Feb. 2, 1960 K. F. JOHNSON 2,923,183

APPARATUS FOR COLDWELDING METAL PARTS TOGETHER

Filed Nov. 8, 1955 2 Sheets-Sheet 1

FIG. 1

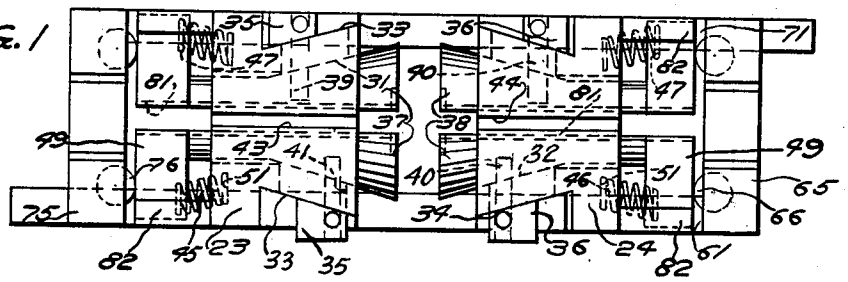


FIG. 2

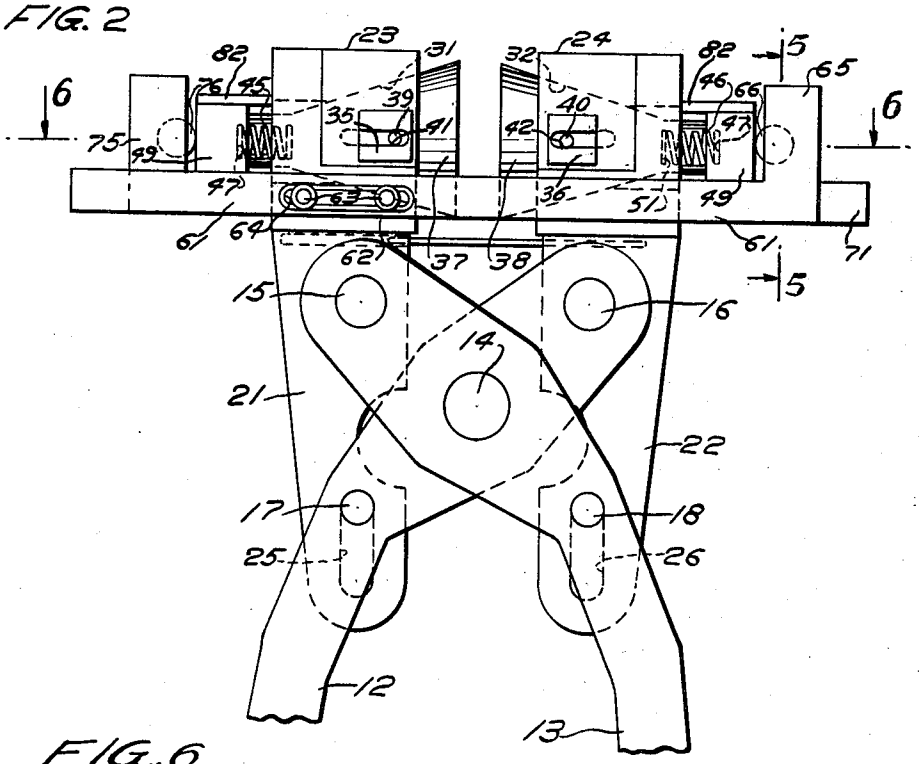
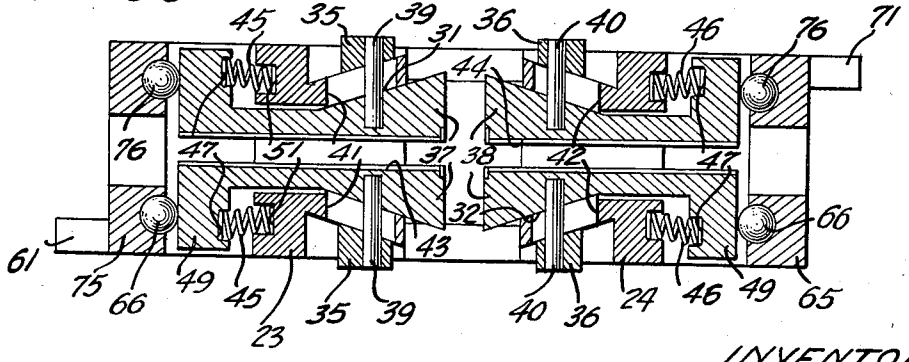


