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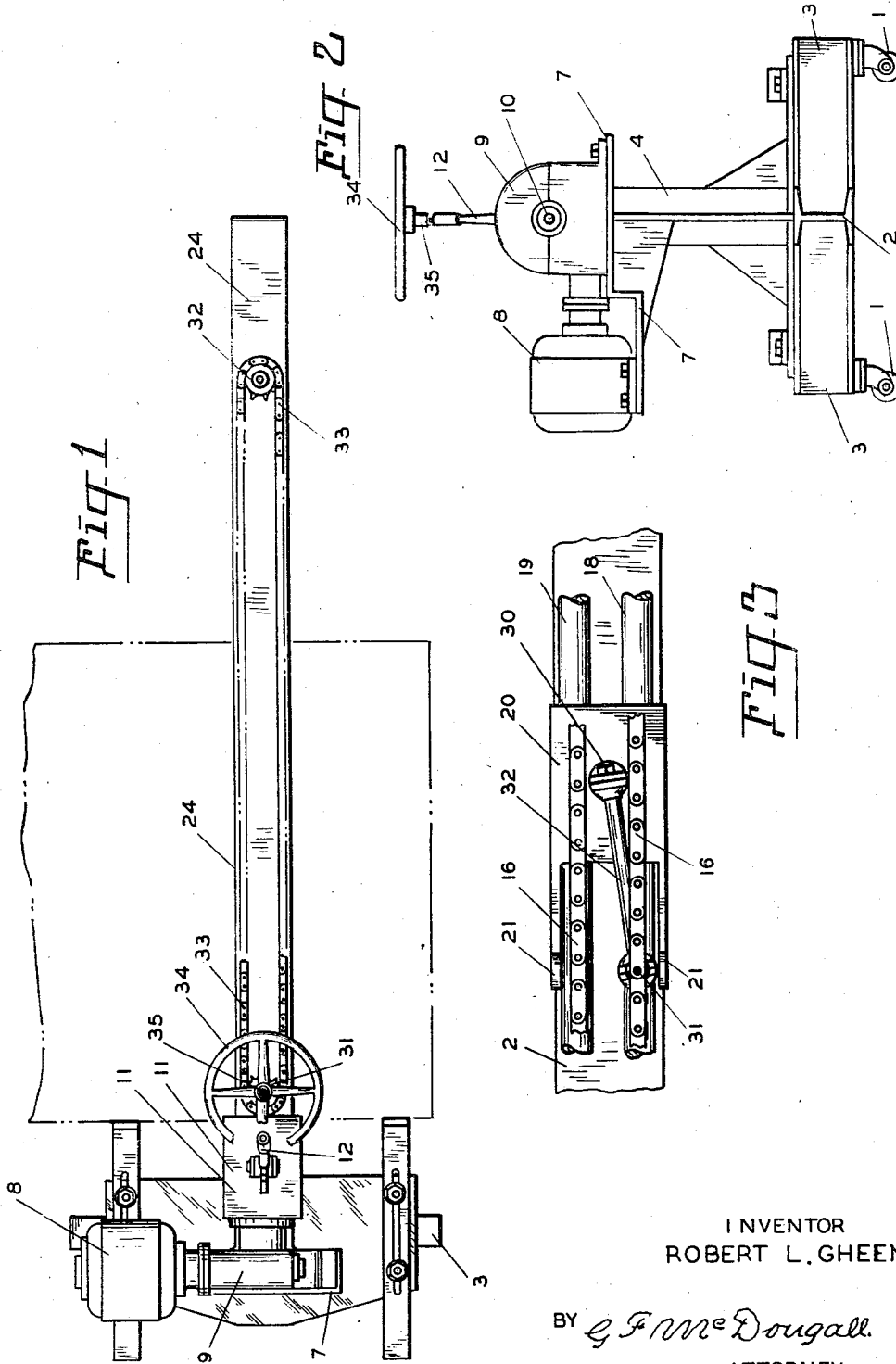
R. L. GHEEN

