Oct. 22, 1968 J. S. CERRA 3,406,764

PIN INSERTION TOOL

Filed April 25, 1967 3 Sheets-Sheet 1

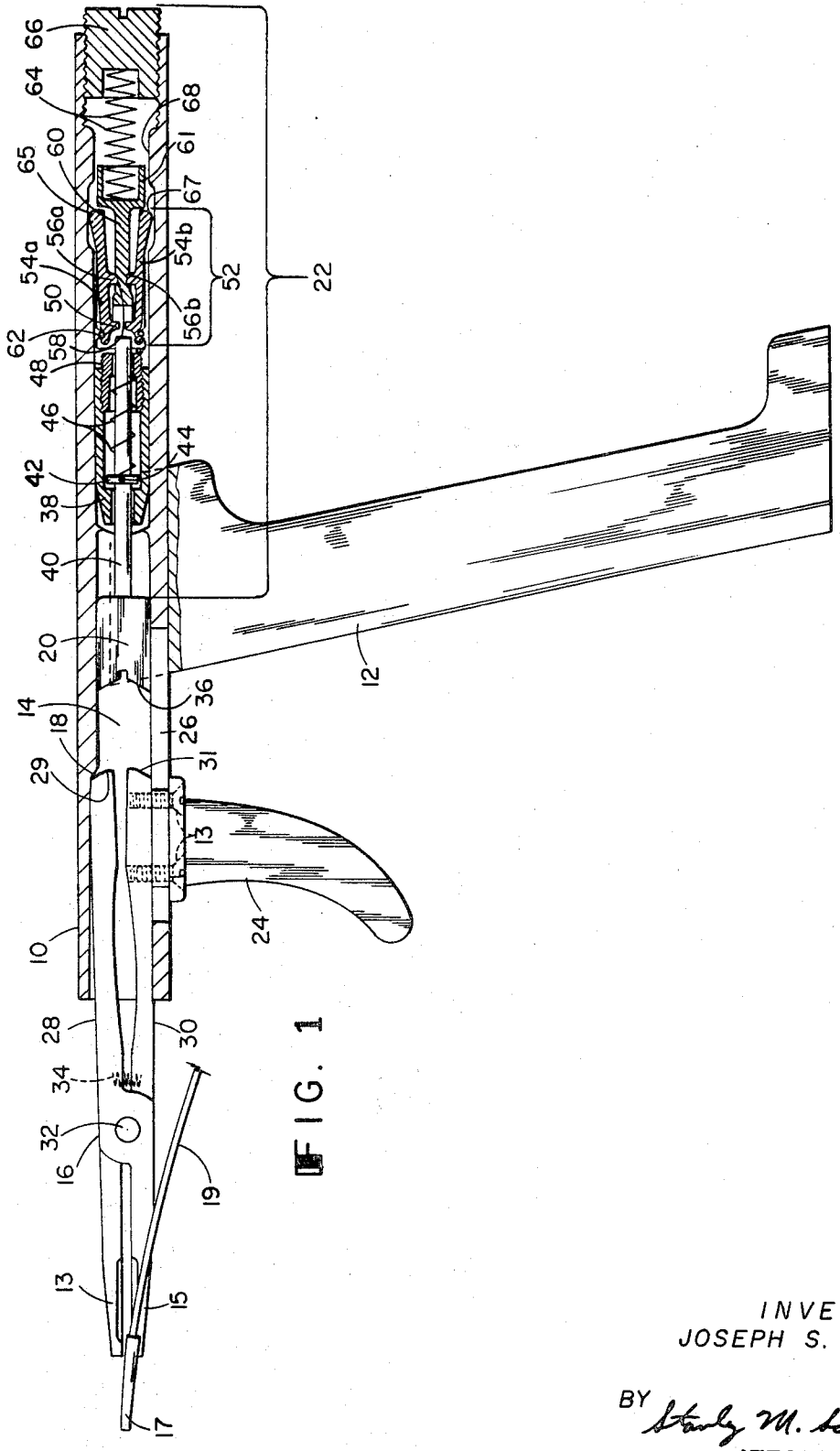


FIG. 1

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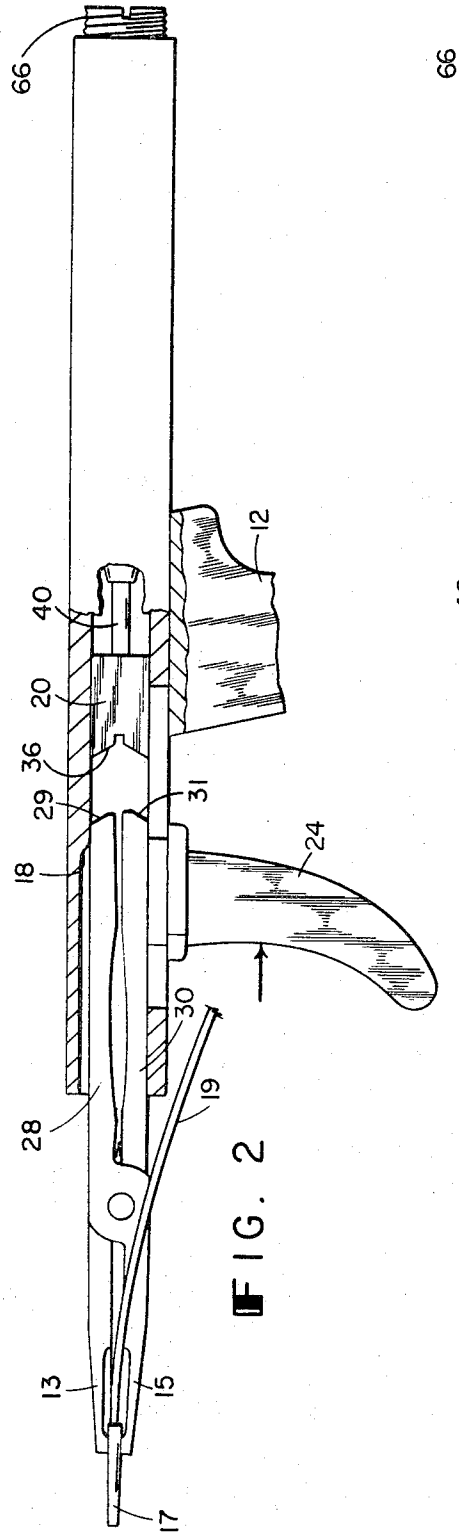


