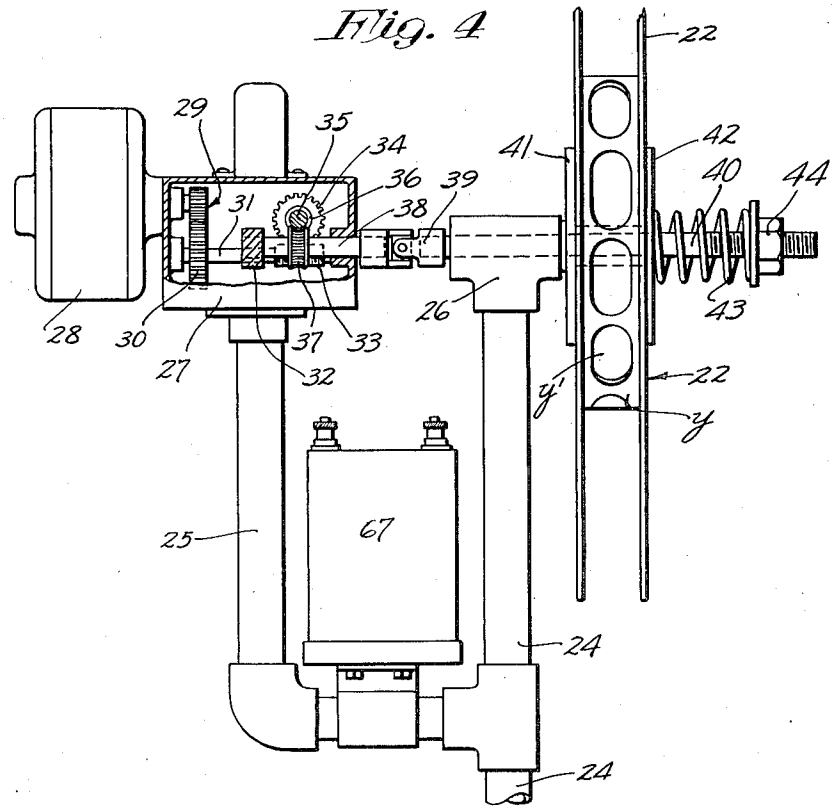
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WINDING DEVICE FOR PUNCHED STRIP STOCK

