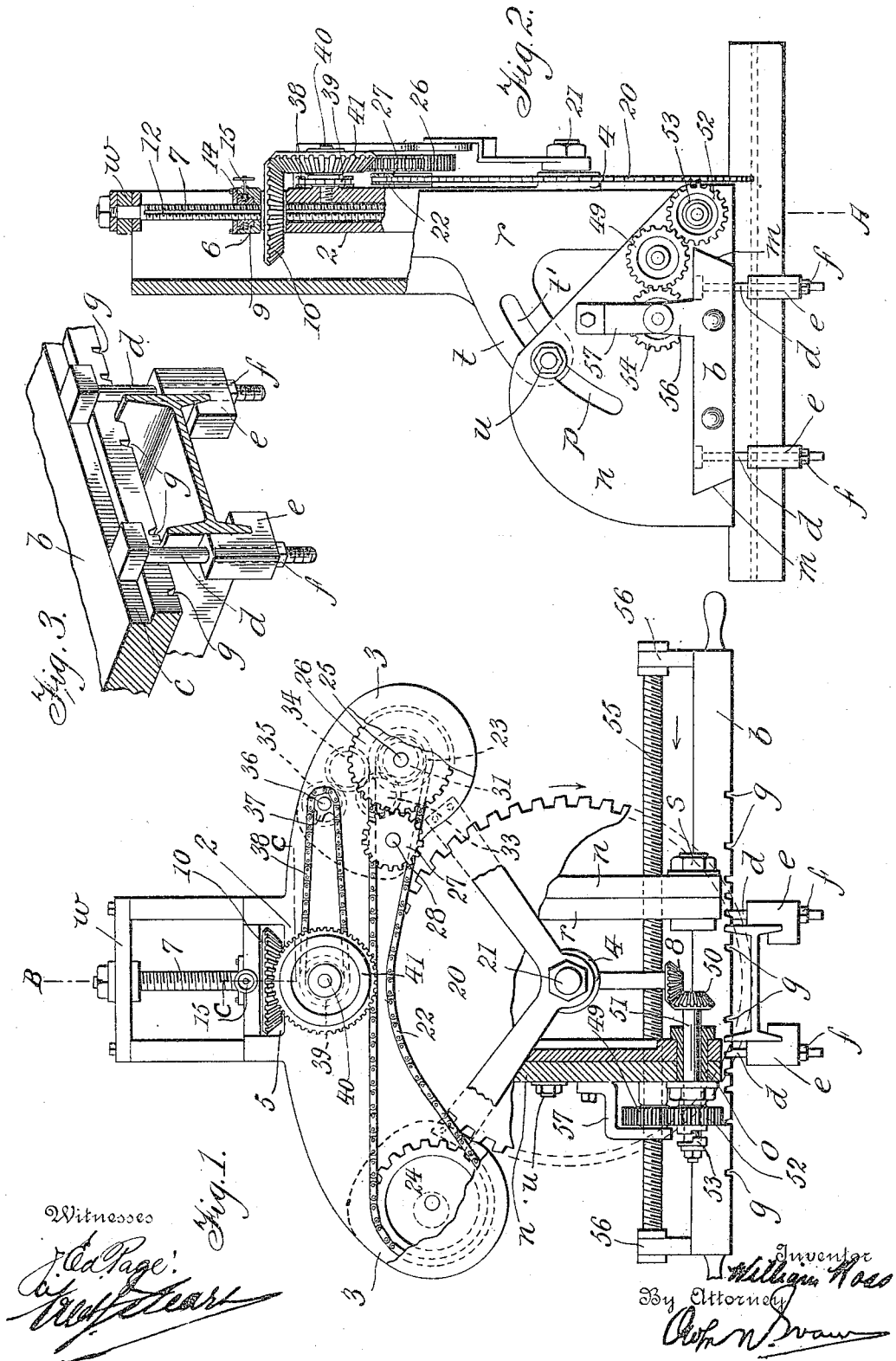


W. ROSS.
METAL CUTTING MACHINE.
APPLICATION FILED MAY 26, 1908.

962,530.

