July 18, 1939. B. C. CRAIG 2,166,800

EXCAVATING STRUCTURE

Filed Nov. 23, 1937

Fig. 1.

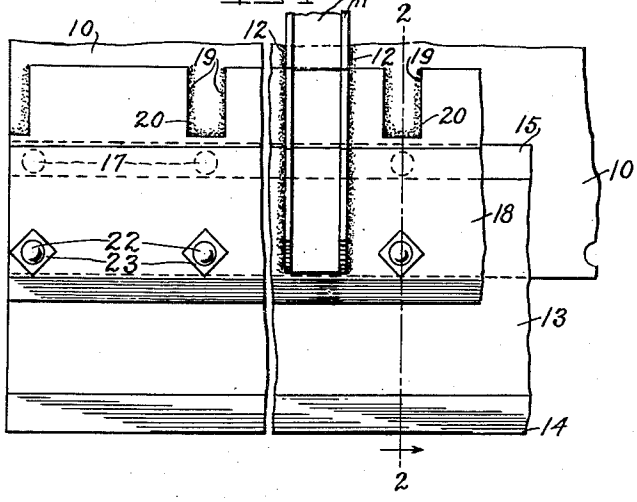


Fig. 2.

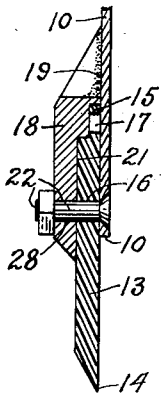


Fig. 3.

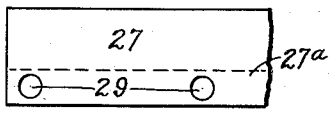


Fig. 4.

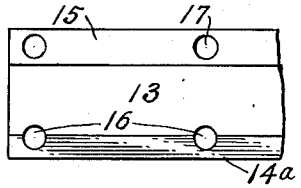


Fig. 5.

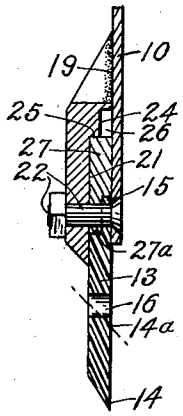


Fig. 6.

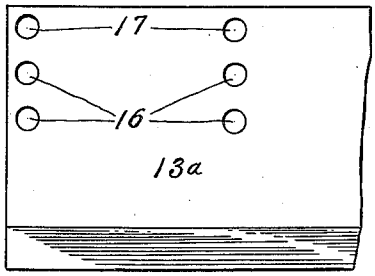
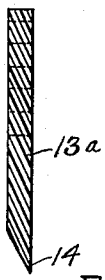


Fig. 7.



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2,166,800

EXCAVATING STRUCTURE

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Application November 23, 1937, Serial No. 176,101

2 Claims. (Cl. 37—143)

This invention relates to excavating structures, and specifically, to means for adjustably holding an earth-cutting strip so as to compensate for narrowing of the strip in consequence of wearing away of its cutting edge. In using the above words "excavating" and "earth", the former is intended to be limited by the latter so as to mean earth-excavating; while the term "earth" is intended to be construed broadly enough to include snow and ice as well as dirt. This is true because the device is useful as an element of a plow, scoop, shovel, scraper-blade or other earth-excavating tool or machine. It is especially useful and advantageous on earth-excavating blades and moldboards of large size where the large cutting strips are of tempered steel or other expensive material which is (or has been heretofore) discarded before it has been used to the limit of its usefulness, in the absence of means to hold it adjustably or in different adjusted or extended positions as it becomes narrower in consequence of being worn away at its cutting edge.

One object of this invention, therefore, is to provide an excavating structure such as will presently be described and which overcomes the necessity of discarding and replacing the cutting strip until it has been extended and thus permitted to be used to the full extent of its usefulness.

Other objects and important features are pointed out or implied in the following details of description, in connection with the accompanying drawing in which:

Fig. 1 is a rear elevation showing fragments of the several primarily separate features or elements of the invention assembled in the primary of initial position, viz., the position wherein the cutting strip has not been narrowed and extended, each part or element being foreshortened by having an intermediate section omitted or broken out.

