United States Patent [19]

Brown

[11] **3,774,301**

[45] **Nov. 27, 1973**

[54] **CUTTERS**

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[21] Appl. No.: **220,179**

[52] **U.S. Cl.** **30/186**
[51] **Int. Cl.** **B26b 17/04**
[58] **Field of Search** 30/28, 175, 181, 30/186, 187, 188, 191, 192, 193, 204, 237, 238, 239

[56] **References Cited**

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Assistant Examiner—Mark S. Bicks
Attorney—Robert H. Ware et al.

[57] **ABSTRACT**

Two cooperating arm members, formed from lightweight sheet metal stampings and each incorporating a ramped blade section and a handle portion, are pivotably interconnected along a pivot axis with the sharp cutting edges of the blade sections axially spaced apart from each other to assure overlapping of the blade cutting edges, thereby forming a unique cutter specifically applicable to shearing of small diameter wires, fibers, plastics, and the like. By providing cutters whose cutting edges are axially spaced apart, the cutting edge of one of the ramped blade sections contacts the other ramped blade section and slidingly advances thereon, providing assurance that a particular item is completely cut, even when the cutting edges of the blades have been dulled from use.

4 Claims, 7 Drawing Figures

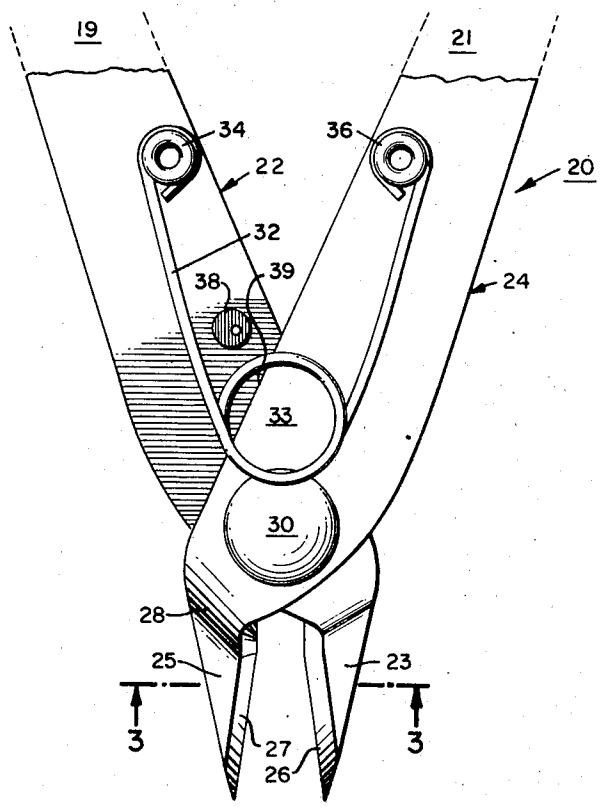


FIG. 1