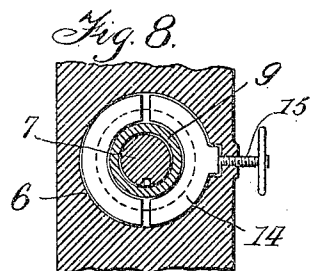
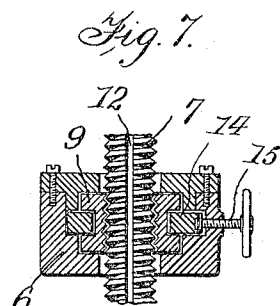
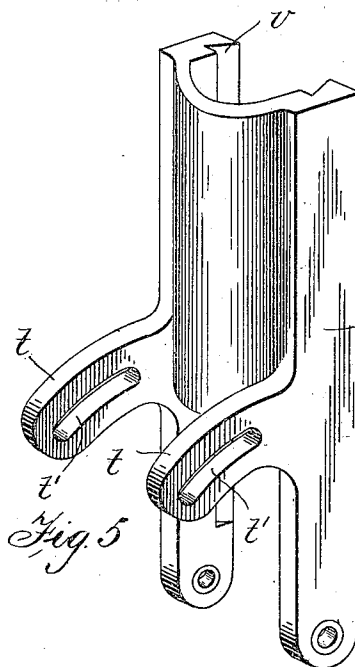
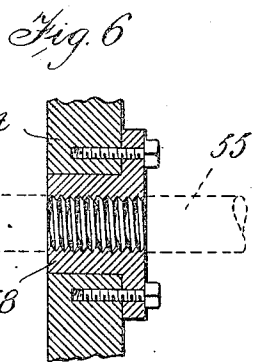
Patented June 28, 1910.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.



Witnesses

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in
~~Red Clay~~

William Ross Inventor
By Attorney
O. W. N. N. N.

UNITED STATES PATENT OFFICE.

WILLIAM ROSS, OF MONTREAL, QUEBEC, CANADA.

METAL-CUTTING MACHINE.

962,530.

Specification of Letters Patent. Patented June 28, 1910.

Application filed May 26, 1908. Serial No. 435,131.

To all whom it may concern:

Be it known that I, WILLIAM ROSS, of the city of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Metal-Cutting Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates particularly to portable metal cutting machines and it has for its object to improve the driving gear, and adapt the same to cut any desired angle or combination of angles.

The invention comprises a base adapted to be readily set at right angles to and clamped upon the object to be cut and adjustable in a horizontal plane to different angular positions relatively to such object; a standard mounted upon the base and fed along the same and adjustable in a vertical plane to different angular positions relatively to such base; and a tool carrying member mounted upon the standard and fed downwardly along the same, the tool being operated through means also carried by the said member and adapted to be coupled at will to any available source of power.

For full comprehension, however of my invention reference must be had to the accompanying drawings, forming a part of this specification, in which similar reference characters indicate the same parts and wherein—

Figure 1 is a part front elevation and part vertical sectional view of my improved cutting machine, the sectional view being taken on line A Fig. 2; Fig. 2 is a part side elevation and part vertical sectional view, the sectional view being taken on line B Fig. 1; Fig. 3 is a perspective view illustrating a portion of the base and the means for clamping the same to the object to be cut. Fig. 4 is a part plan view of the machine and part horizontal sectional view taken on line C C Fig. 1; Fig. 5, is a perspective view of the tiltable standard. Fig. 6 is a vertical sectional view of the portion of the frame and the nut carried thereby with which the horizontal feed screw engages; Figs. 7 and 8 are sectional views, taken at right angles to each other, of the portions of the standard and the nut carried thereby with which the vertical feed screw engages.

