J. WEIGAND.

MITERING MACHINE.

APPLICATION FILED JAN. 30, 1914.

1,098,465.

Patented June 2, 1914.

3 SHEETS—SHEET 1.

Fig. 1.

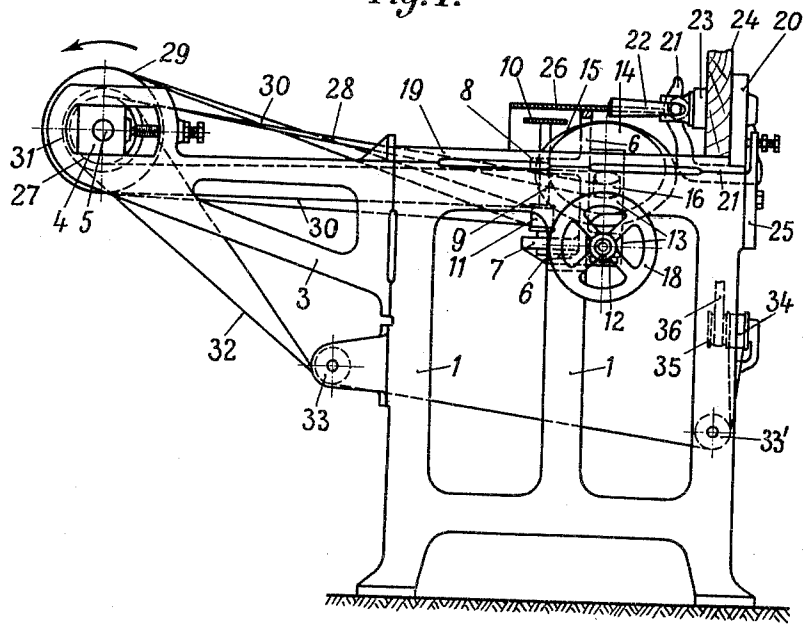
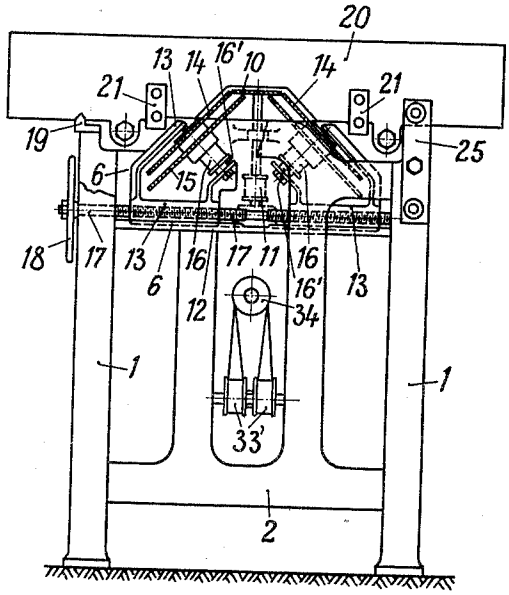


Fig. 2.



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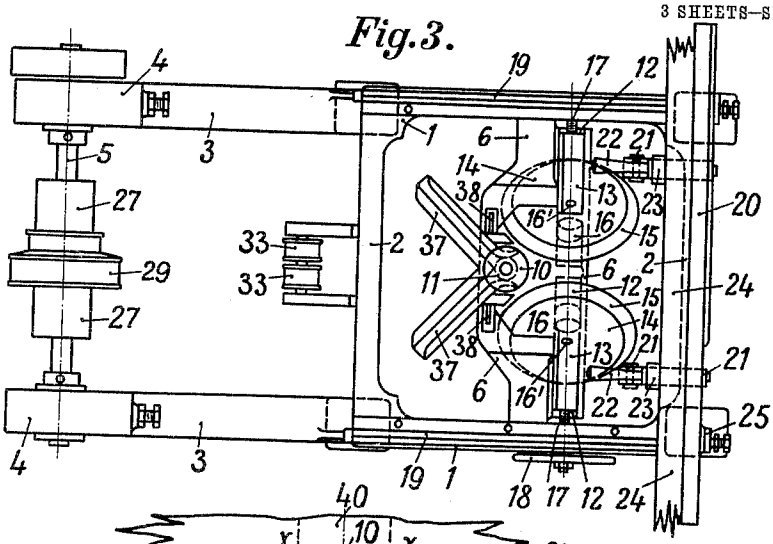
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3 SHEETS—SHEET 2.