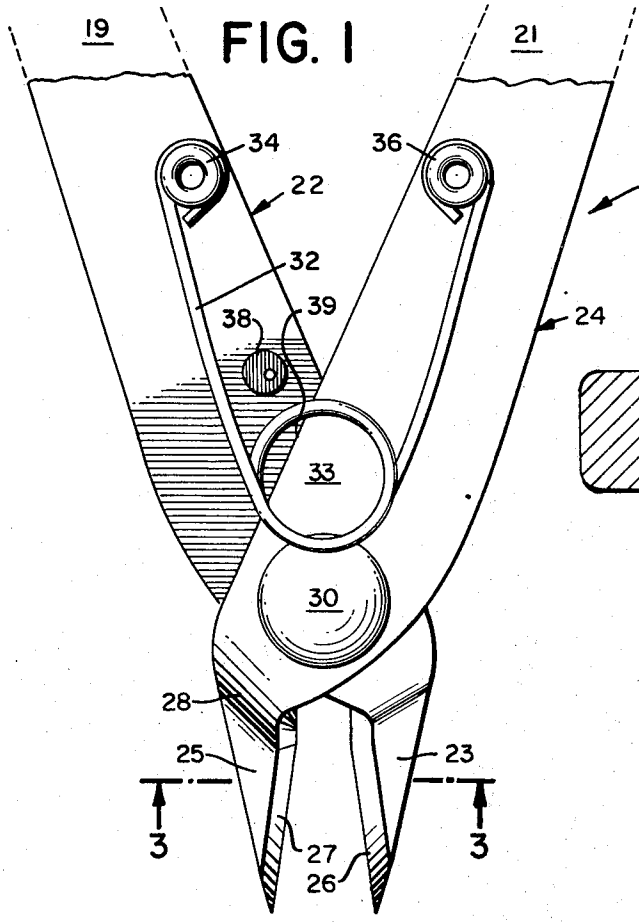


FIG. 7

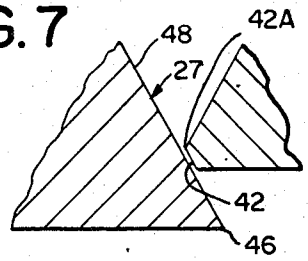


FIG. 3

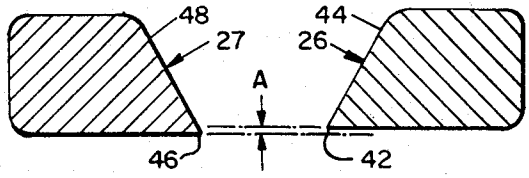


FIG. 4

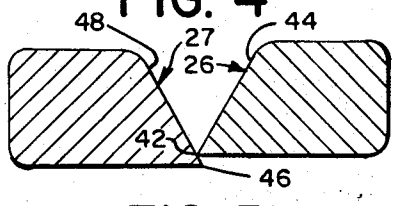


FIG. 5

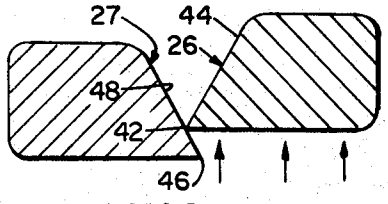


FIG. 6

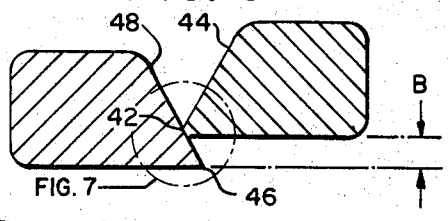
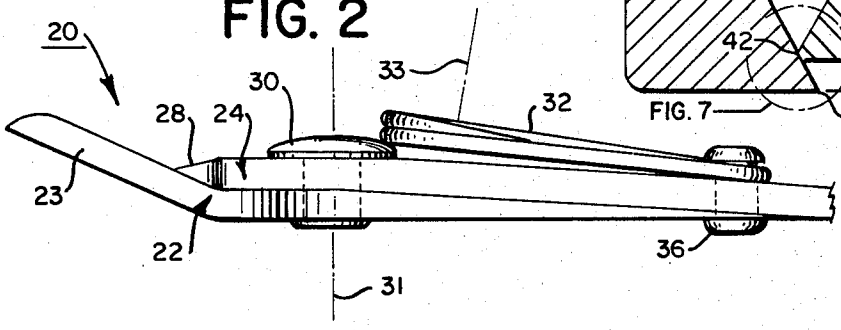


FIG. 2



CUTTERS

BACKGROUND OF THE INVENTION

This invention relates to cutters, and more particularly to cutters for use with small diameter wires, fibers, plastics, and the like.

Most prior art cutters operate by advancing the sharp cutting edges of the blade sections advancing into the item to be cut until the cutting edges substantially contact each other, cutting the item while producing a V-shaped end on the piece cut off. However, when the cutting edges become dull, the edges merely wedge into the wire breaking the wire off with a rough burr.

When small diameter wires are cut by the prior art wire cutters, the wire is generally flattened instead of being severed, with a flat head remaining on the wire.

Another problem prevalent with prior art V-type cutters is partially cut wires, which generally occur when the cutting blades have become dull or nicked.

Therefore, it is a principal object of this invention to provide cutters capable of completely severing a wire, even when the cutting edges are dull, nicked and/or scratched.