Fig. 2 is a transverse sectional view along the line 2—2 of Fig. 1.

Fig. 3 is an elevation of one end of an abutment or backing strip.

Fig. 4 is an elevation of an end of the cutting strip after being worn back to the position indicated by the broken line near the bottom of Fig. 5.

Fig. 5 is a sectional view similar to Fig. 2, except the cutting strip or blade being worn narrower and adjusted to its extended position, and the backing strip or abutment (of Fig. 3) being in place.

Fig. 6 is an elevation of an end of a blade or cutting strip that is somewhat different from that shown in Figs. 1, 2 and 5.

Fig. 7 is a transverse sectional view of the blade shown in Fig. 6, or an end view of the broken-off right-hand end of Fig. 6.

Referring to the drawing in detail, in which, similar reference numerals refer to similar parts in the several views, the invention is described in detail as follows:

The metal plate 10 will be known hereinafter as the blade-plate, and it may be of any appropriate size and shape, according to the specific purpose for which it is to be used, as a moldboard, a road-scraping blade, a scoop-body etc.; and it may be provided with any appropriate means for securing it to a land vehicle or other appropriate carrier for moving its apertured front edge into working engagement with the earth to be moved thereby. For instance, a channel beam 11 may be electrically welded thereto as indicated at 12.

A cutting strip or blade 13, of steel or other appropriate metal, has a sharp longitudinal cutting or scraping edge 14, and an opposite apertured edge 15 which is in the form of a flange one-half the thickness of the main or intermediate portion which is also apertured as at 16. The apertures of the half-thick flange or edge 15 are indicated at 17.

A combined rigidifying and clamping strip 18 of metal, and of the special cross-section illustrated, or of a similar equivalent cross-section, is coherently and immovably united with the blade-plate 10, as by electrically welding at 19, at different points along the strip 18, and extends the entire length of the blade-plate, so as to greatly increase rigidity of the relatively thin blade-plate. In order that the welds 19 may extend from the rear edge (upper edge in the drawing) to the intermediate part, or part near the longitudinal central line, deep notches 20 may be formed in the rear edge of the strip or beam 18 so the welding can be applied as indicated. However this shows only one of the different ways that the parts 10 and 18 may be united or secured to one another. The strip 18 has one side formed with three plane surfaces which are stepped or offset from one another in parallel planes. One of these surfaces is fitted snugly against the blade-plate 10; a second one is indicated at 21, spaced from the apertured front edge of the plate 10 so as to receive and engage with the rear edge and intermediate parts of the cutting strip 13 and to combine with the screw-bolts 22 and their nuts 23 for clamping the cutting

strip and holding it in its working positions, viz., in either its primary position (as when new), or in its secondary adjusted position (as when narrowed by wearing away of its cutting edge); and a third one is indicated at **24**, terminating in a shoulder **25**. It will be seen that this arrangement of stepped level or plane surfaces provides a primarily open space which receives the flange **15** (as in Fig. 2) and provides an opening (as in Fig. 5) at **26** to receive a wedge, lever or other tool for forcing the member **27** (Figs. 3 and 5) or the blade **13***a* (Fig. 7) from its seat; this probably becoming necessary on account of rust in the joints; and this opening is also useful for receiving oil and conducting it to the entire length of the parts **10**, **13** and **18** for lubricating the joints between them.