FIG. 6



INVENTOR
K. F. JOHNSON
BY C. B. Hamilton
ATTORNEY

Feb. 2, 1960 K. F. JOHNSON 2,923,183

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Filed Nov. 8, 1955 2 Sheets-Sheet 2

FIG. 3

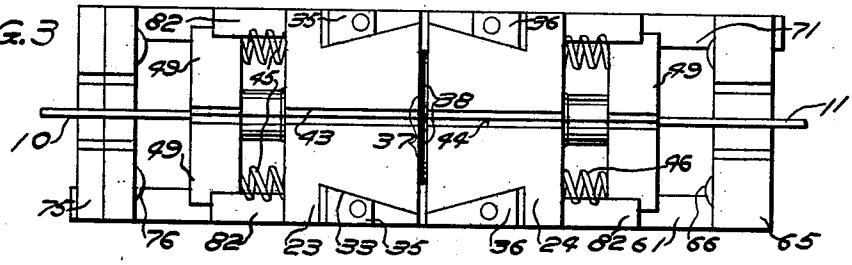


FIG. 4

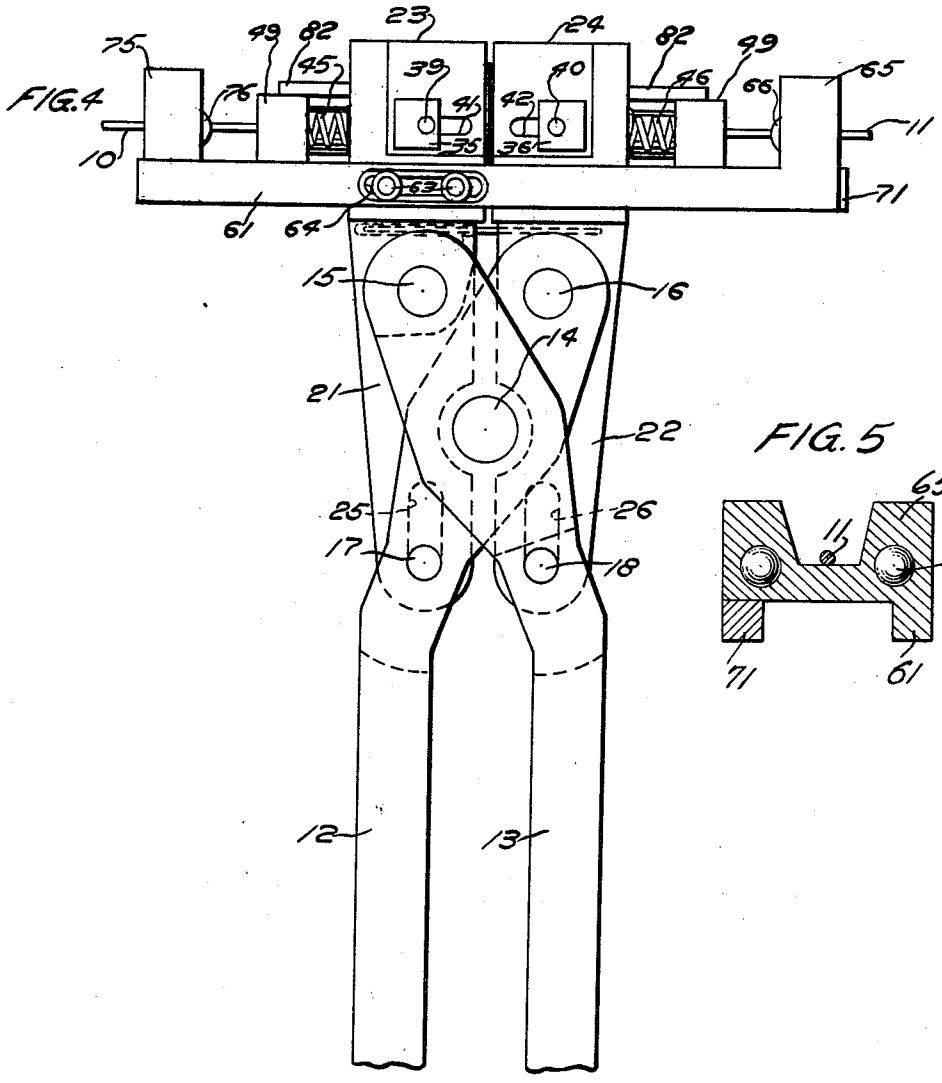


FIG. 5

INVENTOR
K. F. JOHNSON
BY C. B. Hamilton
ATTORNEY

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APPARATUS FOR COLDWELDING METAL PARTS TOGETHER

Kenneth F. Johnson, Cicero, Ill., assignor to Western Electric Company, Incorporated, New York, N.Y., a corporation of New York

