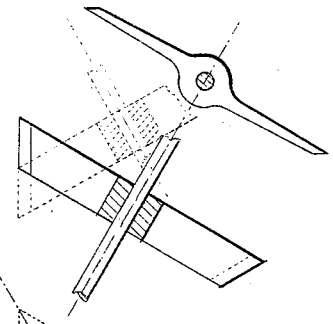


Fig. 1.

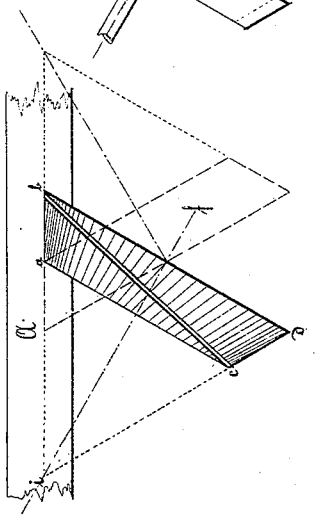


Fig. 7.

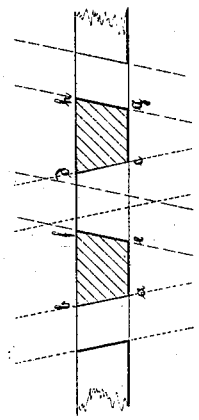


Fig. 6.

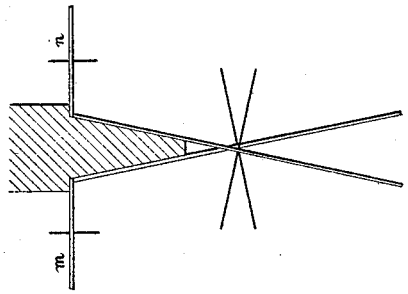


Fig. 5b

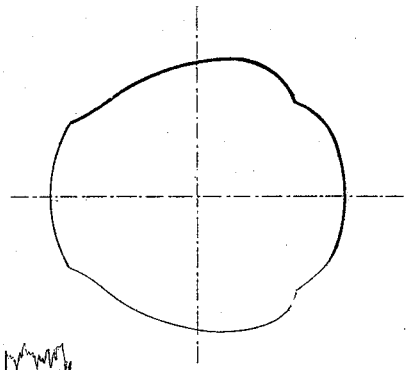
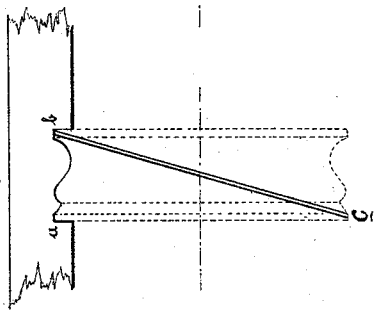


Fig. 5a



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by their attorneys
Howson and Sons