The base *b* of my machine is formed with a pair of longitudinal slots *c* through which

bolts *d* project and are suspended therein by their heads which are slidable along such slots, clamping blocks *e* being supported on the bolts by nuts *f* for adjusting them to different clamping positions; while the underside of such base has a series of grooves *g* cut therein and spaced suitable distances apart to accommodate standard widths of articles to be cut, these grooves being each at right angles to the plane in which the cutter works, as will be presently shown. A carriage is mounted movably on this base and comprises a pair of upwardly projecting quadrantal webs *n* terminating at their apices in bearings *o*, and slotted, as at *p*, concentrically to such bearing, such webs being formed with dovetail recesses to engage the sides of the base which are beveled as at *m* for the purpose. A standard *r* is pivoted by means of a bushing, (constituting the bearing *o*) and a bolt *s*, to the said apices and a pair of quadrantal arms *t* (slotted as at *t'*) register with the quadrantal slots in the webs to which latter the arms and through them the standard, are connected by bolts *u* for the purpose of setting the standard and the cutting tool in different angular positions. This standard is of half-round cross section, flat at the front and presenting a dove-tail guideway *v* extending throughout its length, and having a cross piece *w* at its top.

A dovetail slide 2 travels in the guideway *v* and has a pair of laterally extending arms 3 and a bearing 4, a gear pocket 5 and a nut box 6; while a screw-shaft 7 mounted rotatably in the cross-piece *w* extends through a boring in the slide and has a bevel gear 8 on its lower end. This screw-shaft passes through a nut 9, which is threaded thereon, and a bevel gear 10 is slidably and rotatively connected thereto by a feather upon the gear and a spline 12 in the screw-shaft, the nut being mounted in the nut-box 6 and adapted to either rotate therein with the shaft or be fixed rigidly in such box and therefore travel along the shaft and take the slide with it. The latter connection is effected by a brake shoe 14 having a pinch screw 15 operatively connected thereto.

The saw 20 is mounted upon a stub shaft 21 supported in the bearing 4 (before mentioned) at the foot of the slide, and it is driven by a chain 22 looped over sprocket wheels 23 and 24 and the links whereof intermesh with the teeth of the saw. The

sprocket wheel 23 is mounted rigidly upon a shaft 25 carried rotatably in one of the arms 3 and having secured rigidly thereon a spur gear 26 intermeshing with a spur pinion 27, mounted rigidly upon a short shaft 28 presenting a polygonal end 29 adapted to have a power driven flexible shaft 30 coupled thereto, thus transmitting power to the saw. Power is transmitted to the screw shaft 7 from the shaft 28 by a spur gear 31 also mounted rigidly upon the shaft 25, but at the rear side of the slide, and connected, by a pair of intermeshing idle gears 33, 34, to a spur gear 35 mounted rigidly upon the rear end of a shaft 36 having a sprocket wheel 37 upon its front end. A chain 38 transmits motion from the sprocket wheel 37 to a sprocket wheel 39 mounted rigidly upon a shaft 40, upon which is also rigidly mounted a bevel gear 41 intermeshing with bevel gear 10 thereby completing the rotative connection between the driving shaft 28 and the screw-shaft, and, when the pinch screw 15 is tightened and the brake shoe applied, providing the necessary connection to transmit the required power to cause the slide to feed along the standard.

The carriage is caused to travel horizontally in the direction indicated in Fig. 1 by the bevel gear 8 intermeshing with a bevel gear 50 mounted rigidly upon one end of a shaft 51 bearing rotatably in the sleeve *o* (the pivot point of the standard) the other end of such shaft carrying loosely thereon a spur gear 52 adapted to be rotatively connected to the shaft by a clutch block 53. This spur gear is constantly in mesh through an idler 49, with a spur gear 54 the hub of which has a feather engaging with a spline in a shaft 55 supported rotatably in a bearing 56 upon the base and, through the gear 54, in a bracket 57 upon the carriage. The operative connection between this shaft 55 and the carriage being effected by a nut 58 mounted rigidly in the web *n* adjacent thereto the other web having an opening 60 there-through to accommodate such shaft.