Fig. 3.



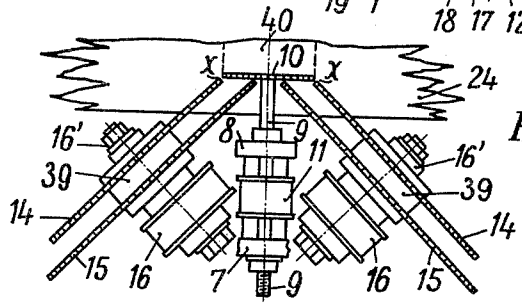


Fig. 4.

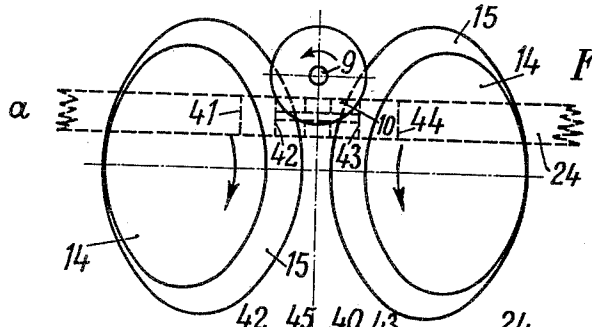


Fig. 5.

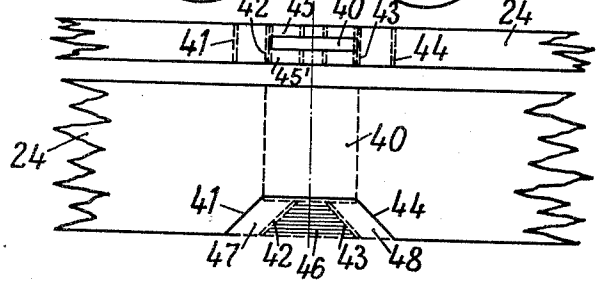


Fig. 6.

Fig. 7.

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3 SHEETS—SHEET 3.

Fig. 8.

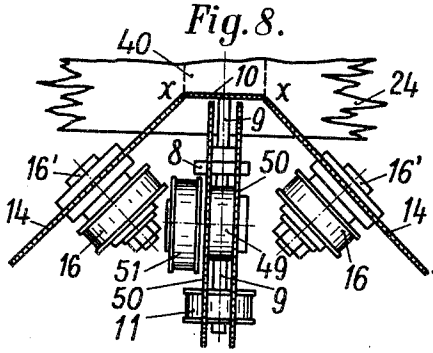


Fig. 10.

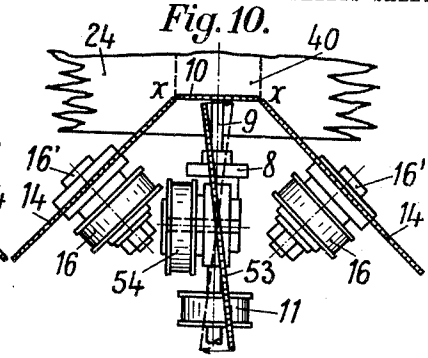


Fig. 9.

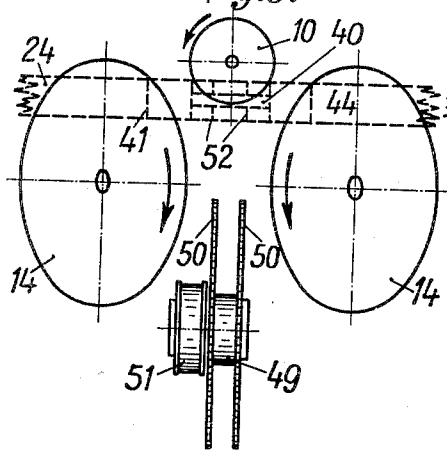


Fig. 11.

