May 7, 1963 L. A. KINGSLEY 3,088,642

WIRE PRE-FEEDER

Filed May 23, 1960 5 Sheets-Sheet 1

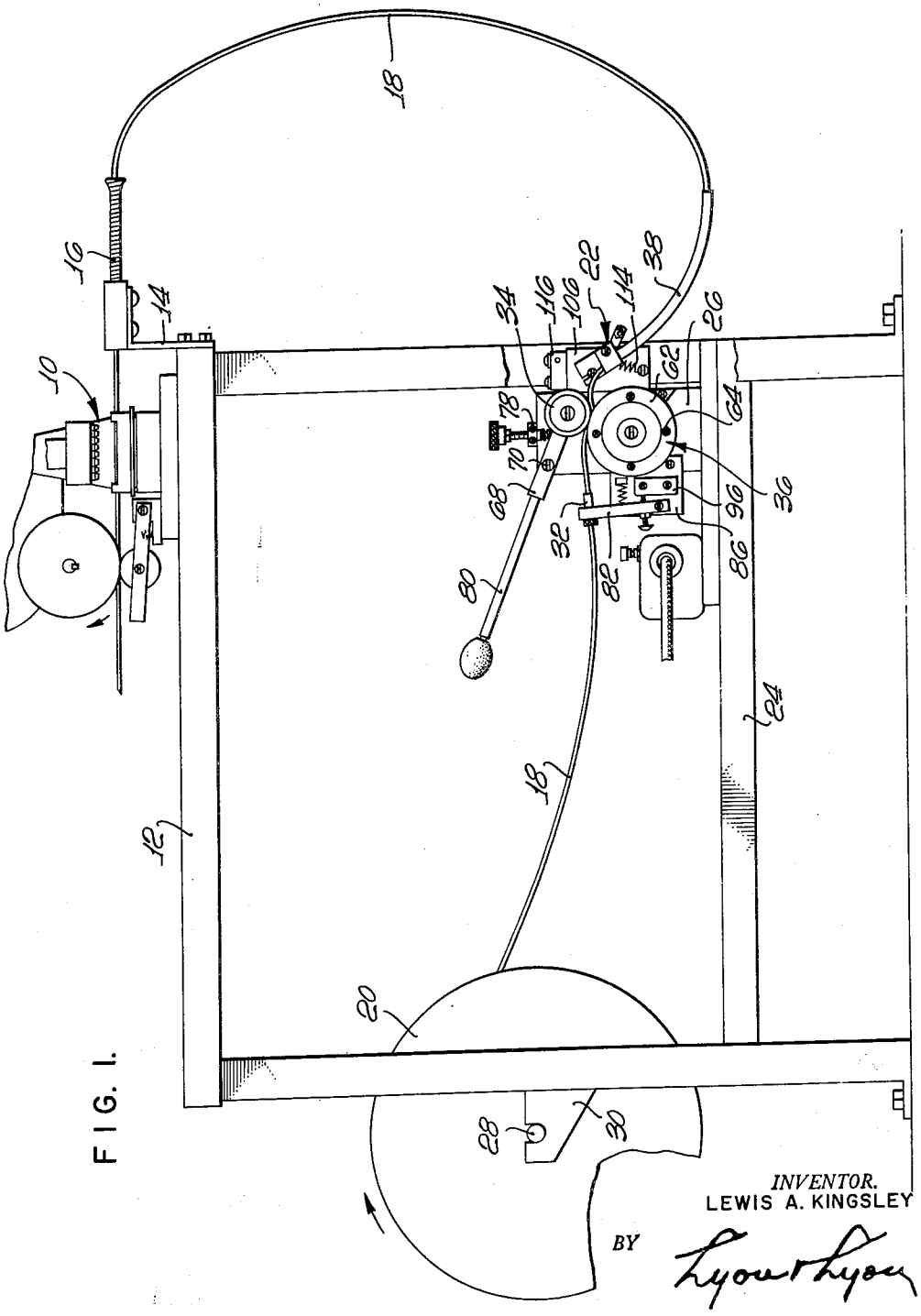


FIG. 1.

INVENTOR.
LEWIS A. KINGSLEY

BY Lyon & Lyon

ATTORNEYS.

May 7, 1963 L. A. KINGSLEY 3,088,642

WIRE PRE-FEEDER

Filed May 23, 1960 5 Sheets-Sheet 2

FIG. 2.

