

April 20, 1965

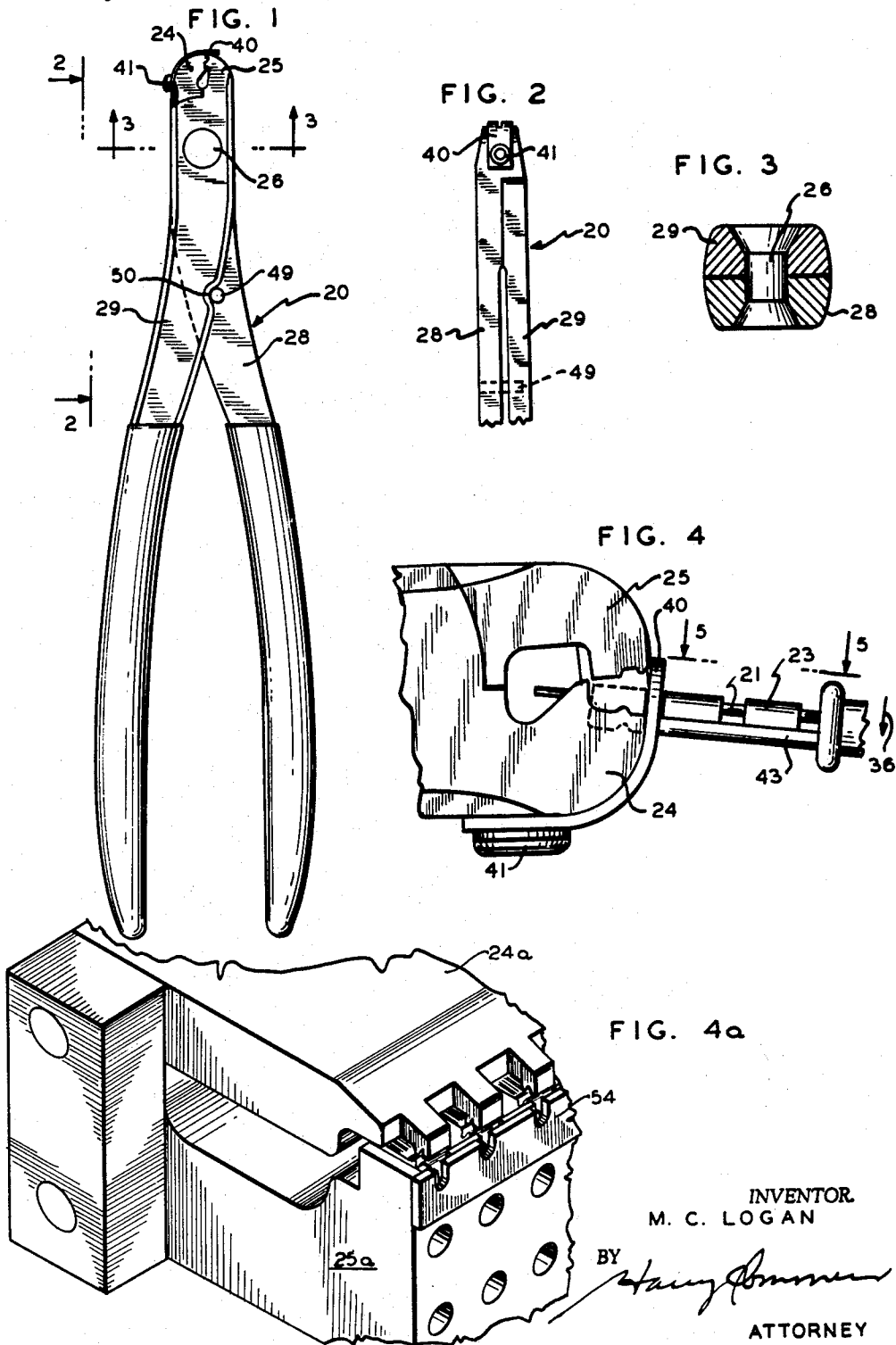
M. C. LOGAN

3,178,926

TOOL FOR CRIMPING ELECTRICAL CONDUCTORS

Filed April 2, 1963

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M. C. LOGAN

3,178,926

TOOL FOR CRIMPING ELECTRICAL CONDUCTORS

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FIG. 5

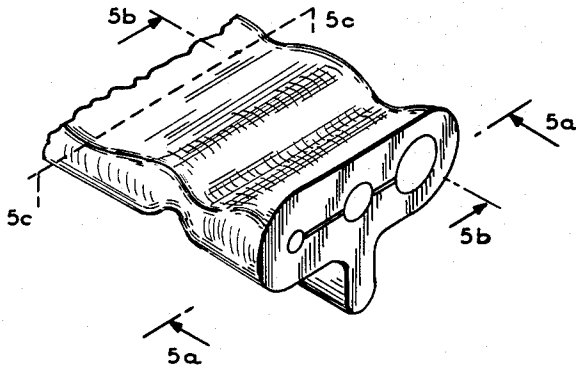


FIG. 5a

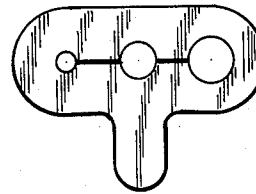


FIG. 5b

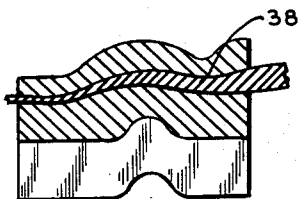


FIG. 5c

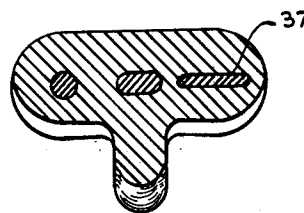
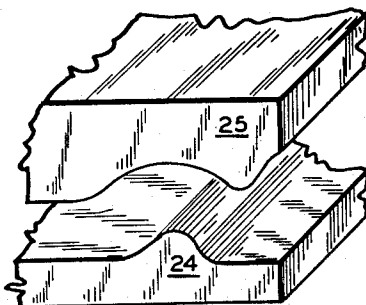