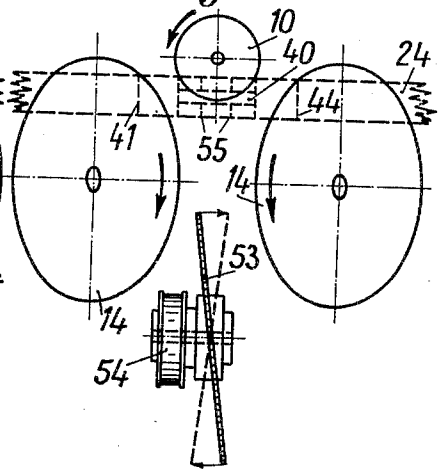


Fig. 12.

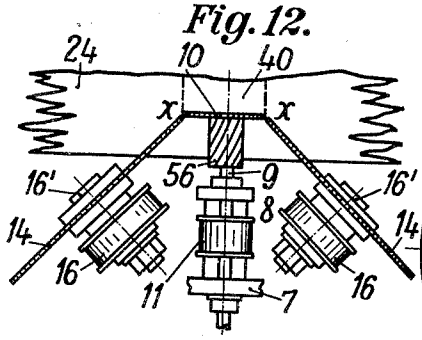
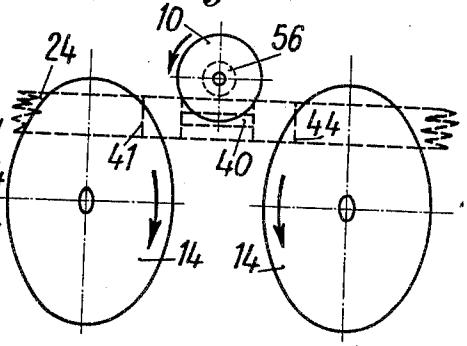


Fig. 13.



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JOHANN WEIGAND, OF FRANKENTHAL, GERMANY.

MITERING-MACHINE.

1,098,465. Specification of Letters Patent. Patented June 2, 1914.

Application filed January 30, 1914. Serial No. 815,550.

To all whom it may concern:

Be it known that I, JOHANN WEIGAND, a subject of the King of Bavaria, and residing at Frankenthal, Palatinate, Germany, have invented certain new and useful Improvements in Mitering-Machines, of which the following is a specification.

My invention relates to mitering machines for cutting miters in wooden beams, particularly in those into which a rectangular mortise has already been cut, and a primary object is to provide an improved mitering machine which will cut a smooth and well-fitting miter in such work-pieces already weakened by a mortise without splitting the wood, particularly at the thin sides of the mortise.

To this end, the machine comprises not only a pair of saws located at an angle to one another, but also a circular saw which is disposed at a tangent to the top cutting edges of this pair of saws, which saws together determine the shape of the piece of wood cut away, and, in addition, a sawing or milling device which operates inside this piece, the said parts being so located relatively to one another that when the work-piece is gradually fed forward it is first cut transversely, then for the purpose of creating a passage for the axle of the said circular saw, the part located in front of this axle is removed and only after the work-piece has been fed farther forward are the remaining parts removed. Such a machine is particularly adapted for cutting miters in frame-pieces of doors and the like.

Several illustrative embodiments of the invention are diagrammatically represented by way of example in the accompanying drawing, wherein:

Figures 1 to 5 show a preferred form of the improved mitering machine, Fig. 1 being a side elevation of the machine, Fig. 2 an elevation thereof as seen from the right of Fig. 1, part of the machine-frame having been broken away in order to show the bearings of the sawing device, Fig. 3 is a top plan view thereof, and Figs. 4 and 5 are detail views of the sawing device in side elevation and top plan view, respectively, on an enlarged scale; Figs. 6 and 7 show a beam having cuts in bottom plan view and side elevation, respectively, on an enlarged scale. Figs. 8 and 9, Figs. 10 and 11 and Figs. 12 and 13 are side elevation and top plan view, respectively, of three modified forms of the sawing device.