Operation: I-beams, channels, angle irons, rails, or the like, can be cut with equal facility, and I have illustrated the machine clamped to an I-beam, the bolts *d* having been adjusted along the slots in the base, the machine placed in position with two of the grooves *g* engaging the upper flanges of the beam, which insures the saw being set at right angles to the latter. The clamping blocks *e* are then set and clamped in place, thus securing the machine against displacement while operating. To cut a comparatively narrow beam, such as illustrated, the standard is swung forward to the limit of the slots *p* and *p'* and clamped by tightening the nuts *u*, the clutch 53 is thrown out, and the pinch screw 15 having been tightened (thus clamping the nut 9 in the slide 2)

upon the power being applied the saw will cut straight down through the beam, at right angles to the latter. To feed the saw horizontally only the screw 15 is loosened, in the latter case the nut being freed from the slide rotates idly with the screw 7. Horizontal bevels are cut at any desired angle by adjusting the standard to the required angular position, and vertical bevels are cut by loosening the clamping screws *f* and swinging the base *b* to the required position, the clamping blocks *e* sliding along the beam; while a combination of these two last mentioned adjustments will cause the saw to cut a bevel diagonally across any desired corner.

What I claim is as follows:

1. In a metal cutting machine, the combination with a base and a power driven metal cutting tool, of means for adjusting such tool relatively to the base in a plane perpendicular to the said base means for adjusting the said tool in a plane at right angles to the plane of the first mentioned adjustment for cutting bevels in different angular planes and means for feeding the cutting tool horizontally and vertically.

2. In a metal cutting machine the combination with a base and means for clamping the same to the thing to be cut, of a carriage slidably carried by the base, a metal cutting tool, means for adjusting the said tool to different angular positions relatively to the carriage; and means for feeding the carriage along the base.

3. In a metal cutting machine the combination with a base and means for clamping the same to the thing to be cut, of a carriage slidably carried by the base, a standard pivoted to the carriage, a metal cutting tool mounted upon the standard; means for adjusting the said standard to different angular positions relatively to the carriage; and means for feeding the carriage along the base.

4. In a metal cutting machine the combination with a base and means for clamping the same to the thing to be cut, of a carriage slidably carried by the base, a standard pivoted to the carriage, a metal cutting tool mounted upon the standard; means for adjusting the said standard to different angular positions relatively to the carriage; means for feeding the tool along the standard and means for feeding the carriage along the base.

5. The combination with a saw having cutting teeth at its perimeter, of a pair of sprocket wheels supported with their lower edges below the level of the uppermost teeth of the saw, a chain looped over the sprocket wheels and engaging the teeth of the saw, and means whereby the said chain is driven.

6. A power driven cutting machine comprising a base having means for clamping the same to the article to be cut, a carriage

mounted upon such base, a standard upon the carriage and supporting a slide, a rotary tool carried by the slide, means for operating the tool consisting of a pair of rotary members disposed with their peripheries intersecting the plane in which the periphery of the rotary tool lies, and a flexible loop looped over the said rotary members and engaging the said rotary tool, power driven means for causing the carriage to travel along the base, and power driven means for causing the slide to travel along the standard.

7. A power driven cutting machine comprising a base having means for clamping the same to the article to be cut, a carriage mounted upon such base, a standard pivoted to the carriage and supporting a slide, a rotary cutting tool carried by the slide, means for setting the standard in different angular positions, means for operating the tool consisting of a pair of sprocket wheels disposed with their peripheries intersecting the plane in which the periphery of the rotary tool lies, and an endless chain looped over the said sprocket wheels and engaging the said rotary tool, means for causing the carriage to travel along the base, and means for causing the slide to travel along the standard.