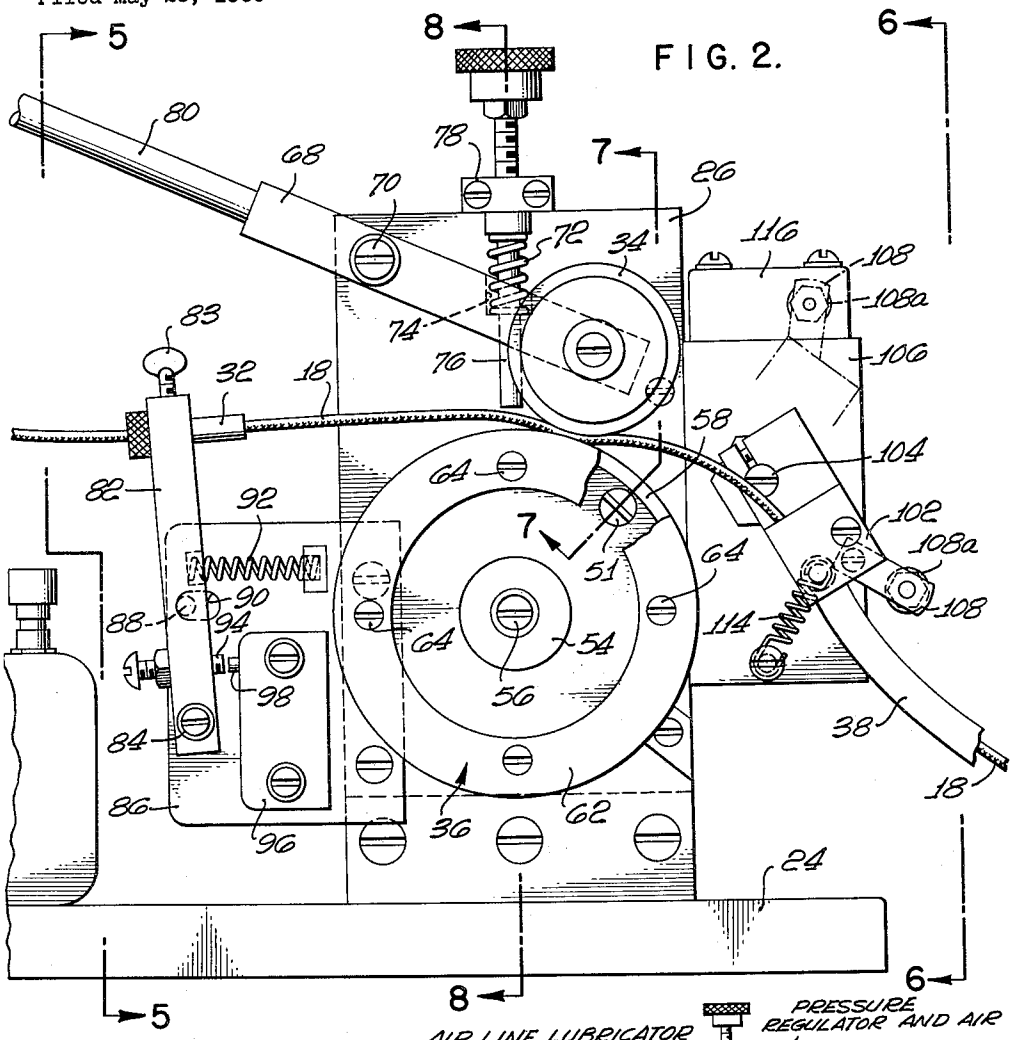
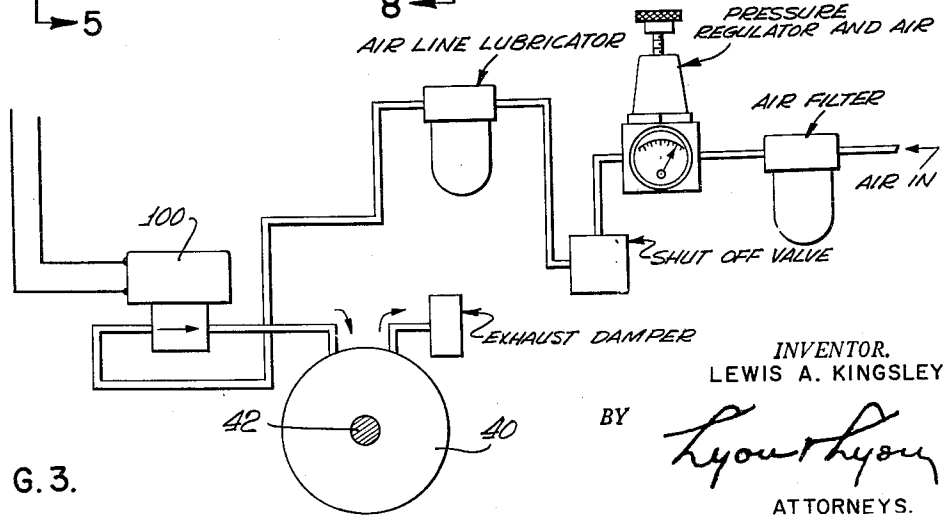


FIG. 3.