4 Sheets—Sheet 2.

M. F. BAHSE & P. E. HAENDEL.

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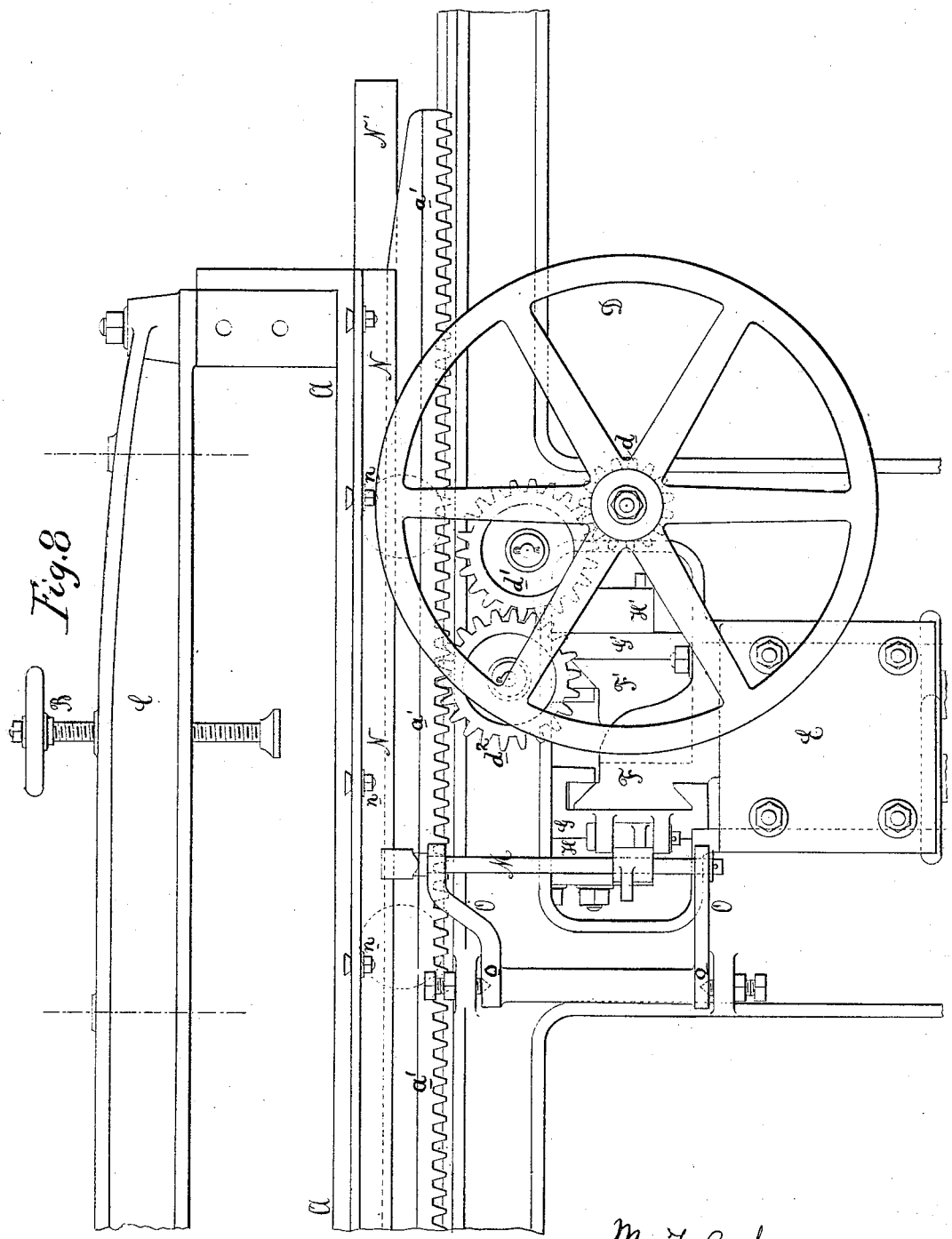
Fig. 8