8. A portable metal cutting machine comprising a base; a carriage secured movably upon such base; a shaft mounted in such carriage; a standard pivoted concentrically with the shaft; means adjustably connecting such standard to the carriage; a screw shaft rotatably mounted on the base; a nut rigidly mounted in the carriage and engaging with the screw-shaft; a train of gears operatively connecting the first mentioned shaft to the nut; a slide mounted movably upon the standard; a nut carried by the slide; means for securing the nut rigidly in the slide; a screw shaft mounted rotatably in the standard and engaging with the last mentioned nut; bevel gears operatively connecting the last mentioned screw shaft to the shaft concentrically with which the standard is pivoted; a circular saw mounted rotatably upon the slide; a power driven shaft mounted in the slide; a pair of sprocket wheels mounted on the slide at opposite sides of the saw; a chain looped over such sprocket wheels and engaging with the teeth of the saw; a train of gears operatively connecting the power driven shaft to one of the said sprocket wheels; a pair of intermeshing bevel gears, one being mounted upon the slide and the other rotatively and slidably upon the last mentioned screw shaft; and a train of gears operatively connecting the power driven shaft to the said last mentioned pair of bevel gears.

9. A portable metal cutting machine comprising a base; a carriage secured movably upon such base; a shaft mounted in such

carriage; a standard pivoted concentrically with the shaft; means adjustably connecting such standard to the carriage; a screw shaft rotatably mounted on the base; a nut rigidly mounted in the carriage and engaging with the screw shaft; a train of gears operatively connecting the first mentioned shaft to the nut such train of gears including a clutch for making and breaking the operative connection thereof with the shaft; a slide mounted movably upon the standard; a nut carried by the slide; means for securing the nut rigidly in the slide or releasing the same; a screw shaft mounted rotatably in the standard and engaging with the last mentioned nut; bevel gears operatively connecting the last mentioned screw shaft to the shaft concentrically with which the standard is pivoted; a circular saw mounted rotatably upon the slide; a power driven shaft mounted in the slide; a pair of sprocket wheels mounted on the slide at opposite sides of the saw; a chain looped over such sprocket wheels and engaging with the teeth of the saw; a train of gears operatively connecting the power driven shaft to one of the said sprocket wheels; a pair of intermeshing bevel gears, one being mounted upon the slide and the other rotatively and slidably upon the last mentioned screw shaft; and a train of gears operatively connecting the power driven shaft to the said last mentioned pair of bevel gears.

10. A portable metal cutting machine comprising a base with clamping blocks adjustably attached thereto; a carriage secured movably upon such base; a shaft mounted in such carriage; a standard pivoted upon the shaft; means adjustably connecting such standard to the carriage; a screw shaft rigidly mounted on the base; a nut rotatably mounted upon the carriage and engaging with the screw shaft; a train of gears operatively connecting the first mentioned shaft to the nut; a slide mounted movably upon the standard; a nut carried by the slide; means for securing the nut rigidly in the slide; a screw shaft mounted rotatably in the standard and engaging with the last mentioned nut; bevel gears operatively connecting the last mentioned screw shaft to the shaft upon which the standard is pivoted; a circular saw mounted rotatably upon the slide; a power driven shaft mounted in the slide; a pair of sprocket wheels mounted on the slide at opposite sides of the saw; a chain looped over such sprocket wheels and engaging with the teeth of the saw; a train of gears operatively connecting the power driven shaft to one of the said sprocket wheels; a pair of intermeshing bevel gears, one being mounted upon the slide and the other rotatably and slidably upon the last mentioned screw

shaft; and a train of gears operatively connecting the power driven shaft to the said last mentioned pair of bevel gears.