Another object of this invention is to provide cutters of the above character which are completely effective in cutting small diameter wires without leaving unwanted edges.

Another object of this invention is to provide a cutter of the above character which is easily handled and manipulated.

A further object of this invention is to provide a cutter of the above character which is not only effective, but also inexpensive to manufacture.

Other and more specific objects will in part be obvious and will in part appear hereinafter.

SUMMARY OF THE INVENTION

The cutters of this invention are capable of assuring complete cutting of small diameter wires, fibers, plastics, and the like, even when the cutting edges are dull or nicked, by arranging the cutting edges so that they do not contact each other. By providing this type of cutter, the cutting edges are free to move independently of each other. As a result, when the cutting edges are brought into close proximity with each other, one of the edges slidingly advances on the beveled surface of the other blade portion. This allows the cutting edges of the blades to overlap each other by a specifically controlled amount. This overlap cutting action assures a complete cut of the item regardless of the condition of the cutting surface.

The invention accordingly comprises the features of the construction, combinations of elements, and arrangement of parts which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

THE DRAWINGS

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

FIG. 1 is a fragmentary plan view of the cutters of this invention;

FIG. 2 is a fragmentary side elevation view of the cutters of FIG. 1;

FIG. 3 is a cross sectional end view of the cutting surface of the cutters of this invention taken along line 3—3 of FIG. 1;

FIGS. 4 through 6 are cross sectional end views similar to that of FIG. 3, showing the progressive steps as the cutting surfaces of the cutters of this invention are brought into contact with each other, and

FIG. 7 is a greatly enlarged cross sectional view of a portion of the cutting surfaces of FIG. 6.

DETAILED DESCRIPTION

In FIGS. 1 and 2, the construction of cutter 20 can best be seen. Cutter 20 is constructed from a pair of arm members 22 and 24, which are pivotably interconnected by rivet 30 having a pivot axis 31.

Arm member 22 comprises an end portion 23 and a handle portion 19, indicated by dash lines in FIG. 1. Arm member 24 comprises an end portion 25 and a handle portion 21, also indicated by dash lines in FIG. 1. Arm members 22 and 24 are die stamped from a single piece of lightweight sheet metal, and the arm members virtually comprise mirror images of each other, except for their offset blade portions. End portions 23 and 25 of arm members 22 and 24 are then ground to form sharp cutting edges 42 and 46 along blade sections 26 and 27.

Since arm member 22 comprises the lower member of cutter 20, its end portion 23 merely incorporates a gentle upward slope, best seen in FIG. 2. However, since arm member 24 is the upper member of cutter 20, arm member 24 incorporates a downward sloping offset portion 28 between rivet 30 and its end portion 25. End portion 25 is shaped to be in substantially the same plane as end portion 23 of arm member 22.

Arm member 22 and 24 of cutter 20 are free to pivot about axis 31 of interconnecting rivet 30 and, for convenience, are optionally biased apart by a torsion spring 32, having an axis 33 near pivot axis 31. One leg of spring 32 is connected to arm member 22 by a rivet 34, while the other leg of spring 32 is connected to arm member 24 by a rivet 36. Preferably, the spring tension of spring 32 is easily overcome with a minimum of effort, and is merely incorporated for the convenience of the user to assure separation of blade sections 26 and 27 from each other after a wire has been cut. Although the use of spring 32 is optional, the incorporation of spring 32 on cutter 20 eliminates the need for the user of cutter 20 to manually separate blade sections 26 and 27 after an item has been cut.

Another optional feature which may be incorporated on cutter 20 is an adjustable cutting stop 38, shown in FIG. 1. Although stop 38 may take many configurations, such as stamped raised legs, one such configuration may comprise a circular boss eccentrically mounted on arm 22 for adjustable-stop action. As arms 22 and 24 are advanced toward each other causing blade sections 26 and 27 to come into cutting juxtaposition with each other, edge 39 of arm 24 approaches abutting contact with stop 38. As will be more clearly explained below, the cutting edges of blade sections 26 and 27 overlap each other with the cutting edge of one sliding along the ramp portion of the other. By changing the position of stop 38, the arch through which arm 24 can swing before edge 39 abuts stop 38 can be preset.