2,374,281

METAL CUTTING MACHINE

Filed May 23, 1944

2 Sheets-Sheet 1



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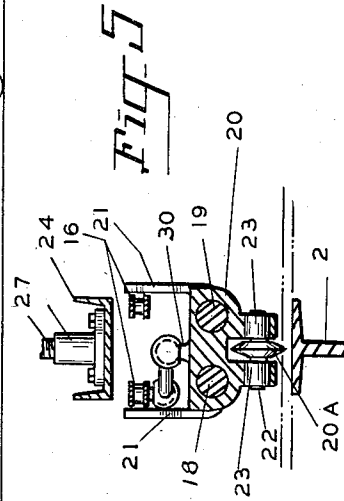
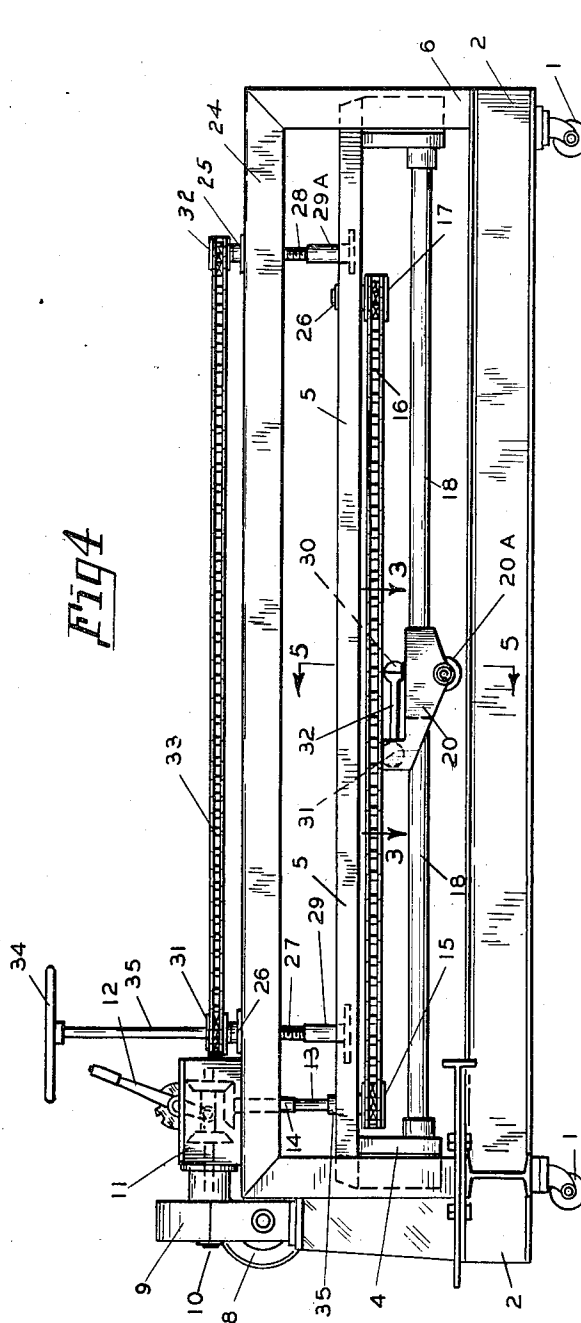
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METAL CUTTING MACHINE

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5 Claims. (Cl. 164—77)

The present invention relates to sheet metal cutter tools, other than shears. More specifically, it relates to a metal cutting tool for sheet metal that uses a sharpened and hardened disc that is pressed into the metal surface and then rolled along the metal on the line to be cut, usually more than once, resembling the action of the well known hand pipe-cutter, save in this tool the metal has a firm backing that prevents its distortion, leaving a clean, flat and longitudinally straight edge.

The object of this invention is to furnish a tool for trimming, cutting to pattern and otherwise reducing the size of a sheet of metal without distorting either piece adjacent the cut edges; which is a result not attainable by ordinary shop equipment.

A further object is to construct a sheet metal cutter that will do first class work with a minimum of capital invested in it and that requires much less floor space than a shear and will, as ordinarily constructed, handle a metal thickness that is quite beyond the range of any but the heaviest shears.

The invention resides in structures that make a rolling cutter available for cutting metal sheets, without distortion of either piece of the sheet that is divided; the combination of structural elements being pointed out in the claims.

An embodiment of the invention that has proved highly satisfactory in shop use is illustrated herewith by drawings, that form a part of this disclosure. While it is the best embodiment I have so far constructed and is accurately described, it is intended as stated, to be an illustration and not a definition of the scope of the invention, which is the function of the claims.