FIG. 6



INVENTOR
M. C. LOGAN

BY

Harry Hume

ATTORNEY

April 20, 1965

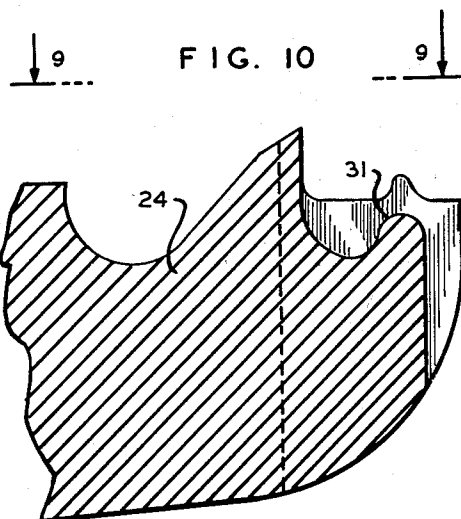
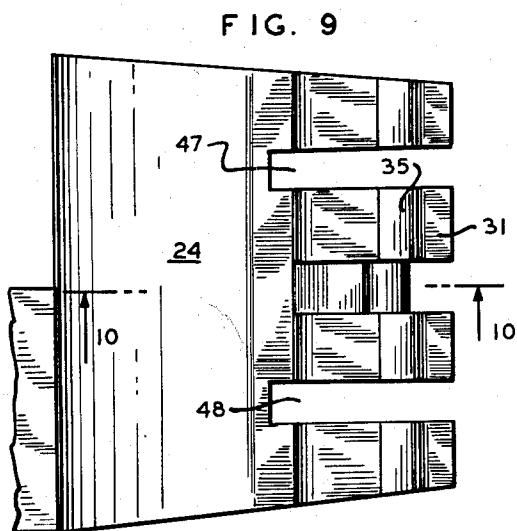
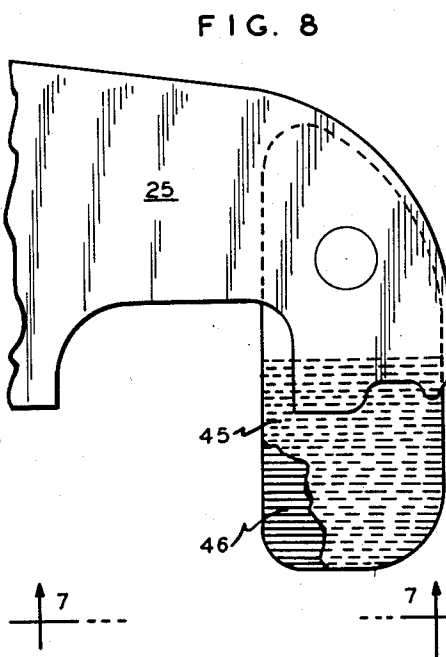
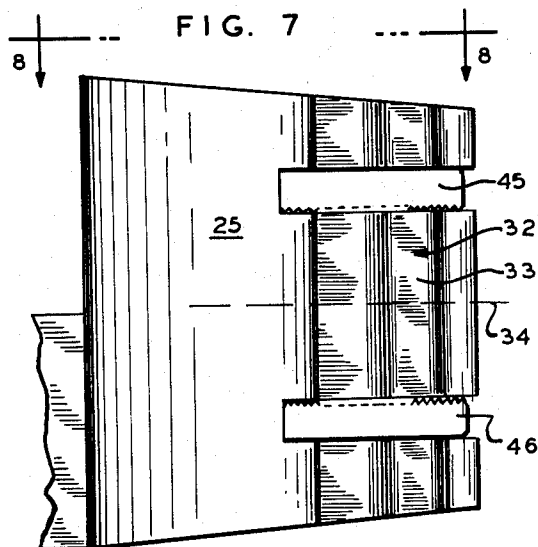
M. C. LOGAN