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Fig. 4



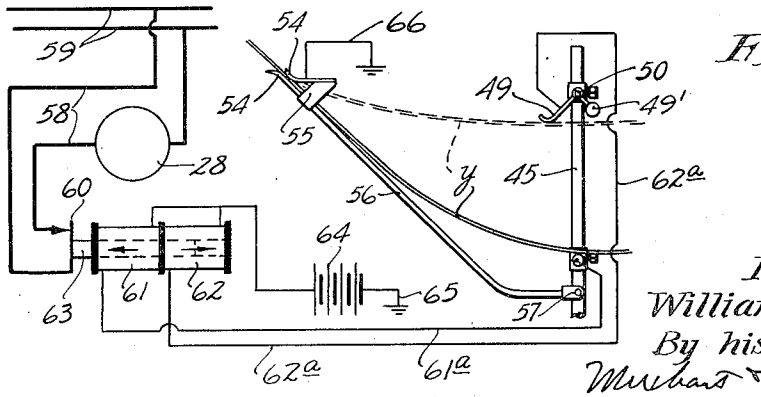




Fig. 5

Inventor
William M. Anderson
By his Attorneys
Murchant & Murchant

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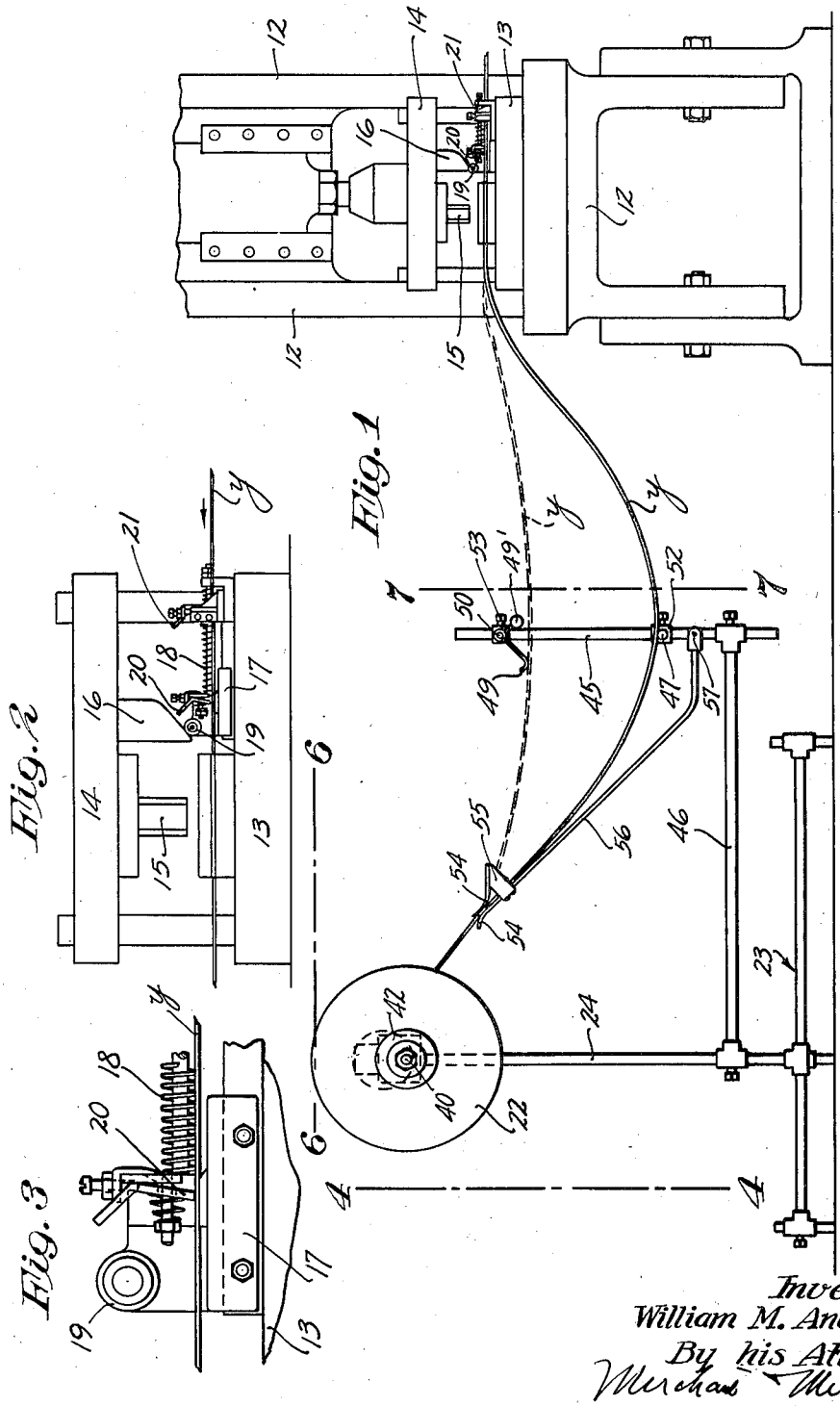