Drawings accompany and form a part of this disclosure, showing a preferred embodiment of the invention in which—

Figure 1 is a top or plan view of the machine with a part broken away to show another as will be seen, and indicating a sheet of metal, represented by a rectangular broken line, to show its position while being cut, clamps to hold it are assumed to be present;

Figure 2 is an end view in elevation taken from the left hand end of Figure 1;

Figure 3 is an enlarged plan view of that portion of Figure 1, looking down as indicated; by the line 3—3 Figure 4;

Figure 4 is a side view of Figure 1 but showing some parts omitted from that figure and

part of the machine taken on the section line 5—5 Figure 4.

Describing the drawings in more detail.

The present invention is designed to be movable from place to place within an iron works and to that end is provided with casters such as 1, shown in Figures 2 and 4. These casters, which are no part of the invention and may be omitted or substituted for, are placed in supporting relation to the underlying frame, shown to be of generally T formation, having an I beam longitudinal member 2 and a T head member 3 of similar form made rigid with it to form the base of the machine, and in this case the unhardened anvil surface upon which the sheet metal is cut, as will be explained. The whole frame construction will be preferably welded together so far as the stress and load carrying parts are concerned.

An upright 4 is made of channel section with the channel inwardly, the space between flanges serving as a guide for the cutting tool carriage generally designated in Figure 4 by the numeral 5, and which, as seen in the section of it in Figure 5 is of composite construction. At the opposite end of the machine there is another upright 6, likewise of channel section, which also is made rigid with the beam 2 and faces inwardly to constitute a guide for the tool carriage 5 at its other end.

The upright 4 at the right hand end of the machine, Figure 4, and a part of the beam 2 supports a motor base 7 upon which is mounted an electric motor 8, the same being directly connected to a worm gear case 9 from which a shaft 10 extends, and it will be seen that the reversing transmission 11, is selectively operated by the lever 12, by means of which instrumentalities, power at reduced speed flows from the motor 8 to the vertical shaft 13, by the splined sleeve 14 which is long enough so that the carriage 5 may be selectively moved up and down within the range intended, meanwhile without disconnecting the shaft 13 from the motor 8. Mounted upon the lower end of the shaft 13 is a sprocket 15 which runs the sprocket chain 16, which is also mounted on the sprocket 17, and means for keeping the chain tight and firm on its sprockets will be provided, as is well known.

Also forming a part of the carriage 5 is a pair of guide rails 18 and 19, upon which rails the roller carrier 20 is slidably mounted and carries, underneath, the hardened and sharpened cutter 20A provided with a spindle 22 and which will be revolvably mounted in heavy duty bearings 23 and which will apply a revolving cutting action to

Figure 5 is a view in section of an important

the plate beneath it, again represented in Figure 5 by broken lines.

Both end uprights are securely joined at their upper ends by the longitudinal channel member 24 which as indicated carries shaft bearing members 25 and 26 within which screws 27 and 29 are journaled by unthreaded parts of their surfaces and which work equally in the nuts 29 and 29A under influence of the sprockets 31 and 32, the chain 33, the hand-wheel 34 and the extension 35. As the nuts 29 and 29A are made rigid with the carriage 5 operation of the hand wheel selectively raises or lowers this carriage and applies pressure, selectively, to the cutter causing it to penetrate a sheet of metal held beneath it and when the roller carriage is caused to traverse such sheet of metal, a sharp, clean cut results because of the backing afforded by the upper flat surface of the beam 2.

The roller carriage, 20, see Figure 3, is provided with means for engaging the chain 16 which will now be described. The roller carriage 20 has integral therewith a pair of side shrouds 21 and a ball 30 which is centrally disposed with respect to the carriage. A dependent ball is also carried by the chain 16 at 31, see Figure 5, and a connecting rod 32 with a socket on each end, serves to transmit circular motion of the chain around the sprockets 15 and 17 into reciprocating motion of the roller carriage 20 as will be seen. If the sheet to be cut is relatively short, the reciprocating motion of the roller carriage 20 may be shortened up and attained by means of the reversing transmission shown diagrammatically at 11.