3,178,926

TOOL FOR CRIMPING ELECTRICAL CONDUCTORS

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4 Sheets-Sheet 3



INVENTOR.
M.C. LOGAN

BY

Harry C. Logan

ATTORNEY

April 20, 1965

M. C. LOGAN

3,178,926

TOOL FOR CRIMPING ELECTRICAL CONDUCTORS

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FIG. 11

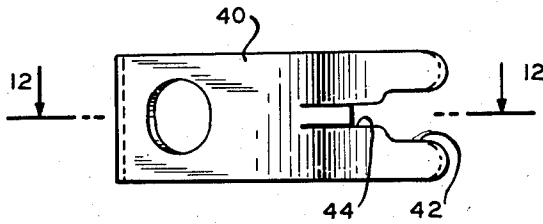


FIG. 12

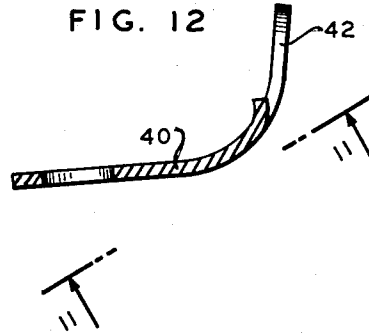


FIG. 13

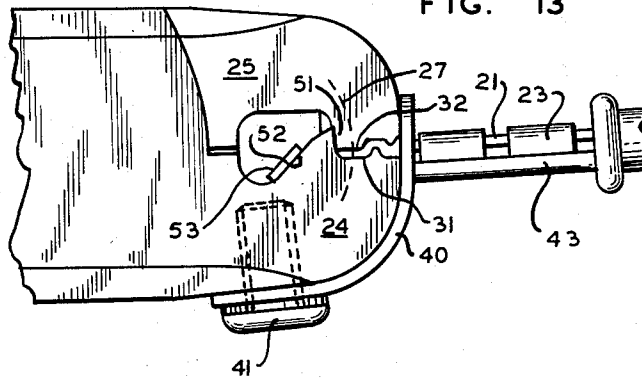
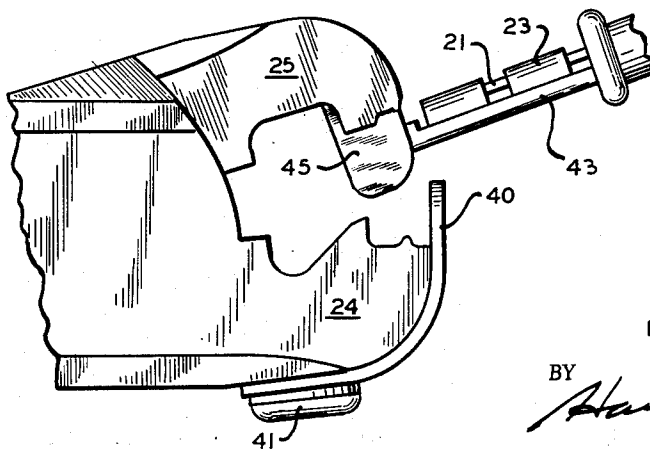


FIG. 14



INVENTOR
M.C. LOGAN

BY *Harry Brunner*
ATTORNEY

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3,178,926

TOOL FOR CRIMPING ELECTRICAL CONDUCTORS

Maurus C. Logan, Elizabeth, N.J., assignor to The Thomas & Betts Co., a corporation of New Jersey
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5 Claims. (Cl. 72—410)

This invention relates to a tool for crimping electrical components—exemplarily electrical conductors, the tool having novel structural features below further described, whereby the assembly of the electrical parts may be positioned across the face of a jaw member of the tool and the tool then closed to axially compress the parts and simultaneously impart transverse crimps therein for further interlocking the parts. The tool is further provided with novel means for initially holding the connector across the face of one of the jaw members and fingers extending from the other jaw member frictionally engaging the tubular connector after the latter has been compressed in the tool so as to carry the connector therewith on opening of the jaw members after the crimping operation. Means are provided automatically severing ends of the parts or portions thereof extending beyond the inner walls of the jaw members automatically on completion of the compressing, crimping operation.

The tool is further designed to provide accurate and efficient crimping of parts of differing dimensions and contours therein with a minimum amount of force and without stress or damage to the parts.