FIG. 2

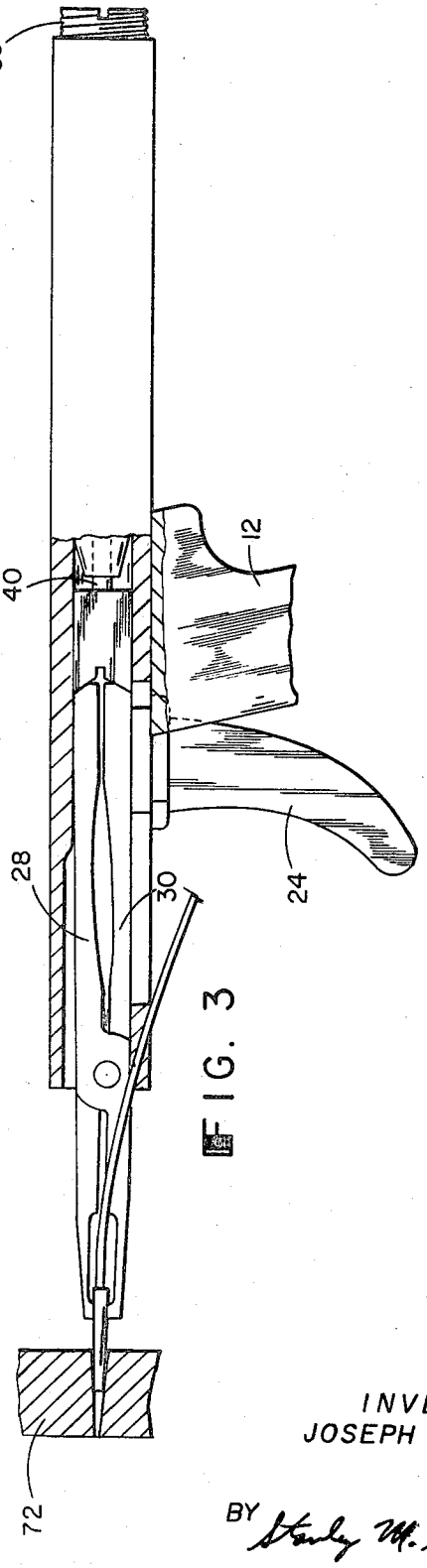


FIG. 3

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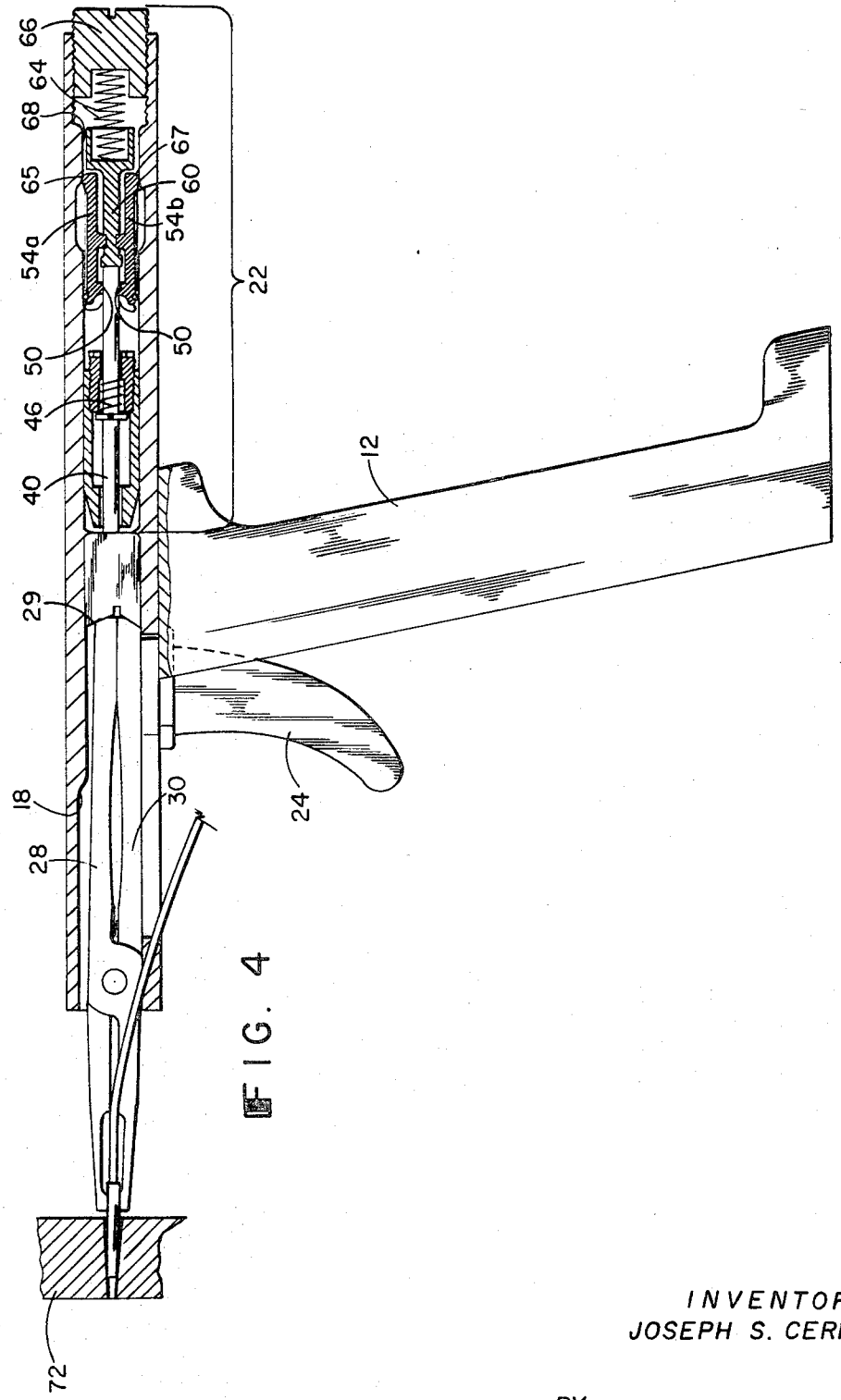


FIG. 4

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PIN INSERTION TOOL

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ABSTRACT OF THE DISCLOSURE

A pin insertion tool for seating pins into a receptacle including a gripping mechanism adapted to grasp a pin and slidably mounted within a tool housing and a semi-automatic impact assembly also disposed within the housing and operative to provide a force which is transmitted via the gripping mechanism to seat the pin. The gripping mechanism closes on a pin as the mechanism moves rearward in the housing by the action of a first camming surface located within the housing, and further closes onto the pin during the seating thereof by the action of a second camming surface cooperating with the gripping mechanism.

Background of the invention

This invention relates to pin insertion tools and, more particularly, to a tool for inserting tapered pins into a connector block or other receptacle.