Fig. 1



Fig. 2



Fig. 3

Inventor
William M. Anderson
By his Attorneys
Merchant & Merchant

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Fig. 6

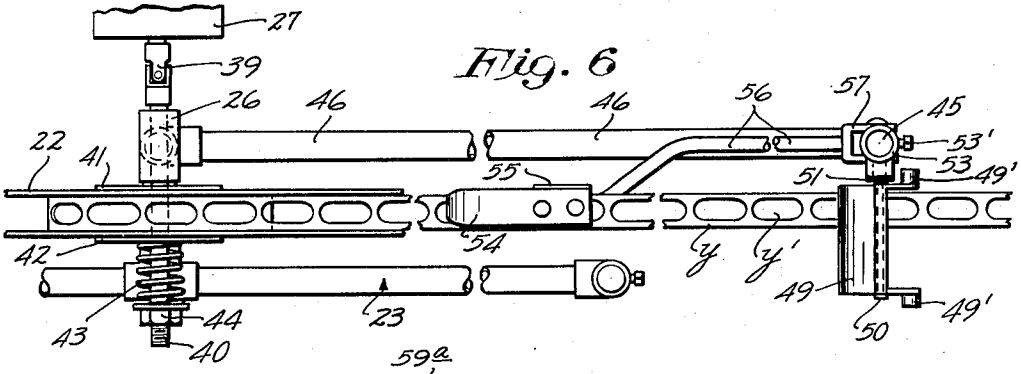



Fig. 7

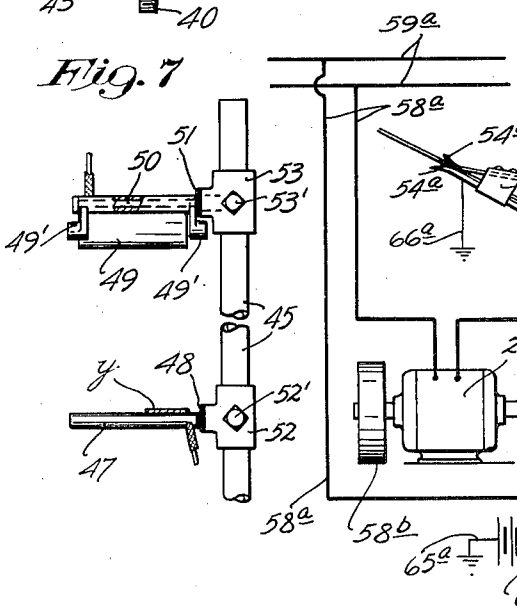



Fig. 8

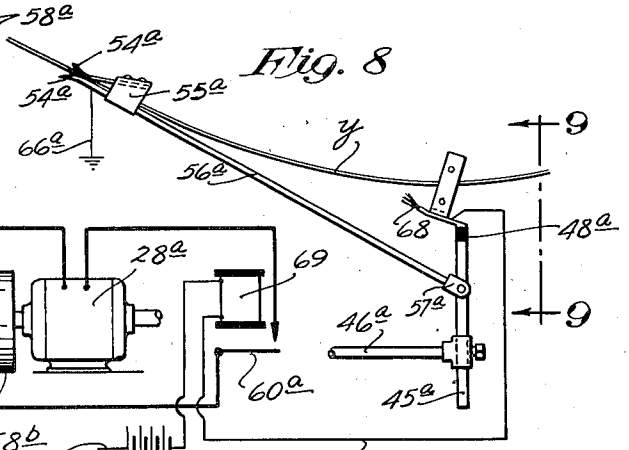
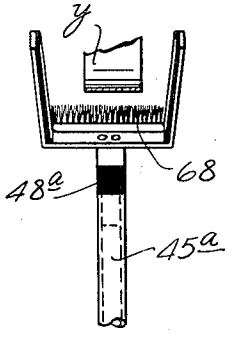



Fig. 9




Inventor
William M. Anderson
By his Attorneys
Murchand & Murchand

Patented Sept. 22, 1942

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# UNITED STATES PATENT OFFICE

2,296,488

## WINDING DEVICE FOR PUNCHED STRIP STOCK

William M. Anderson, Minneapolis, Minn., assignor to said Anderson and F. J. Kerner, both of Minneapolis, Minn., a co-partnership

Application October 23, 1940, Serial No. 362,374

1 Claim. (Cl. 242—55)

My present invention provides a simple and highly efficient device for the winding of punched strip stock and, generally stated, consists of the novel devices, combinations of devices and arrangements of parts hereinafter described and defined in the claim.

The term "strip stock" as usually referred to in the trade designates long ribbon-like metal strips such as frequently employed in connection with punch presses. These strip stocks or metallic ribbons are usually quite thin and quite flexible and generally come to the trade wound on reels or large spools from which they are delivered to the punch press. These punch presses usually have their own intermittently acting and properly timed feed mechanism that feed the strip stock from the supply reel to the punch mechanism.

My invention makes it practicable to rewind the punched strip or ribbon onto a motor-driven receiving reel. In accomplishing this result, however, it is of very great importance that there be maintained a certain amount of slack in the ribbon between the punching mechanism and the rewinding reel so that there will be no undue strains put upon the punched ribbon. My invention provides extremely simple and highly efficient means for accomplishing this result.