INVENTOR.
LEWIS A. KINGSLEY

BY Lyon & Lyon

ATTORNEYS.

May 7, 1963 L. A. KINGSLEY 3,088,642

WIRE PRE-FEEDER

Filed May 23, 1960 5 Sheets-Sheet 3

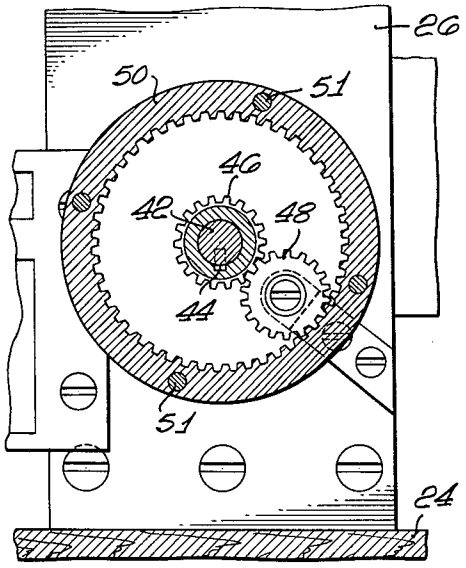


FIG. 4.

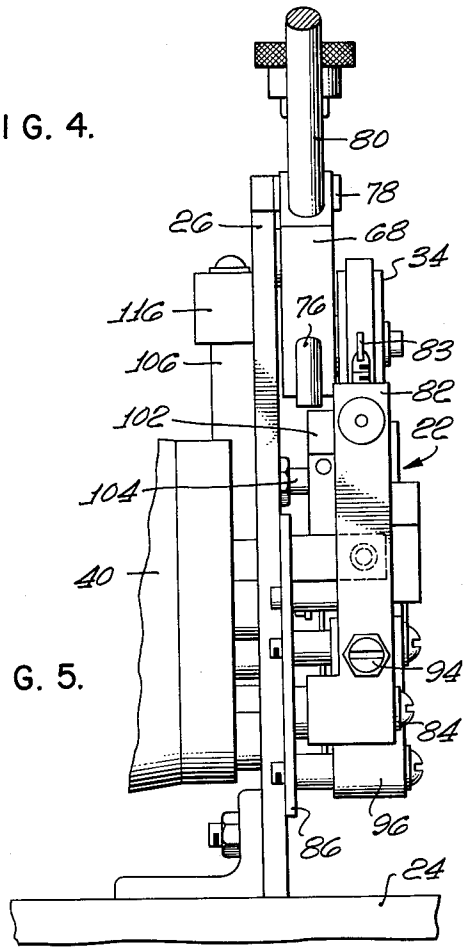


FIG. 5.

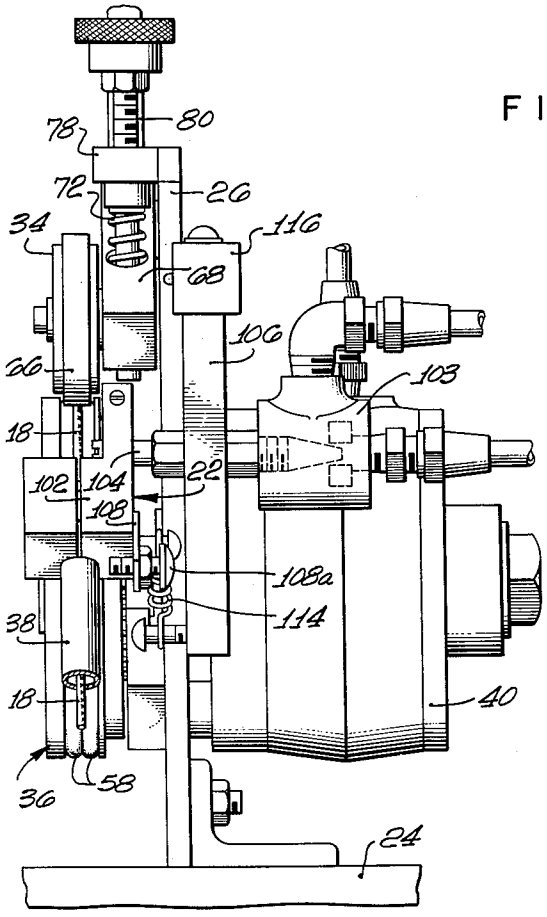


FIG. 6.

INVENTOR.
LEWIS A. KINGSLEY

BY Lyon & Lyon

ATTORNEYS.