11. A portable metal cutting machine 5 comprising a base with clamping blocks adjustably attached thereto; a carriage secured movably upon such base; a shaft mounted in such carriage; a standard pivoted concentrically with the shaft; means 10 adjustably connecting such standard to the carriage; a screw shaft rotatably mounted on the base; a nut rigidly mounted in the carriage and engaging with the screw shaft; a train of gears operatively connecting the 15 first mentioned shaft to the nut such train of gears including a clutch for making and breaking the operative connection thereof with the shaft; a slide mounted movably upon the standard; a nut carried by the 20 slide; means for securing the nut rigidly in the slide or releasing the same; a screw shaft mounted rotatably in the standard and engaging with the last mentioned nut; bevel gears operatively connecting the last 25 mentioned screw shaft to the shaft concentrically with which the standard is pivoted; a circular saw mounted rotatably upon the slide; a power driven shaft mounted in the slide; a pair of sprocket wheels mounted on 30 the slide at opposite sides of the saw; a chain looped over such sprocket wheels and engaging with the teeth of the saw; a train of gears operatively connecting the power driven shaft to one of the said sprocket 35 wheels; a pair of intermeshing bevel gears, one being mounted upon the slide and the other rotatably and slidably upon the last mentioned screw shaft; and a train of gears operatively connecting the power driven 40 shaft to the said last mentioned pair of bevel gears.

12. A portable metal cutting machine comprising a base with clamping blocks adjustably attached thereto; a carriage secured 45 movably upon such base and presenting a pair of webs; a shaft mounted in such webs; a standard pivoted upon the shaft, and presenting members movable therewith close to the webs; means adjustably connecting 50 such members to the webs; a screw shaft rigidly mounted upon the carriage and engaging with the screw-shaft; a train of gears operatively connecting the first mentioned shaft to the nut; a slide mounted movably 55 upon the standard; a nut carried by the slide; means for securing the nut rigidly in the slide; a screw shaft mounted rotatably in the standard and engaging with the last mentioned nut; bevel gears operatively connecting the last mentioned screw shaft to 60 the shaft upon which the standard is piv-

oted; a circular saw mounted rotatably upon the slide; a power driven shaft mounted in the slide; a pair of sprocket wheels mounted 65 on the slide at opposite sides of the saw; a chain looped over such sprocket wheels and engaging with the teeth of the saw; a train of gears operatively connecting the power driven shaft to one of the said sprocket 70 wheels; a pair of intermeshing bevel gears, one being mounted upon the slide and the other rotatively and slidably upon the last mentioned screw shaft; and a train of gears 75 operatively connecting the power driven shaft to the said last mentioned pair of bevel gears.

13. A portable metal cutting machine comprising a base with clamping blocks adjustably attached thereto; a carriage secured 80 movably upon such base and presenting a pair of webs; a shaft mounted in such webs; a standard pivoted upon the shaft, and presenting members movable therewith close to the webs; means adjustably connecting such 85 members to the webs; a screw shaft rigidly mounted on the base; a nut rotatably mounted upon the carriage and engaging with the screw shaft; a train of gears operatively connecting the first mentioned shaft 90 to the nut such train of gears including a clutch for making and breaking the operative connection thereof with the shaft; a slide mounted movably upon the standard; a nut carried by the slide; means for secur- 95 ing the nut rigidly in the slide or releasing the same; a screw shaft mounted rotatably in the standard and engaging with the last mentioned nut; bevel gears operatively connecting the last mentioned screw shaft 100 to the shaft upon which the standard is pivoted; a circular saw mounted rotatably upon the slide; a power driven shaft mounted in the slide; a pair of sprocket wheels mounted on the slide at opposite sides of the saw; a 105 chain looped over such sprocket wheels and engaging with the teeth of the saw; a train of gears operatively connecting the power driven shaft to one of the said sprocket wheels; a pair of intermeshing bevel gears, 110 one being mounted upon the slide and the other rotatively and slidably upon the last mentioned screw shaft; and a train of gears operatively connecting the power driven shaft to the said last mentioned pair of bevel 115 gears.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLIAM ROSS.

Witnesses:

WILLIAM P. McFEAT,
FRED J. SEARS.