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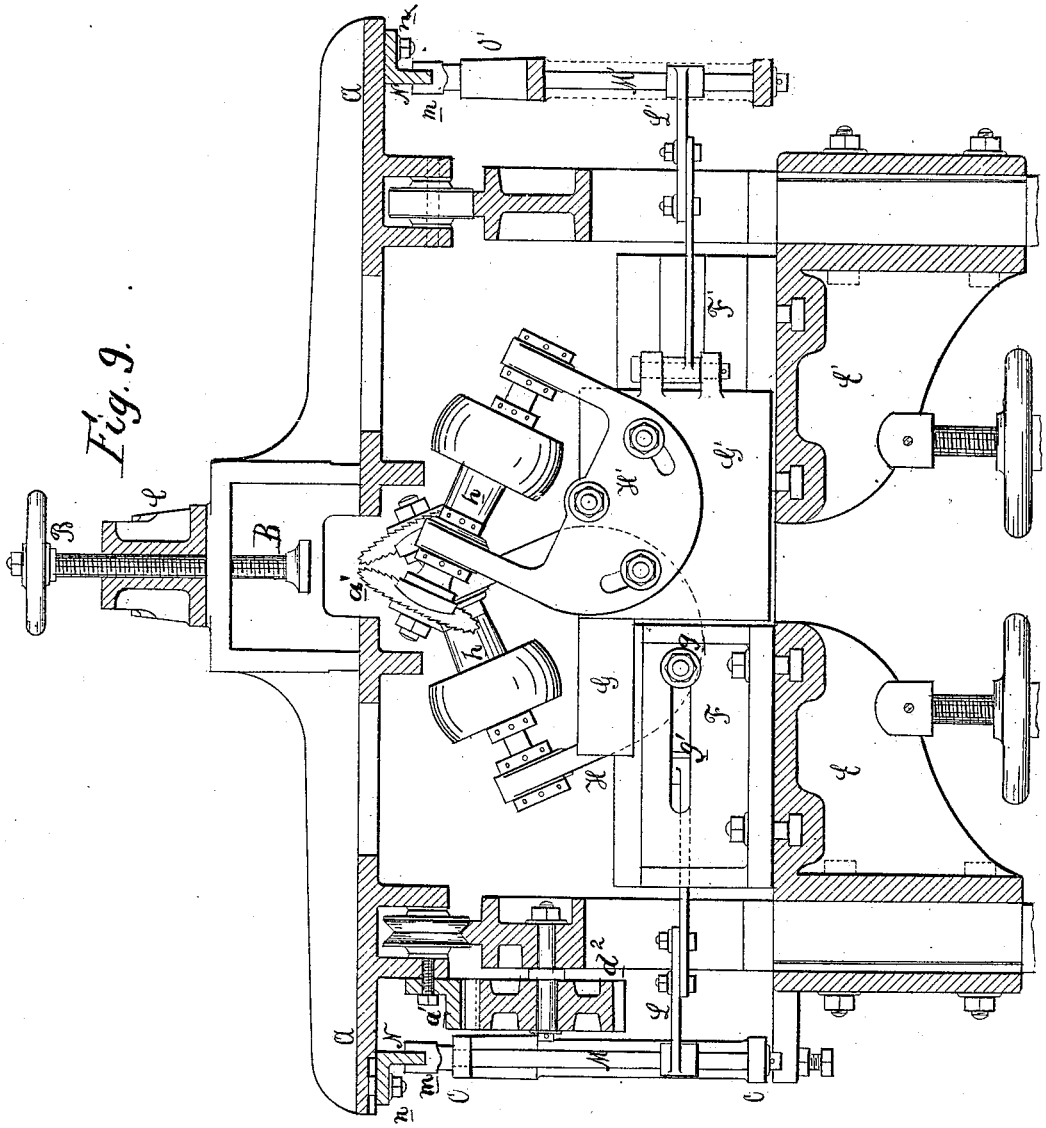
4 Sheets—Sheet 3.

M. F. BAHSE & P. E. HAENDEL.

MACHINES FOR CUTTING DOVETAILS.

No. 181,897. Patented Sept. 5, 1876.

Fig. 9.



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MACHINES FOR CUTTING DOVETAILS.