The purpose of the extension-strip **27** is to compensate for the wearing away of the front or working edge **14**; for the blade would become extremely inefficient if permitted to wear away until its cutting edge were permitted to wear back to or very near to the rigidifying beam **18**; and it would be very wasteful to either discard the worn cutting blade, to weld an extension onto it, or even to be wasting time by tightening or replacing nuts on the bolts **22**, as would become necessary if the nuts would come into contact with rocks and other hard substances when the device is in operation. Therefore when the blade or cutting strip **13** has become about as narrow as that shown in Fig. 5, the user forces it forward until its apertures **17** register with apertures **28** (Figs. 2 and 5) of the rigidifying beam **18**, after first removing the bolts **22**; and next, the extension strip **27** is thrust into the position shown in Fig. 5 where its apertures **29** register with apertures **17** and **28**; whereupon, the bolts **22** are inserted in the registering apertures, their nuts tightened, and the flanges **15** and **27***a* are interlapping and clamped upon one another by the combined action of the bolts, the blade-plate and the rigidifying strip. Moreover, the strip **27** now rests against the abutment **25** so as to supplement the bolts in keeping the blade **13** from being bent rearward by pressure against the earth, especially against roots, rocks, etc.

When the blade has been narrowed to the degree indicated in Fig. 4, so its cutting edge is at **14***a*, the apertures **16** serve as an index to notify operators that the blade should be discarded and replaced by a new one such as shown in Figs. 1 and 2 or as the modified form of Figs. 6 and 7. In this modified form, the flange **15** is omitted, and the strip **27** may be omitted in connection therewith; and moreover, this form is provided with a greater number of apertures more closely arranged laterally, so as to provide for more gradual adjustments of the blade or cutting strip to its working position.

In addition to the welding of the attaching beams **11** (only one here shown), they may be welded to the lower or front and intermediate parts of the rigidifying bar or beam **18** (as in Fig. 1), so as to combine with the beam **18** in rigidifying the blade-plate **10**, so the thickness and consequent weight and cost of the plate **10** may be minimized while its efficiency is maximized in consequence of its rigidity.

Although I have described these embodiments of my invention specifically, it is not my intention to limit my patent protection to these precise details of construction and arrangement, for the invention is susceptible of various changes within the scope of the invention ideas as implied and claimed.

What I claim, as my invention, is:

1. In an excavating structure substantially as specified, the combination of a blade-plate having a longitudinal apertured edge-portion, a cutting strip having an apertured edge-portion and a cutting edge and an apertured intermediate portion, a combined rigidifying and clamping strip having an apertured longitudinal edge portion spaced from the apertured edge portion of said blade-plate and having its opposite longitudinal edge-portion against and secured to said blade-plate, said cutting strip having its intermediate portion primarily or normally between the apertured edge of the blade-plate and the combined rigidifying and clamping strip, securing means normally or primarily extending through the apertures of said blade-plate and clamping strip and through apertures of the intermediate part of said cutting strip and being interchangeable in the apertures of the edge portion of the cutting strip so as to hold the latter in an extended position when desirable to compensate for wear and consequent narrowing of the cutting strip, and an abutment-strip adapted to be fitted between the blade-plate and the clamping strip and against the rear edge of said cutting strip when the latter is adjusted to its extended position, for the purpose specified.

2. In an excavating structure substantially as specified, the combination of a blade-plate having a longitudinal apertured edge-portion, a cutting strip having an apertured edge-portion and a cutting edge and an apertured intermediate portion, a combined rigidifying and clamping strip having an apertured longitudinal edge-portion spaced from the apertured edge portion of said blade-plate and having its opposite longitudinal edge-portion against and secured to said blade-plate, said cutting strip having its intermediate portion primarily or normally between the apertured edge of the blade-plate and the combined rigidifying and clamping strip, securing means normally or primarily extending through the apertures of said blade-plate and clamping strip and through apertures of the intermediate part of said cutting strip and being interchangeable to the apertures of the edge-portion of the cutting strip so as to hold the latter in an extended position when desirable to compensate for wear and consequent narrowing of the cutting strip, said apertured edge-portion of the cutting strip being a flange of substantially one-half the thickness of the main portion of the cutting strip, and an abutment-strip having an edge-portion interlapped with said flange, said securing means being adapted to extend through the apertures of the extension strip and flange and being operable to cause the blade-plate and clamping strip to clamp the interlapped flange and abutment-strip, said clamping strip having an abutment against which the rear edge of the abutment-strip is seated when in the interlapped and clamped relation, for the purpose specified.

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