The drawings, illustrating procedures and devices useful in carrying out the invention, and the description below, are exemplary only of the invention, which shall be deemed to cover all other devices and procedures coming within the scope and purview of the appended claims.

In the drawings, wherein similar reference characters indicate like parts:

FIG. 1 is a side elevational view of a tool embodying the invention, shown in closed position,

FIG. 2 is a fragmentary end elevational view thereof, taken at line 2—2 of FIG. 1,

FIG. 3 is an enlarged transverse sectional view thereof, taken at line 3—3 of FIG. 1,

FIG. 4 is an enlarged, fragmentary, side elevational view of the jaw end of the tool, showing a connector about to be crimped therein,

FIG. 4a is a fragmentary perspective view of a machine tool embodying the invention,

FIG. 5 is a fragmentary plan view of an electrical connector crimped by the tool of this invention,

FIG. 5a is a transverse sectional view thereof, taken at line 5a—5a of FIG. 5,

FIG. 5b is a longitudinal sectional view thereof, taken at line 5b—5b of FIG. 5,

FIG. 5c is a transverse sectional view thereof, taken at line 5c—5c of FIG. 5,

FIG. 6 is a fragmentary perspective view of the jaw members 24, 25 of a tool 20, pursuant to the invention,

FIG. 7 is an enlarged fragmentary plan view of jaw member 25 taken at line 7—7 of FIG. 8,

FIG. 8 is a side elevational view thereof, taken at line 8—8 of FIG. 7,

FIG. 9 is an enlarged fragmentary plan view, taken at line 9—9 of FIG. 10, of the other jaw member,

FIG. 10 is a vertical sectional view thereof, taken at line 10—10 of FIG. 9,

FIG. 11 is a top plan view of a bracket which may be secured to one of the jaw members, as in FIG. 4,

FIG. 12 is a side elevational view thereof, taken at line 12—12 of FIG. 11,

FIG. 13 is a partly fragmentary side elevational view

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of the jaw end of the tool in its crimping operation, showing the end of the conductors extending beyond the inner walls of the jaw member, severed thereby, and

FIG. 14 is a similar view showing said jaw members opened after the FIG. 4 operation, the connector being then lifted by the fingers of the jaw member 25.