Referring firstly to Figs. 1 to 5, the frame of the machine comprises the two side walls 1 which are connected by cross-pieces 2. Brackets 3 which carry the adjustable bearings 4 of the driving shaft 5 are screwed to the machine frame. A cross-piece 6 is firmly connected with the side walls 1 and constitutes the support for the sawing device. This sawing device (Figs. 4 and 5) comprises two pairs of circular saws 14, 15 which are mounted on two shafts 16′ located at an angle of 45° relatively to the horizontal. The circular saws 14 and 15 which are held apart by distance rings 39 are of different diameter and are so arranged that the four top cutting edges are located in one plane x—x. Another circular saw 10 mounted on a vertical shaft 9 coöperates with the said pairs of saws. The plane of this circular saw 10 is thus at a tangent to the circles of the saws 14 and 15, as will be readily understood from Fig. 4.

The vertical shaft 9 is journaled in the brackets 7 and 8 formed on the cross-piece 6 and is provided with a driving pulley 11. The shafts 16′ of each pair of circular saws 14, 15, on the contrary, are journaled in separate bearings 13 which are displaceable on a slide 12 formed on the member 6. Each of the axles 16′ carries a driving pulley 16. A threaded spindle 17 rotatable in the frame passes through the two bearings 13. On the one side of the machine this spindle has a right-handed thread and on the other a corresponding left-handed, so that when the spindle is rotated by the hand-wheel 18 the bearings 13 and, consequently, the pairs of circular saws 14, 15 are uniformly shifted apart or toward one another. The sawing device is preferably normally covered by a suitable guard, *e. g.* a plate 26, which is secured in suitable manner to a slide 20 and is diagrammatically indicated only in section in Fig. 1.

The saws are driven by means of the shaft 5, shown only in Fig. 1, by belts or cords. In the illustrative embodiment two pulleys 27 are mounted on the shaft 5, and their rotation is imparted by the crossed belts 28 to the pulleys 16 and consequently to the pairs of saws 14, 15. Another pulley 29

on the shaft 5 drives the saw 10 by means of the crossed belt 30 running over the pulley 11.

The device for holding the work-piece comprises the slide 20 movable on the rails 19 fastened to the side walls 1. This slide has two holders 21 attached thereto. Levers 22, eccentrically mounted in the ends of the holders 21, act on the adjustable jaws 23 and in the one end position press and hold the work-piece 24 against the slide. The stops 25 screwed to the walls limit the movement of the slide.

After the mortises 40 (Figs. 6 and 7) have been cut in the work-piece 24 which is to be mitered the work-piece is set up in the slide and fed toward the sawing device. The work-piece first arrives into the zone of cutting of the four saw-blades 14 and 15, whereby the four slanting cuts 41, 42, 43 and 44 shown in Fig. 7 are produced. When the work-piece is fed farther forward the circular saw 10 also cuts it. On the work-piece arriving into the position *a—a* indicated in dotted lines in Fig. 5 the small saw 10 has cut through the front cheek 45 (Fig. 6) between the miter cuts 42 and 43, so that the part 46 shown hatched in Fig. 7 falls out. When the work-piece is fed still farther forward the described operation is repeated at the cheek 45′ (Fig. 6) whereby a free passage is made for the shaft 9, and the circular saw 10 can saw off the two lateral parts 47 and 48 (Fig. 7) and a complete mitered notch is thereby formed.

A device for carrying away the sawed-off parts of wood is indicated only in Fig. 3. The same comprises two outwardly directed slanting channels 37 attached to the cross-piece 6 under the circular saw 10. These channels can be shifted longitudinally in the slot 38. Ths wood sawed off falls into these channels and is led away laterally over the belts.

The width of the mitered notch can be very readily varied by adjusting the two pairs of saws 14, 15 and by inserting a larger or smaller circular saw 10.