Application November 8, 1955, Serial No. 545,752

2 Claims. (Cl. 78—82)

This invention relates to apparatus for coldwelding metal parts together, and more particularly to apparatus for coldwelding ends of aluminum wire together.

In coldwelding the ends of wires together for continuously operable, high speed machines for processing wire, such as, for example, machines for covering the wires, it is essential to rapidly splice wires from full reels to trailing ends of the wires of exhausted reels without interrupting the operation of the machine. One device for rapidly effecting such welds is disclosed and claimed in copending application Serial No. 397,561, filed December 11, 1953, by K. F. Johnson-H. G. Kohr for "Apparatus for Coldwelding Metal Parts Together", now abandoned. However, for certain operations, it is desirable to be able to load and unload this device more rapidly than has been possible hitherto.

An object of the invention is to provide new and improved apparatus for coldwelding metal parts.

Another object of the invention is to provide apparatus for coldwelding the ends of aluminum wires together.

Another object of the invention is to provide apparatus for rapidly coldwelding the ends of aluminum wires together to make high tensile strength welds without impairing the strength of the portions of the wires adjacent to the welds.

In an apparatus illustrating certain features of the invention, two pairs of wire clamps are provided, the pairs being movable relative to the other between open or retracted positions and closed or welding positions. Means are provided for automatically opening the pairs of jaws when they are in their retracted positions and closing the jaws when the pairs of jaws leave their retracted positions.

A complete understanding of the invention may be obtained from the following detailed description of an apparatus forming a specific embodiment thereof, when read in conjunction with the appended drawings, in which

Fig. 1 is a top plan view of an apparatus forming a specific embodiment of the invention;

Fig. 2 is a front elevation of the apparatus shown in Fig. 1;

Fig. 3 is a top plan view of the apparatus shown in Fig. 1 disclosing the jaws in closed position;

Fig. 4 is a front elevation of the apparatus shown in Fig. 1 disclosing the jaws in closed position;

Fig. 5 is a sectional view taken along line 5—5 of Fig. 1; and

Fig. 6 is a cross-sectional view along line 6—6 showing in detail the cooperating elements of the jaw and a holder apparatus.

Referring now in detail to the drawings, there is shown a hand tool for forcing ends of wires **10** and **11** together to swage, coldweld or buttweld the wires together. The tool includes levers **12** and **13** secured pivotally together by a pin **14** and carrying pins **15**, **16**, **17** and **18** rigidly thereon. Arms **21** and **22** rigidly secured to jaw-holders **23** and **24** are mounted rotatably on the pins **15** and **16** and have slots **25** and **26** into which the pins **18** and **17** project. When the levers **12** and **13** are opened, the jaw-holders **23** and **24** and the arms **21** and **22** are moved apart while the arms **21** and **22** are kept parallel to one another and the jaw-holders are kept aligned with one another. The jaw-holders are provided with internal frusto-conical guiding surfaces **31** and **32** and external cam surfaces **33** and **34** along which slide follower cams **35** and **36** secured to grooved jaws **37** and **38** by pins **39** and **40**. The jaws **37** and **38** are provided with outer frusto-conical surfaces that engage and cooperate with the internal frusto-conical surfaces of the jaw holders. The pins **39** and **40** are slidable laterally thereof in slots **41** and **42**. The jaw-holders **23** and **24** also have slots **43** and **44** to permit removal of welded wires.