In the accompanying drawings my invention is illustrated in connection with a punch press of the self-feeding punch reciprocating type.

Referring to the drawings wherein like characters indicate like parts throughout the several views:

Fig. 1 is a view in elevation illustrating the invention as applied to or in connection with a punch press of the type above just stated, some parts of the press being broken away;

Fig. 2 is a front elevation showing the die plate, punch mechanism, and feed mechanism of the punch press, said parts being on a somewhat larger scale than in Fig. 1;

Fig. 3 is a fragmentary view in front elevation showing part of the punch feeding mechanism on a somewhat larger scale than in Fig. 2;

Fig. 4 is a view in elevation, with some parts in section and some parts broken away, showing the parts just at the right of the dotted line marked **4—4** on Fig. 1, the said parts being shown on a much larger scale than in Fig. 1;

Fig. 5 is a view partly in diagram but with some parts in front elevation;

Fig. 6 is a plan view, with some parts broken away, showing parts found just below the line marked **6—6** on Fig. 1 and showing the said parts on a much larger scale than in Fig. 1;

Fig. 7 is a fragmentary view in elevation showing parts just at the left of the dotted line marked **7—7** on Fig. 1;

Fig. 8 is a view corresponding to Fig. 5 but illustrating a modified arrangement; and

Fig. 9 is an enlarged section taken on the line **9—9** of Fig. 8, some parts being broken away.

The preferred arrangement illustrated in Figs. 1 to 7, inclusive, will first be referred to and described. The punch press illustrated is of a well-known type, and hence, the parts thereof may be briefly enumerated as follows: The punch framework **12**, the die plate **13**, and the reciprocating punch plate **14**, which latter carries the customary punch **15** and cam-acting feed lug **16**. Mounted on the die plate **13** is a slide **17** that is pressed forwardly by a spring **18** and is provided with a roller **19** which, when the die plate is depressed, is engaged by the cam lug **16** and slide **17** is then pressed rearward or toward the right in respect to Figs. 2 and 3. On slide **17** is a spring-pressed friction-acting feed dog **20** and on the die plate **13** is a similar spring-pressed retaining dog **21**. The action of this feed mechanism is well-known and for the purpose of this case, it is only deemed necessary to state that when the slide **17** is pressed rearward, dog **21** prevents the strip or ribbon *y* from being moved rearward and when slide **17** is returned forward, under the action of spring **18** after lug **16** and punch are lifted, feed dog **20** will frictionally clamp the strip or ribbon to the slide and produce the required or predetermined feed movement of the strip or ribbon. It may be further stated that under the action of the feed mechanism just described, rearward movement of the strip will be prevented and the proper feed movement of the ribbon will be produced, but it will be possible by the application of a forward pulling force to move the ribbon through the feed mechanism and which movement would throw the timing of the punching action out of action.

Under the action of the punch slots or holes *y'* will be produced in the strip *y* and the punched out portions will be dropped from the press. In some instances the punched out portions will be waste and the punched ribbon will be a finished or partly finished article, but in other instances the punched out portions may be for the making of certain articles and in which case the punched ribbon or strip will be waste. In either event the punched strip or ribbon must be taken care of and in accordance with my in-

vention, it is arranged to be wound upon a receiving reel. This reel, in the drawings, is indicated by the numeral **22**, is mounted on a support somewhat distant from the punch and is motor-driven. This support can take various forms but, as shown, in the drawings, it involves a floor-engaging anchor or base frame **23** provided with an upstanding post **24** with an offset secondary post **25**. The post **24**, at its upper end, has a bearing head **26** and to the upper end of the secondary post is applied a box-like gear housing **27**. The reel **22**, through connections now to be described, is arranged to be driven at its relatively slow speed from a small electric motor **28**, the casing of which is shown as secured to the housing **27**.