As shown in the drawings, the device of this invention comprises a tool 20 for crimping electrical conductors, such as shown at 21 in FIGS. 4, 13, 14 and 5 in an elongated tubular connector 23 which may be made of any soft or compressible metal, alloy or other material having good conductivity, so that, following the crimping operation, said conductors will be essentially homogeneous and integral with the connector 23, the material of which will be tightly crimped transversely (FIG. 5c) and longitudinally (FIG. 5b) around and flow over the conductors 21, forming an essentially keyed and unitary structure therewith (FIG. 5b).

The tool comprises first and second jaw members 24, 25, shown in FIGS. 4, 6, 13 and 14 and which are connected by means such as the pivot pin 26 (FIGS. 1 and 3) for movement of said jaw members in a given plane relative to each other. Said given plane may be a straight line or an arcuate plane as indicated by the line 27 (FIG. 13). The jaw members are provided with inner walls 31, 32 (FIGS. 9 and 7), the inner wall 32 being provided with a recess 33 disposed transversely of the longitudinal axis 34 of the jaw member 25, for reception of the transverse rib 35 formed on the inner wall 31 of the first jaw member 24, registering therewith when said jaw members are moved together (FIG. 1), thereby longitudinally axially compressing the connector as at 38 in the plane 5b of FIG. 5 and crimping the connector transversely in registry with the jaw rib 35 and recess 32 (FIG. 7).

The crimping operation is performed when the connector is positioned across the inner wall 31 of the first jaw member and said jaw members are moved relative to each other (FIG. 13) compressing the connector 23 therebetween. The connector is thus axially compressed and crimped (38, FIG. 5b) and transversely crimped (37 FIG. 5c) reinforcing and strengthening the connector, the material thereof thereby flowing solidly around and electrically connecting the conductors 21 therein. Aligning bracket 40 is secured, as by a bolt 41 or the like (FIG. 4) to the first jaw member 24, in registry with the inner wall 31 of said first jaw member, for receiving the connector therethrough and aligning the same across said inner wall. The aligning bracket 40 is provided with a medial recess 42 at the end thereof (FIG. 11) spaced from the inner wall of the jaw to which said bracket is secured to receive connector 23 in said recess (FIG. 4). As the connector 23 may have a longitudinal rib 43 (FIG. 4) medial recess 42 of the bracket may terminate in a narrow aligning slot 44 proportioned to receive the connector rib 43 when said connector is disposed in the bracket and thus positioned across the face of the jaw member (FIG. 4).

The jaw members 24, 25 are exemplarily shown (FIG. 1) as having extended handle portions 28, 29. The portion of the connector, when crimped and compressed as above noted intermediate the jaw members, expands transversely of the longitudinal axis thereof and thereby spreads into frictional engagement with fingers 45, 46 (FIG. 7) on jaw member 25, spaced apart preferably a distance slightly greater than the width of the recess 42 of the bracket secured to the jaw member 24. Fingers 45, 46 so extending from the inner wall 32 of jaw member 25 (FIGS. 7 and 8) preferably are received in slots 47, 48 in the other jaw member 24 (FIG. 9) when (FIGS. 13 and 1) the jaw members are closed so that, on separa-

tion of said jaw members (FIG. 14) after the crimping operation connector 23 will be frictionally held by and intermediate the fingers 45 and 46 of jaw member 25 and may be conveniently removed therefrom.

From the foregoing, it will be noted that the tool of this invention provides convenient and accurate compressing and crimping means. It may be readily manufactured as a standard unit of long lasting and essentially fool-proof features, which is effective and accurate and requires a minimum amount of force in operation.