A chain-cutter which previously cuts the mortises 40 in the work-piece 24 can be very readily connected with the described machine. For this purpose a belt-pulley 31 is mounted on the driving shaft 5 and drives the horizontally mounted pulley 34 by means of the belt 32 led about the guide-rollers 33 and 33′ journaled on the machine-frame. Connected with this pulley 34 is a sprocket-wheel 35 over which is led the chain-cutter 36 which is only partially indicated in Fig. 1 but which runs over a second sprocket-wheel, not shown, as far as the work-piece. The described new mode of mitering can however be carried into practice in another manner by modifying the form of the inner saws 15 whose purpose is to enable the shaft 9 of the saw 10 to pass. For example, in the embodiment shown in Figs. 8 and 9 the inner pair of saws 15 (Fig. 4) has been replaced by a horizontally journaled pair of saws 50 held apart by a distance piece 49 and driven by a pulley 51. In this case the work-piece is first sawed by this pair of saws according to the cuts 52, then by the slanting saws 14 according to the cuts 41 and 44, and finally in a horizontal plane by the saw 10. In the embodiment according to Figs. 10 and 11 the saws 15 (Fig. 4) have been replaced by one single saw 53 which is rotatable about a horizontal axis but is located at an angle to this axis and is driven by the pulley 54. When this saw rotates its teeth move to and fro and make a groove 55 in the work-piece 24 for the passage of the shaft 9 of the saw 10. Lastly, in the embodiment according to Figs. 12 and 13, the pair of saws 15 (Fig. 4) has been replaced by a cutter 56 mounted on the shaft 9 of the saw 10, so that when this shaft rotates the wood is cut away in front of it. Of all the various forms described, however, that described with reference to Figs. 1 to 7 is preferred because the driving means thereof are the simplest.

I claim:—

1. In a mitering machine, the combination of a frame, a pair of circular saws mounted therein at an angle relatively to one another and relatively to the horizontal, a third circular saw mounted in the frame at the rear of the said pair of saws and disposed at a tangent to the top of the cutting edges thereof, and cutting means adapted to work in the space inclosed between said saws.

2. In a mitering machine, the combination of a frame, a pair of circular saws mounted therein at an angle relatively to one another and relatively to the horizontal, a third circular saw mounted in the frame at the rear of the said pair of saws and disposed at a tangent to the top of the cutting edges thereof, and sawing means adapted to work in the space inclosed between said saws.

3. In a mitering machine, the combination of a frame, a pair of circular saws mounted therein at an angle relatively to one another and relatively to the horizontal, a third circular saw mounted in the frame at the rear of the said pair of saws and disposed at a tangent to the top of the cutting edges thereof, and a pair of circular saws adapted to work in the space inclosed between said saws.

4. In a mitering machine, the combination of a frame, a pair of circular saws mounted therein at an angle relatively to one another and relatively to the horizontal, a third circular saw mounted in the frame at the rear of the said pair of saws and disposed at a tangent to the top of the cutting edges thereof, and a pair of circu-

lar saws adapted to work in the space inclosed between said saws, each saw of the former pair being rigidly connected with a saw of the latter pair.

5. In a mitering machine, the combination of a frame, a pair of circular saws displaceably journaled therein at an angle one with another, means for shifting the saws relatively to one another, a third circular saw mounted in the frame at the rear of the said pair of saws and disposed at a tangent to the top of the cutting edges thereof, and cutting means adapted to work in the space inclosed between said saws.

6. In a mitering machine, the combination of a frame, a pair of circular saws having axles slanting toward one another displaceably journaled therein, a horizontal circular saw journaled in the frame at the rear of the said pair of saws and disposed at a tangent to the top of the cutting edges thereof, a second saw fast on each of said axles between the former saws, a driving shaft journaled in the frame, and means driven by the shaft for driving said saws.

In testimony whereof, I affix my signature in the presence of two witnesses.

JOHANN WEIGAND.

Witnesses:
HART SIPP,
G. CARLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."