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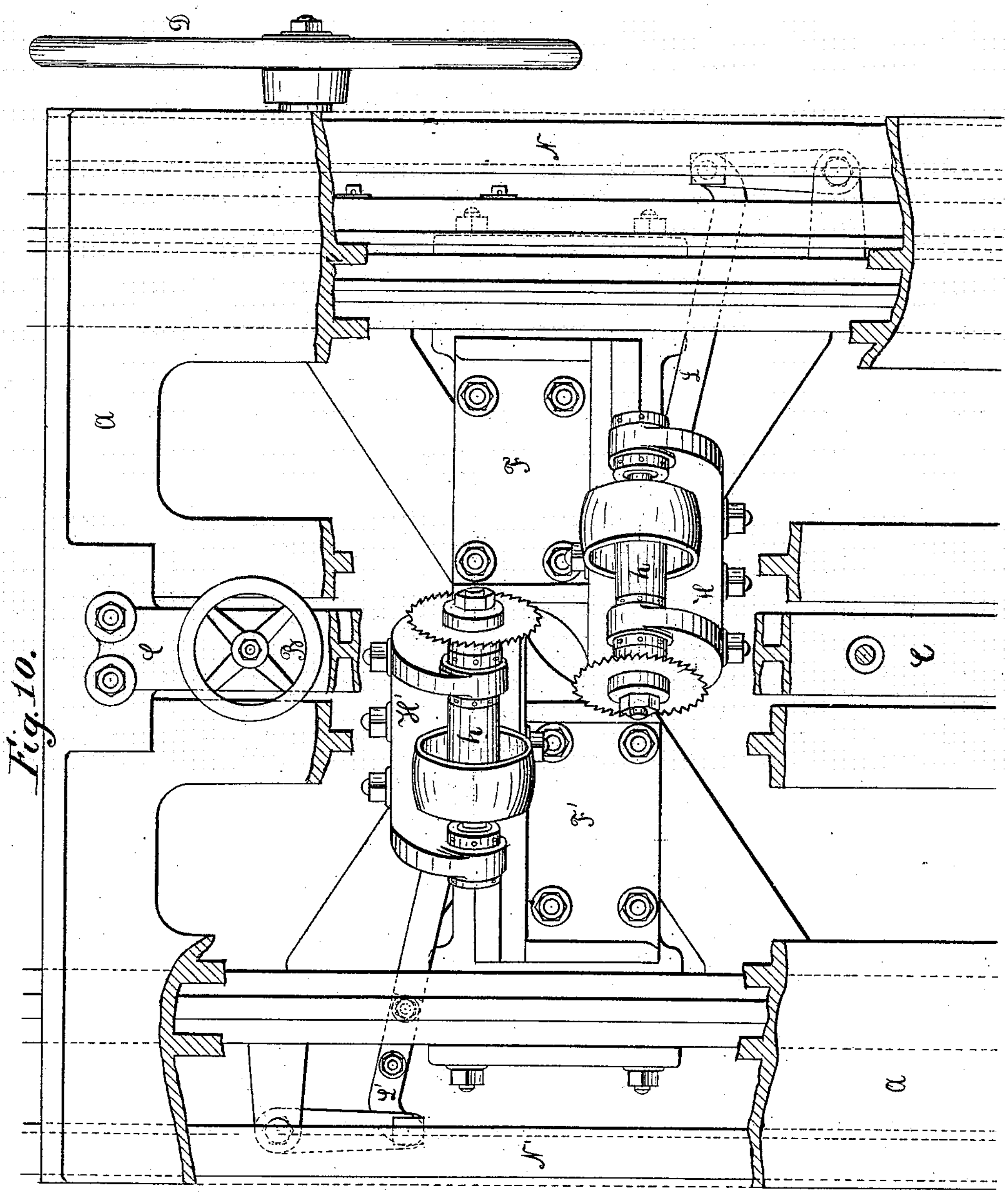
Fig. 10.



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Howson and Son

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UNITED STATES PATENT OFFICE.

MORITZ F. BAHSE AND PAUL E. HAENDEL, OF CHEMNITZ, SAXONY.

IMPROVEMENT IN MACHINES FOR CUTTING DOVETAILS.

Specification forming part of Letters Patent No. **181,897**, dated September 5, 1876; application filed May 4, 1876.

To all whom it may concern:

Be it known that we, MORITZ F. BAHSE and PAUL E. HAENDEL, of Chemnitz, Kingdom of Saxony, have invented certain Improvements in Machines for Cutting Dovetails, of which the following is a specification:

The main object of our invention is to so construct a machine for cutting dovetailed grooves that the latter may be cut tapering longitudinally, and this object we attain in the manner which we will now proceed to describe, reference being had to the accompanying drawing, in which—

Figures 1 to 7 are diagrams illustrating our invention; Fig. 8, Sheet 2, a side view of a portion of our improved dovetailing-machine; Fig. 9, Sheet 3, a transverse vertical section; and Fig. 10, Sheet 4, a plan view, partly in section.

In order to more fully understand the principle on which our machine operates it will be necessary to refer to the diagrams on Sheet 1 of the drawings. If the frustum of a cone, *a b c d*, turning on its axis *i f*, be provided on its periphery with cutting-edges it will cut an oblique groove in a board, A, for instance, presented to its cutting-surface. By presenting to the board a second revolving cutter of the same character, but inclined in the opposite direction, as shown in dotted lines, it will be evident that a complete dovetailed groove will be the result. It is on this principle that the machine patented by Jones and Carter, August 20, 1864, operates; but cutters of this character are expensive and need constant repair. This objection could be overcome by forming the tool as shown in Fig. 2; but such a cutter is objectionable, as it is apt to tear the wood. Both these objections have been overcome by cutting a plate on the plane *b c* of the frustum, thus forming a drunken saw, the outline of which is an ellipse, and whose axis does not pass through the center of the saw. It will be evident that a saw of this character will cut to the same extent as the whole frustum, and in the same way two saws are required to complete the dovetail groove.