The jaws **37** and **38** are urged toward closed positions by springs **45** and **46** seated in sockets **47** in flanges **49** of the jaws and sockets **51** in jaw-holders **23** and **24**. Interposed springs **45** and **46** tend to move the flanges **49** from the respective jaw-holders **23** and **24** and thus move each pair of jaws **37** and **38** toward the closed position. An arm **61** is secured adjustably in a groove **62** in jaw-holder **23** by screws **63** projecting through a slot **64** in arm **61**. A notched stop plate **65** carrying ball bearings **66**, is integrally formed on or is secured rigidly to arm **61** and is slidable along an arm **71** (see Fig. 5) similar to the arm **61** and secured adjustably to jaw-holder **24**. Arm **71** has integrally formed thereon or attached thereto a notched stop plate **75** carrying ball bearings **76** and is slidable on arm **61**. The arm **61** serves to guide jaw-holder **24** and hold it aligned with jaw-holder **23**, and arm **71** similarly guides jaw-holder **23**. The springs are just strong enough to cause roughened surfaces of grooves **81** to hold the wires against slipping during the welding, but do not prevent slipping of the wires when the wires tend to pull the jaws open as the jaw-holders are moved apart. Jaw guides **82** are secured to the jaw holders.

Operation

With handles **12** and **13** open, jaws **37** are engaged by balls **76** and pushed to the right in jaw-holder **23**. The follower cams **35** through the agency of pins **39** hold jaws **37** apart so wire **10** can be inserted therethrough. Similarly, stop **65** pushes jaws **38** to compress the springs **46** and the follower cams **36** thruogh the agency of pins **40** open jaws **38** for loading wire **11** therein. The wires are inserted and the handles are closed to simultaneously move jaw holders **23** and **24** toward each other and the stop plates **65** and **75** away from each other whereupon the springs **45** and **46** will hold the flanges **49** of the jaw members against the balls **76** and **66**. Surfaces **31** and **32** of jaw members **23** and **24** thereupon react on frusto-conical surfaces of the jaws **31** and **38** to close the jaws on the wires and hold the wires in alignment.

Upon further movement of the levers **12** and **13** toward each other, the jaw holders **23** and **24** and the jaws **37** and **38** advance as two units toward each other to swage together the ends of the wires. The handles then are opened, which moves the flanges **49** of jaws **37** and **38** against the bearings **76** and **66** and holds the jaws **37** and **38** against further longitudinal movement with the jaw-holders **23** and **24**. The further advance of the jaw-holders cause the follower cams **35** and **36** to ride up on the surfaces **33** and **34** to slide the jaws laterally from engagement with the swaged wire. The welded wires then may be moved laterally out of the jaws, and the operation described above may be repeated.

The above-described apparatus may be used as a plier-like tool or may be mounted on a standard or the like. The arms **61** and **71** may be adjusted to positions in which one pair of the jaws closes before the other pair of jaws so that one wire may be held firmly by the earlier closed

jaws while the second wire is inserted into the still open pair of jaws.

Certain features of the above-described tool are disclosed and claimed in above-mentioned copending application Serial No. 397,561 and copending application Serial No. 545,650, filed Nov. 8, 1955, by K. F. Johnson for "Apparatus for Coldwelding Metal Parts Together."

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. An actuating mechanism for opposing pairs of stock-gripping jaws having lateral projections, said jaws having conical external surfaces tapering to cylindrical surfaces adjoining the lateral projections, comprising a pair of movable holders having openings therein complementarily and slidably receiving the pairs of jaws in opposed relation, said holders having external cam surfaces and lateral pin slots extending inwardly therefrom, cam followers engaging said cam surfaces, pins rigidly connecting said followers to the jaws through the pin slots in the holder, jaw-stops individually mounted on respective holders and in sliding engagement with each other to actuate the jaws in the opposing holder, pivotally interconnected levers individually and pivotally connected to respective holders, and resilient means mounted between the lateral jaw projections and the jaw stops.

2. An actuating mechanism for a stock-gripping mechanism having opposing pairs of jaws wherein said jaws have external conical surfaces, which comprises a pair of plier-like levers, a jaw-holder carried by one lever, a first actuating means urging a pair of jaws toward closed positions, a second jaw-holder carried by the other lever, said jaw holders having conical internal surfaces in sliding engagement with the respective external conical jaw surfaces and having slotted external cam surfaces parallel to sliding conical surfaces, cam followers in contact with the respective external cam surfaces of the holders and rigidly connected to the jaws through the slots in the holders, a second actuating means urging a second pair of jaws toward closed positions, a stop carried by the first jaw-holder for actuating the second actuating means as the levers are opened, and a second stop carried by the second jaw-holder for actuating the first actuating means.

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