The reduction mechanism here illustrated is of conventional type and, as shown, involves a spur pinion **29** on the rotor shaft of motor **28** and which pinion meshes with a spur gear **30** on a short shaft **31** journaled in the housing **27** and a bearing **32** of the housing. Within the housing **27** shaft **31** has a worm **33** that meshes with a worm gear **34** on a shaft **35** also journaled in bearings of housing **27**. Shaft **35** has a worm **36** that meshes with a worm gear **37** carried by a shaft **38** journaled in bearings on the housing and projecting therefrom. At its outer end shaft **38**, by universal joint **39**, is connected to a reel-carrying shaft **40** journaled in the head **26**. Reel **22** is mounted on and arranged to be rotated by shaft **40**, preferably through a frictional connection which consists of a fixed disc-like flange **41**, a loose frictional disc **42**, and a tension spring **43**, which latter is subject to a nut **44** screw-threaded on the projecting end of the shaft **40**. By the action of spring **43**, the reel will be frictionally coupled to shaft **40** so that it will be rotated at a relatively low speed from the motor through the reduction mechanism described or any other suitable reduction mechanism.

Located midway between the press and receiving reel is a contact supporting post **45** which may be and, as shown, is supported from an arm **46** projected from the post **24**. This contact supporting post **45**, at its lower portion, is provided with a laterally projecting contact pin or element **47** that is insulated from said post **45** by insulating material **48**, see particularly Fig. 7.

At a point considerably above the contact pin **47** is a second contact **49**, see particularly Figs. 5 and 7. This contact **49** is pivoted on a pin or projection **50**, see particularly Figs. 5, 6 and 7, that projects from the post **45** but is insulated therefrom by insulating material **51**. The pins or elements **47** and **50**, as shown, are directly connected to sleeve-like heads **52** and **53**, respectively, which, as shown, are rigidly but adjustably secured on post **45** by set-screws **52'** and **53'**. Pivoted upper contact **49** is shown as provided with a small counter-weight **49'** which is little less in weight but sufficient to overcome the weight of the radial projecting portion of said contact **49**.

In this preferred arrangement the metallic stock strip or ribbon is used as a part of the electrical control circuit, and hence, a sort of a wiper-acting contact or friction device is arranged to engage the punched metallic stock strip or ribbon at a point between the punch and reel. This wiper-acting contact, as shown, comprises two spring prongs **54** secured to a head **55** shown as on the end of an arm **56** pivoted at **57** to the lower portion of post **45**.

The punched stock strip *y*, as it comes from the press on its way to the reel **22**, is passed between the lower and upper contacts **47** and **49** and between the spring prongs of wiper-acting contact **54**. Here it may be stated that the frictional clamping action between the prongs **54** and the punched stock strip is only sufficient to maintain good electrical contact and to put a light tension on the strip stock as it is being wound on the reel.

Also, it may be here stated that the tension of spring **43** will be set so that it is sufficient to cause the reel **22** to rotate with motor-driven shaft **40**, but will not be sufficient to cause breaking of the punched stock strip *y* if anything should happen to stop the punching machine while the motor-driven receiving reel is still in action.

The reel-actuating motor **28** is in a supply circuit **58** that is connected across the main or supply line **59**. In the motor circuit **58** is a controlling switch **60**, see particularly Fig. 5. Motor switch **60** arranged to be opened and closed at the proper times, hereinafter specified, by a differential relay which involves tandem arranged solenoids **61** and **62** and a reciprocating core **63**. Both solenoids or coils **61** and **62**, at one end, are connected to a battery **64**, one side of which is grounded at **65**. The other sides or ends of solenoids **61** and **62** are connected, respectively, by wires **61***a* and **62***a* to the heretofore noted contacts **47** and **49**. The so-called wiper contact **54—55** is grounded through a wire or conductor **66**, as shown in Fig. 5.

In Fig. 4 the numeral **67** indicates a casing secured to the base of post **25** and in which the battery **64** is adapted to be contained.

*Operation of structure illustrated in Figs. 1–7, inclusive*

In starting the winding mechanism into action, the punched metal strip *y* will, as already stated, be passed below the upper contact **49** and above the lower contact **47**. When the strip *y* does not engage either of the said contacts **47—49**, the circuit to reel-actuating motor **28** will be opened and, of course, the receiving reel will not then be rotated. When the press is operated so as to produce enough slack to permit the strip *y* to engage lower contact **47**, solenoid or coil **61** will be energized causing the core **63** to close motor switch **60**, thereby starting the motor and actuating the reel **22** to wind thereon the punched strip and take up slack thereof. This condition is shown by full lines in Fig. 5.