The handle portions 28, 29 of the jaw members 25, 24, may be provided with spring or other means (not shown) for urging them to normally closed or normally open position as desired according to customer preference and may be provided with stop means such as (FIG. 1) a pin 49 on one of the handles received in a slot 50 on the other. The inner walls 31, 32 of the jaw members 24, 25 may be provided with complementary severing means such as aligning anvil portions 51, 52 so that, on closing of the jaw members for the crimping operation the parts of the connector 23 as well as the conductors extending therebeyond, as noted in 53 of FIG. 13, will be severed. By this arrangement end portions of the connector 23 desired to be severed therefrom may be so severed as noted at 53 in FIG. 5 simultaneously with the compression of the adjacent portion of the connector.

The jaws 24 and 25 may be part of a hand tool, as shown in FIG. 1, for example, or part of a machine or automatic tool, as shown at 24a and 25a in FIG. 4a, for simultaneous operation on one or more connectors such as shown at 23 in FIGS. 4 and 13. The FIG. 4a form is particularly useful, for example, in simultaneously handling a plurality of connectors which may be disposed in line by a suitable support. Stripper plate 54 may be provided for stripping the connectors from the jaw 25a. One of the jaws, such as 25a may be fixed, and the other movable, by any suitable motor or other means for opening and closing operations, in a manner comparable to the opening and closing of the hand tool of FIG. 1.

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

1. A tool for crimping electrical conductors in an elongated compressible tubular connector to thereby connect said conductors therein, said tool comprising first and second jaw members, inner walls provided on said jaw members, means connecting said jaw members for movement in a given plane relative to each other, to thereby dispose said inner walls thereof in abutting juxtaposition, the inner wall of one of said jaw members being provided with a recess disposed transversely of said plane of movement, and a rib formed on the inner wall of the other jaw member transversely of said plane of movement, for registration with said recess when said jaw members are moved into abutting relation, to thereby crimp and compress said connector in one plane and expand it in another plane, forming a transverse rib therein interlocking said conductors in the so crimped and compressed connector, holding fingers secured to the inner wall of one of the jaw members and extending therefrom toward the other jaw member, said fingers being spaced apart a distance greater than the width of the uncompressed connector and being adapted to engage the connector and hold the

same upon expansion of said connector on crimping, said connector being then carried by said fingers on movement of the jaw members apart.

2. A tool for crimping electrical conductors in an elongated compressible tubular connector to thereby connect said conductors therein, said tool comprising first and second jaw members, inner walls provided on said jaw members, means connecting said jaw members for movement in a given plane relative to each other to thereby dispose said walls thereof in abutting juxtaposition, the inner wall of one of said jaw members being provided with a recess disposed transversely of said plane of movement, a rib formed on the inner wall of the other jaw member transversely of said plane of movement for registration with said recess when said jaw members are moved into abutting relation, to thereby crimp and compress said connector in one plane and expand it in another plane, forming a transverse rib therein interlocking said conductors in the so crimped and compressed connector, an aligning bracket on one of said jaw members registered with the inner wall thereof for receiving said connector therethrough and aligning the same across said inner wall of the jaw member, and holding fingers secured to the inner wall of the other jaw member extending therefrom toward the inner wall of the opposite jaw member for engaging the connector and holding the same therein on expansion of said connector.

3. In a tool for crimping conductors as set forth in claim 2, said opposite jaw member having recesses therein for receiving said fingers upon closing movement of said jaw members to restrict outwardly yielding of the fingers when thrust is exerted thereon by the expansion of the compressed connector, said connector being retained between said fingers upon opening of said jaw members and withdrawal of said fingers from said recess.

4. In a tool for crimping electrical conductors as set forth in claim 2,

said holding fingers being formed with roughened surfaces for so engaging said connector.

5. In a tool for crimping electrical conductors as set forth in claim 2,

said fingers being made of yieldable material and being so spaced apart that, when the connector is so crimped, it will expand into frictional engagement with the fingers.

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WILLIAM FELDMAN, *Primary Examiner.*