In the manufacture and maintenance of electronic equipment, there is often a requirement for constructing or rewiring densely wired connector blocks. This requirement is met generally by attaching a wire to a connector pin and then inserting the pin in a connector block with an insertion tool. Most tools used to insert the pins require some lateral movement when disengaging the pin from the tool which is a disadvantage not only because of the wiring density, but also because this lateral movement often results in unseating the pins. It would be advantageous to have, and it is an object of this invention to provide a pin insertion tool that can seat and disengage a pin in a connector block and withdraw therefrom without a lateral movement.

Summary of the invention

Briefly, a pin insertion tool according to the invention comprises an elongated housing having a gripping mechanism including a pair of jaws adapted to engage a pin, slidably mounted in the front portion thereof and an impact mechanism in the rear portion of the housing with a camming block disposed between the gripping and impact mechanisms. A camming surface within the front portion of the housing is operative upon rearward movement of the gripping mechanism to close the jaws of this mechanism, and a camming surface of the gripping mechanism cooperates with the camming block to urge the jaws tightly closed as the gripping mechanism moves further rearward and triggers the impact mechanism.

In operation, the jaws of the gripping mechanism close on a pin to be inserted as the mechanism is moved rearward in the tool housing by a trigger suitably connected to the gripping mechanism. The pin is then placed into the connector by a forward motion of the tool and by continuing the forward motion, the gripping mechanism is driven further into the tool housing until the impact mechanism is tripped, thereby seating the tapered pin in the connector block. By withdrawing the tool along the axis of entry, the jaws of the gripping mechanism are automatically opened and no lateral forces are exerted on the pins.

Brief description of the drawings

The invention will be more fully described in the following detailed description, taken in conjunction with the accompanying drawings in which:

FIG. 1 is a cross-sectional side view of a tool according to the invention; and

FIGS. 2, 3 and 4 are cross-sectional side views of the tool at progressive stages of its operation.

Detailed description of the invention

Referring to FIG. 1, the illustrated insertion tool comprises an elongated housing **10** with a handle **12** suitably fastened on the bottom side of the housing, for example by machine screws (not shown). A channel **14**, machined within the front portion of housing **10**, contains a slidably mounted gripping mechanism **16**, a camming surface **18** machined on the upper surface of channel **14**, an impact mechanism **22** contained within the rear portion of the housing, and a block **20** slidably mounted between gripping mechanism **16** and impact mechanism **22**. A trigger **24** is attached via screws **13** to gripping mechanism **16** through a slot **26** in the bottom surface of the tool housing to facilitate longitudinal movement of the gripping mechanism within channel **14**.

The gripping mechanism **16** comprises a set of gripping arms **28** and **30**, slidably mounted within channel **14** of the tool housing, and joined together at a fulcrum by a pin **32**, the continuation of these arms forming jaws **13** and **15**. A spring **34** is mounted in slots behind pin **32** to force the upper and lower arms **28** and **30**, respectively, against the upper and lower surfaces of channel **14**. The rear surface **29** and **31** of respective arms **28** and **30** is shaped at an angle compatible with the camming surface **36** on the forward surface of block **20**.

The impact mechanism **22** includes a shaft housing **38** affixed to tool housing **10** and containing a slidably mounted shaft **40** extending beyond both ends of the shaft housing, a disk **42** coaxially mounted on shaft **40** by a pin **44** passing through the diameter of the disk and shaft **40**, and a spring **46** coaxially disposed around shaft **40** having its front end engaged by disk **42** and its rear end engaged against an adjusting screw **48**. The rear end of shaft **40** is in contact with a pair of teeth **50** of a slidably mounted release mechanism **52** which includes a set of arms **54***a* and **54***b* pivotally mounted via respective fulcrums **56***a* and **56***b* seated in grooved surfaces **58** on the top and bottom of an anvil **60**. An elastic ring **62** set in a groove at the forward end of arms **54***a* and **54***b* retains teeth **50** in a closed position. A coaxially mounted impact spring **64** is contained between a cup shaped rear section **61** of anvil **60** and an adjusting screw **66** threshably attached to the rear end of housing **10**. A camming surface **68** is provided in the rear portion of housing **10**, this surface being operative in conjunction with the rear surfaces **65** and **67** of respective arms **54***a* and **54***b* to open teeth **50** to allow spring **64** to drive anvil **60** against the rear surface of shaft **40** to thereby transmit a force via block **20** and jaws **13** and **15** to seat pin **17** in a connector.