Having thus explained the definite principle on which it is preferable to construct the drunken or wabbling saw, we will proceed to describe our improvements before mentioned.

Referring to Figs. 8, 9, and 10, on Sheets 2, 3, and 4, respectively, of the accompanying drawings, in which the saws are shown in position for cutting dovetail grooves, A is the horizontal table for holding the wood to be cut, which is held down by the screw-stems B passing through the transverse beam C connected to the table. As will be seen on reference to Fig. 9, this table is supported by rollers arranged to traverse longitudinal ways on the frame of the machine, and it may be moved simply by hand, or may be operated by rack *a* and pinions *d d'* from the wheel D, Fig. 8. In the center of the table there is a longitudinal slot, *a'*, through which the saws project, as seen in Fig. 9. The saws and their spindles *h h*, which may be driven by belting from a suitable driving-shaft (not shown in the drawing) turn in head-stocks H H', which are swiveled to movable saddles, as will be explained hereafter.

When the saws and head-stocks have been adjusted to the required angle they are secured in position by nuts and bolts, which pass through segmental slots in the said head-stocks. The wood being clamped on the table, and the saws set in motion, the table, with the lumber to be cut, is caused to move on the ways, and the desired groove is then formed.

The machine, as thus described, does not differ materially from those now in use; but our improvements consist in adjusting one or both head-stocks and saws laterally, so as to alter the width of the groove cut, as we will now describe.

The saddles G G', to which the head-stocks H H' are swiveled, are adapted to slide laterally on guides F F', Figs. 8 and 9, and are each secured by a bolt and nut, *g*, passing through a horizontal slot in the said guides, so that the head-stocks and saws may be moved laterally to the various positions required. The guides F are secured to brackets E, which can slide vertically on the frame of the machine, and are adjusted by the screws N and their wheels; hence the saws may be

adjusted vertically as well as laterally, and to different angles in respect to the wood, as before described.

To the saddles G G′ are pivoted rods L L′, connected to vertical rods M M′, so that they can move longitudinally thereon. The rods M M′ are connected to, and turn in, brackets O O′, arranged to turn on pivot-pins *o o* in the frame of the machine. On the upper end of each of the rods M M′ is a jaw, *m*, which embraces the guides N′, secured to the movable table A. One or both of these guides N are adjusted laterally on the table to positions at angles in respect to the slot *a*′ corresponding to the taper desired to be imparted to the groove to be cut. Then as the table A traverses the frame of the machine the inclined guide or guides move the saddles G G′ and saws laterally to a corresponding degree through the medium of the rods M M′ and L L′, so that a groove of the desired taper is cut by the saws. Other means than the rods, &c., may be employed, however, as we do not desire to restrict ourselves to the precise devices shown.

Figs. 3, 4, 6, and 7, Sheet 1, illustrate different forms of grooves which may be cut on this machine, and which do not require description. Figs. 5[a] and 5[b] illustrate a mode of making ornamental grooves on the principle previously described. A cylinder is formed with its periphery turned to the form of the required molding, and an oblique plane, *b c* is is cut through this cylinder, as shown in Fig. 5[a]. The outline thus obtained determines the outline of the saw, which is placed on its spindle in the same inclined position as the plane *b c*. It will be evident then that this saw will cut a molding or groove of the same character as if the entire cylinder were employed.

I claim as my invention—

1. The combination of the head-stocks H H′, carrying the saws with the guides N, and mechanism, substantially as described, whereby the said saws may be moved laterally.

2. The within-described saw for forming moldings, having its outline determined by cutting in an oblique plane through a cylinder turned to the outline of the desired molding, substantially as shown and described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

MORITZ FERDINAND BAHSE.
PAUL EDUARD HAENDEL.

Witnesses:
ERNST LUDWIG KUNZE,
CARL H. MÜLLER.