As will be seen at once by those familiar with sheet metal cutting, we now have a cutter for sheet metal that will cut sheets of steel of much heavier gauge than the old stand-by shear with a fixed lowered blade and a reciprocating upper blade that engages a sheet therebetween by a diagonal approach and cutting progressively across, but which must in any event make its complete cut with one pass, which limits its capacity as to metal thickness. My new cutter will also cut the narrowest usable strip from a sheet without distorting either the sheet or strip, which the strongback shear blade will not do.

In cutting any save the lightest of sheets, such as 26 or 28 gauge, my machine works best when it is caused to make several passes over the sheet to be cut. Since the flap top surface of the I beam 2 is of unhardened steel, the cutter suffers no damage by coming in heavy contact with it. In fact continued use will soon develop a shallow roller groove in the top of the anvil portion, be it an I beam or anything else that is suitable, which will actually improve the action. Oil or cutting compound used on the sheet will also improve the work.

The outstanding feature of my invention is the rolling cutter, with provision for reciprocating it back and forth over a sheet, always in exactly the same track and meanwhile supporting the sheet on an unhardened anvil portion so that the cut may be all cut clear through the sheet.

Having fully disclosed my invention so that anyone familiar with the work such a machine is required to perform can clearly understand it and make its advantages available; what I claim as new and desire to secure by Letters Patent is:

1. In a machine for cutting metal sheets, a frame member that includes an elongated anvil portion upon which plates are cut, a carriage above the anvil portion mounted for movement longitudinally, over the anvil, a driven chain belt,

connected to said carriage by a connecting rod with ball-and-socket joints at the chain and carriage ends thereof, sprockets upon which said chain is operatively mounted for rotation therearound, the said ball-and-socket joint on the chain passing around the sprockets to transform the cyclic motion of the chain into reciprocating rectilinear movement of the carriage, a cutter wheel on the carriage and means for engaging said wheel with a sheet to be cut.

2. In a sheet metal cutting tool, a frame member, an elongated anvil portion supported by said frame, a cutter carriage supported on guides above said anvil portion, a cutter wheel mounted underneath said carriage for frictional contact with material supported by said anvil, a horizontal double reach chain belt above said carriage, sprockets upon which said belt is mounted with the two reaches thereof substantially parallel to the path of motion of said carriage, a jointed connecting rod, one end of which operatively engages the chain and the other end joint connected to the carriage, means for driving at least one of the sprockets to transform the roundabout motion of the chain into reciprocating rectilinear motion of the carriage and means for feeding the carriage and cutter to and from its work.

3. A sheet metal cutter comprising a frame, said frame including a longitudinally disposed relatively stiff member with a flat elongated upper face, a carriage mounted to traverse said elongated face in vertically spaced parallel relation thereto, there being a sharp edged, rolling cutter mounted on the carriage to reciprocate with it, said cutter being nearest to said elongated upper face, screw operated means for varying the distance between said upper face and the cutter by vertical movement of the carriage, a chain belt drive for said carriage, said belt connected to the carriage by universal joints to permit carriage reciprocation by reversely running belt reaches.

4. A sheet metal plate cutting machine comprising a frame, an elongated anvil portion made rigid with said frame and so positioned that a sheet of metal to be worked may rest flat upon it, a reciprocating guided carriage mounted in spaced position from said elongated anvil portion, a rolling cutter operatively mounted beneath said carriage and above said anvil, means for varying the space to force said cutter into or withdraw it out of a sheet of metal resting flat on said anvil, a driven chain, the reaches of which are substantially parallel to and spaced above the carriage and anvil, power operated sprocket mounting means for said chain, a connecting rod jointed to the chain at one of its ends and to the carriage at its other end effective to transform the roundabout motion of the chain on the sprockets to rectilinear reciprocating motion of the carriage and means for varying the space between the cutter and the anvil while the same is being reciprocated with the carriage.

5. A cutting machine for sheet metal comprising a frictionally rotatable cutter wheel, a reciprocable carriage upon which the cutter wheel is mounted for contact with material to be cut, guide means for the carriage and a chain belt drive for said carriage, said chain connected to said carriage by a connecting rod universally jointed at both ends, to permit reciprocable movement of said carriage by reversely running belt reaches.

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