The operation of the tool in grasping a pin and seating it in a connector block will now be described in conjunction with FIGS. 1–4, in FIG. 1, the jaws **13** and **15** of the gripping mechanism are illustrated in the open position, with a tapered connector pin **17** and attached wire **19** inserted into but not clamped by the jaws. The jaws are closed onto pin **17** by moving the gripping mechanism rearward into tool housing **10** via trigger **24**. As seen in FIG. 2, during a rearward movement of gripping mechanism **16**, arms **28** and **30** slide within channel **14** and the rear surface **29** of arm **28** cooperates with camming surface **18** to close jaws **13** and **15** onto pin **17**. The gripping mechanism is moved rearward in housing **10** until surfaces **29** and **31** of respective arms **28** and **30** engage surface **36** of block **20**.

The pin is next inserted into a hole in a connector block **72**, as seen in FIG. 3, and by pushing tool housing

10 against connector block 72, by means of handle 12, arms 28 and 30 are moved rearward against the urging of spring 46 and are forced toward each other by the camming action of surfaces 29 and 31 with surface 36 of block 20. Pin 17 is thereby tightly gripped by jaws 13 and 15 to prevent slipping as the pin is forced into the connector block.

During the initial insertion of the pin into the connector block, shaft 40 of the impact mechanism is moved rearward against spring 46, and engages teeth 50 to force release mechanism 52 rearward compressing spring 64 within housing 10. At a point in the rearward travel of this release mechanism (FIG. 4), surfaces 65 and 67 of respective arms 54*a* and 54*b* mate with camming surface 68 of housing 10, causing teeth 50 to open and allowing anvil 60 to spring forward to strike shaft 40. The force of this impact drives pin 17 further into connector block 72 to fully seat it. The impact force can be regulated by adjusting screw 66 to vary the compression of spring 64.

After impact, the tool is withdrawn axially of the pin, the tapered pin remaining clamped between jaws 13 and 15 until surface 29 of arm 28 passes over camming surface 18 causing jaws 13 and 15 to open and thereby releasing the pin. The straight line withdrawal motion to remove the insertion tool eliminates any twisting or lateral movement that could result in unseating the pin from its connector.

The invention is not to be limited to the specific embodiment shown and described herein but is to embrace the full scope of the following claims.

What is claimed is:

1. A tool for inserting a pin into a receptacle and sequentially operable to grasp a pin to be inserted, more tightly grasp said pin as it is being inserted, provide an impact force to said pin to seat it, and release said pin after it is seated, said tool comprising:

an elongated housing including a handle secured thereto and within a front portion thereof a channel containing a first camming surface;

a gripping mechanism including a pair of jaws adapted to grasp a pin, and a pair of arms pivotably linked to said jaws, said arms being slidably mounted within said channel, at least one of said arms including a surface which mates with said first camming surface at one point in the travel of said arms in said channel to cause said jaws to close;

means for slidably moving said gripping mechanism within said housing;

a block slidably mounted within said channel and having a second camming surface operative at another point in the travel of said arms to engage a portion of said arms to cause a further gripping force on said jaws; and

an impact mechanism contained within the rear portion of said housing and operative at yet another point in the travel of said arms to provide an impact force to said block to thereby seat said pin in said receptacle.

2. The invention according to claim 1 wherein said impact means includes a shaft housing mounted within said tool housing, a shaft slidably mounted within said shaft housing operative to maintain contact with the rear surface of said block, a disk connected to said shaft, a first spring having its front surface resting against the rear surface of said disk operative to urge said disk and shaft in a forward direction, a first adjusting screw connected to said shaft housing operative to adjust the force of said first spring, an anvil, a second spring operative to urge said anvil in a forward direction, a second adjusting screw operative to adjust the compression of said second spring, and release means operative to release said anvil to strike the rear surface of said shaft.

3. The invention according to claim 1 wherein said pair of arms includes a spring mounted between said arms and operative to urge said arms apart, and an inclined surface on the rear portion thereof adapted to cooperate with said second camming surface of said block to urge said arms toward each other.

4. The invention according to claim 3 wherein said pair of arms further includes a trigger mechanism secured to one of said pair of arms through a slot in the lower surface of said housing and operative to slidably move said gripping mechanism along the longitudinal axis of said housing.

References Cited

UNITED STATES PATENTS

2,707,278	5/1955	Lindstrom	173—121
3,071,994	1/1963	Swenson	173—121
3,177,952	4/1965	West	173—55 X
3,268,013	8/1966	Sussman	173—53

FOREIGN PATENTS

241,618	12/1962	Australia.

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