Referring to FIGS. 3 through 6, the unique arrangement of blade sections 26 and 27 and their novel cut-

ting operation can best be understood. Blade section **26** incorporates a cutting edge **42** and a ramp section **44**, while blade section **27** incorporates a cutting edge **46** and a ramp portion **48**. In the normal position, cutting edge **42** of blade section **26** is axially spaced apart a distance "A" from cutting edge **46** of blade section **27**, as shown in FIG. **3**. Although distance "A" can be varied, depending upon the desired results, in the preferred embodiment the distance "A" is approximately 0.001 inches.

As the arm members of cutter **20** are moved towards each other, cutting edges **42** and **46** approach each other, cutting into a particular item, as shown in FIG. **4**. With the prior art cutters, the cutting edges cannot even reach the cutting position shown in FIG. **4**. As a result, if the cutting edges of the prior art cutters are dull or nicked, the item being cut will not be completely severed.

With the cutters of this invention, cutting edge **42** of blade section **26** is designed to approach ramp surface **48** of blade section **27**, near but displaced from cutting edge **46** of blade section **27**. In the prior art cutters, the two cutting edges are designed to merely contact each other.

With the cutters of this invention, ramp surface **48** is sloped, and cutting edge **42** is juxtaposed to ride up ramp surface **48**. As a result, when blade sections **26** and **27** are forced into closer intimate contact, cutting edge **42** of blade section **26** cammingly slides along ramp surface **48** of blade section **27**. By this novel sliding, camming action cutting edge **42** penetrates more deeply into the item being cut, assuring complete severence of the item into two pieces. This additional sliding, complete cutting action is best seen in FIG. **5**.

As shown in FIG. **6**, the distance "B" between cutting edges **42** and **46** when blade sections **26** and **27** have been squeezed tightly together, is substantially greater than the axial edge separation distance "A" shown in FIG. **3**. By providing a cutter which has this added sliding capability at the cutting edges, a novel cutter which assures complete and accurate cutting without unwanted burrs or rough edges is provided.

Furthermore, the cutters of this invention have a self-sharpening effect, shown in FIG. **7**. As cutting edge **42** repeatedly, cammingly slides up ramp surface **48** of blade section **27**, cutting edge **42** undergoes a self-sharpening or burnishing effect, which produces and maintains a sharp cutting edge **42A**. This provides assurance that the cutters of this invention will always be sharp, and will always produce a complete and accurate severence of the desired item.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained, and since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim is new and desire to secure by Letters Patent is:

1. A cutter comprising:

A. a pair of arm members, each of said arm members incorporating blade portions at one end, said blade portions comprising:

a. cutting edges, and

b. a camming, ramp portion on at least one of said blade portions;

B. means pivotably interconnecting said pair of arm members at a pivot axis; and

C. the cutting edges of said arm members being axially offset from each other and individually flexible with respect to each other, whereby one cutting edge of the other arm member contacts the ramp portion of said one arm member and, as cutting pressure is applied, flexes and cammingly advances along said ramp portion assuring complete cutting of a wire.

2. A cutter, as defined in claim **1**, further comprising a torsion spring having an axis near said pivot axis and two legs respectively mounted to each of said pair of arm members for maintaining said cutting edges apart when no pressure is applied to said arm members.

3. A cutter, as defined in claim **1**, further comprising stop means mounted to one of said arm members for lifting the arc through which the other of said arm members may move when said cutting edges are closely juxtaposed to each other.

4. The cutter defined in claim **3**, wherein said stop means is adjustable.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,774,301 Dated November 27, 1973

Inventor(s) Frank R. Brown

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 35, "member" should be -- members --

Column 4, line 25, after "blade portions" insert -- facing the other of said blade portions --

Signed and sealed this 16th day of July 1974.

(SEAL)
Attest:

McCOY M. GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,774,301 Dated November 27, 1973

Inventor(s) Frank R. Brown

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 35, "member" should be -- members --

Column 4, line 43, "lifting" should be -- limiting --

Signed and sealed this 30th day of April 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334