At the time just stated current from battery **64** will be through coil **61**, through wire **61***a* to contact **47**, from contact **47** through a portion of punched metallic strip *y* to contact **54—55**, and from thence from ground and back to battery. This operation of winding up the punched strip on the receiving reel will continue until the slack in the strip has been taken up substantially as shown by dotted lines in Fig. 5, and thereupon, coil **62** will be energized causing motor switch **60** to be opened and the receiving reel stopped. At the time just now noted the flow of current from battery **64** will be through coil **62**, wire **62***a* to upper contact **49**, and from thence through a portion of the strip *y* to contact **54—55** and to ground and back to battery **64**. When coil **62** is energized, core **63** will be retracted, thereby opening the motor switch **60**, as just stated. Of course, the arm **56**, which is preferably metal, could be grounded from the post **45**, but that is not necessary since

the controlling contacts **47**—**49** are insulated one from the other and from the metallic parts of the machine.

In Figs. 8 and 9 I have illustrated a somewhat modified arrangement in which the lower contact, corresponding largely to the contact **47**, is employed, and in which structure the reel-actuating motor will preferably be provided with a flywheel that would cause the motor and receiving reel to be rotated by momentum for a short interval after the motor circuit has been broken. In this modified structure some of the parts are identical with those illustrated in connection with Figs. 1 to 7, inclusive, and hence, these very similar parts are indicated by the same numerals with the exponent *a* added thereto.

In this modified structure the lower strip-engaging contact **68** is shown as of the brush type and is supported by and insulated from the post **45***a*. The motor circuit switch **60***a* in this arrangement is subject to a solenoid or magnet **69**, one side of which is grounded through battery **64***a* and the other side of which is connected by a wire **70** to contact **68**. Also in this structure wiper contact **54***a*—**55***a* is grounded through wire **66***a*. The reel-actuating motor **28***a*, which is in the circuit **58***a*, is shown as provided on its rotor shaft with a small flywheel **58***b*.

*Operation of Figs. 8 and 9*

From the foregoing the operation of the structure of Figs. 8 and 9 is probably obvious, but may be briefly stated as follows:

When the slack in strip *y* is such as to cause it to drop into engagement with brush contact **68**, magnet **69** will be energized thereby closing switch **60***a*, thereby starting the motor **58***a* into action to operate the receiving reel. As soon as strip *y* is raised from contact **68**, the battery circuit through coil **69** will be broken causing switch **68** to open and thereby cutting off the current to motor **28***a*. After the current is cut off from motor **28***a*, the motor under momentum will operate the receiving reel so as to continue the winding action to a considerable extent but not enough to take all of the slack out of the strip *y*.

From the foregoing it will be understood that while I have illustrated several embodiments of my invention that the same is capable of various other modifications or changes all within the scope of the invention herein broadly claimed.

What I claim is:

The combination with means for feeding a ribbon-like metal strip, and a receiving reel rotatively mounted at a point distant therefrom and positioned to receive the strip, of an electric motor with connections for rotating said reel, a supply circuit for said motor including a portion of said metallic strip and a master switch, a two-coiled differentially acting magnet for operating said master switch, a supporting post, a lower or cut-in electrical contact adjustably mounted on but insulated from said post, an upper or cut-out electrical contact adjustably mounted on but insulated from said post, an arm pivoted to said post below said metallic strip, a wiper contact carried by the free end of said pivoted arm and maintaining contact with said metallic strip at a point distant from said post, and a divided electric circuit, one branch of which includes one coil of said electro-magnet, said cut-in contact and said wiper contact, the other branch of which circuit includes the other coil of said electro-magnet, said cut-out contact and said wiper contact, the arrangement of said elements being such that the circuit to the first noted coil of said electro-magnet will be closed when, and only when, said metallic strip is engaged with said cut-in contact, and the circuit through the other coil of said electro-magnet will be closed when, and only when, said metallic strip is engaged with said cut-out contact.

WILLIAM M. ANDERSON.