May 7, 1963 L. A. KINGSLEY 3,088,642

WIRE PRE-FEEDER

Filed May 23, 1960 5 Sheets-Sheet 4

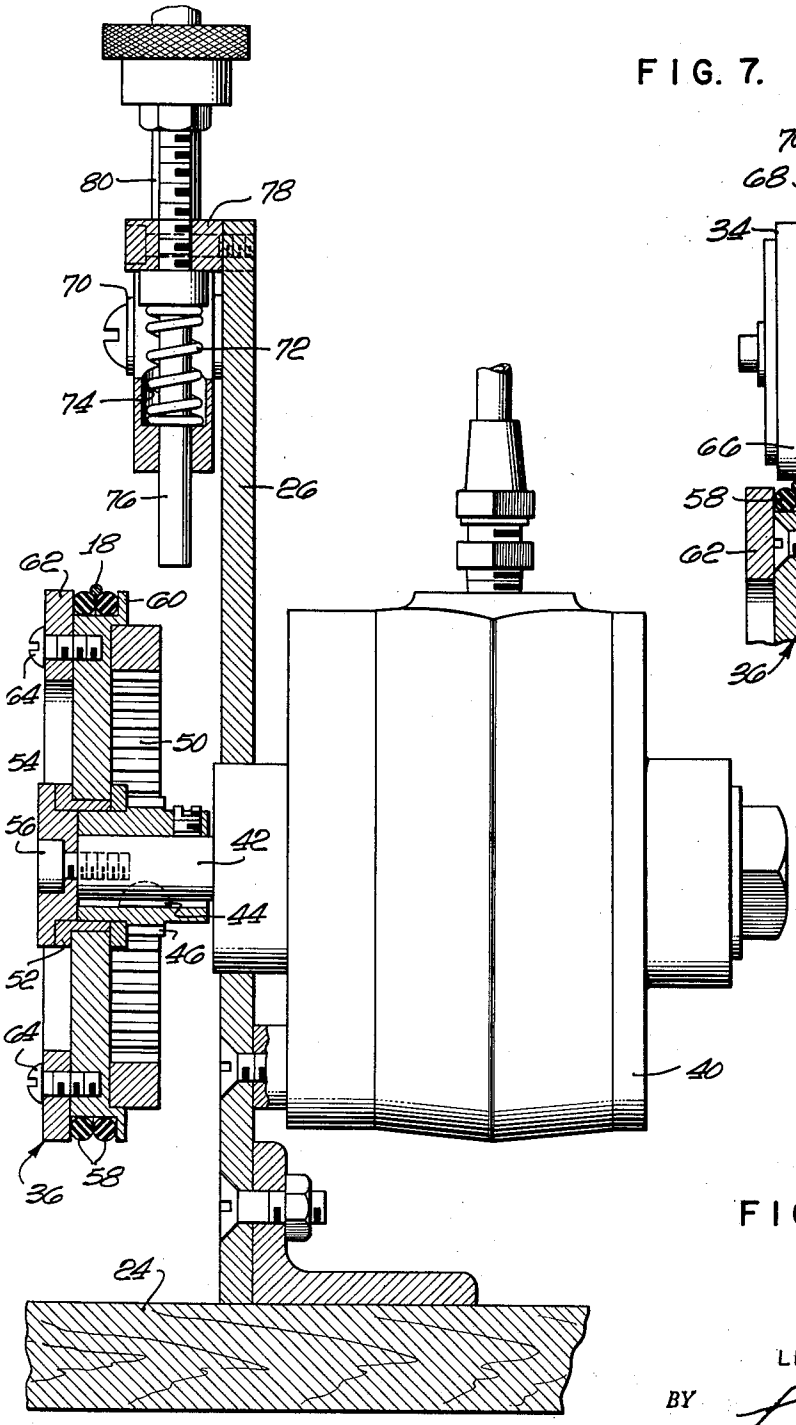


FIG. 7.

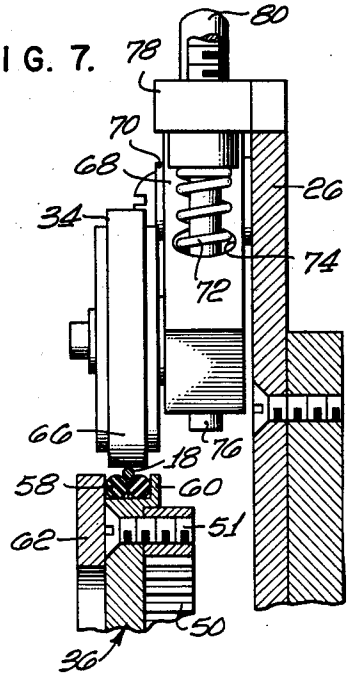


FIG. 8.

INVENTOR.
LEWIS A. KINGSLEY

BY Lyon & Lyon

ATTORNEYS.

May 7, 1963 L. A. KINGSLEY 3,088,642

WIRE PRE-FEEDER

Filed May 23, 1960 5 Sheets-Sheet 5

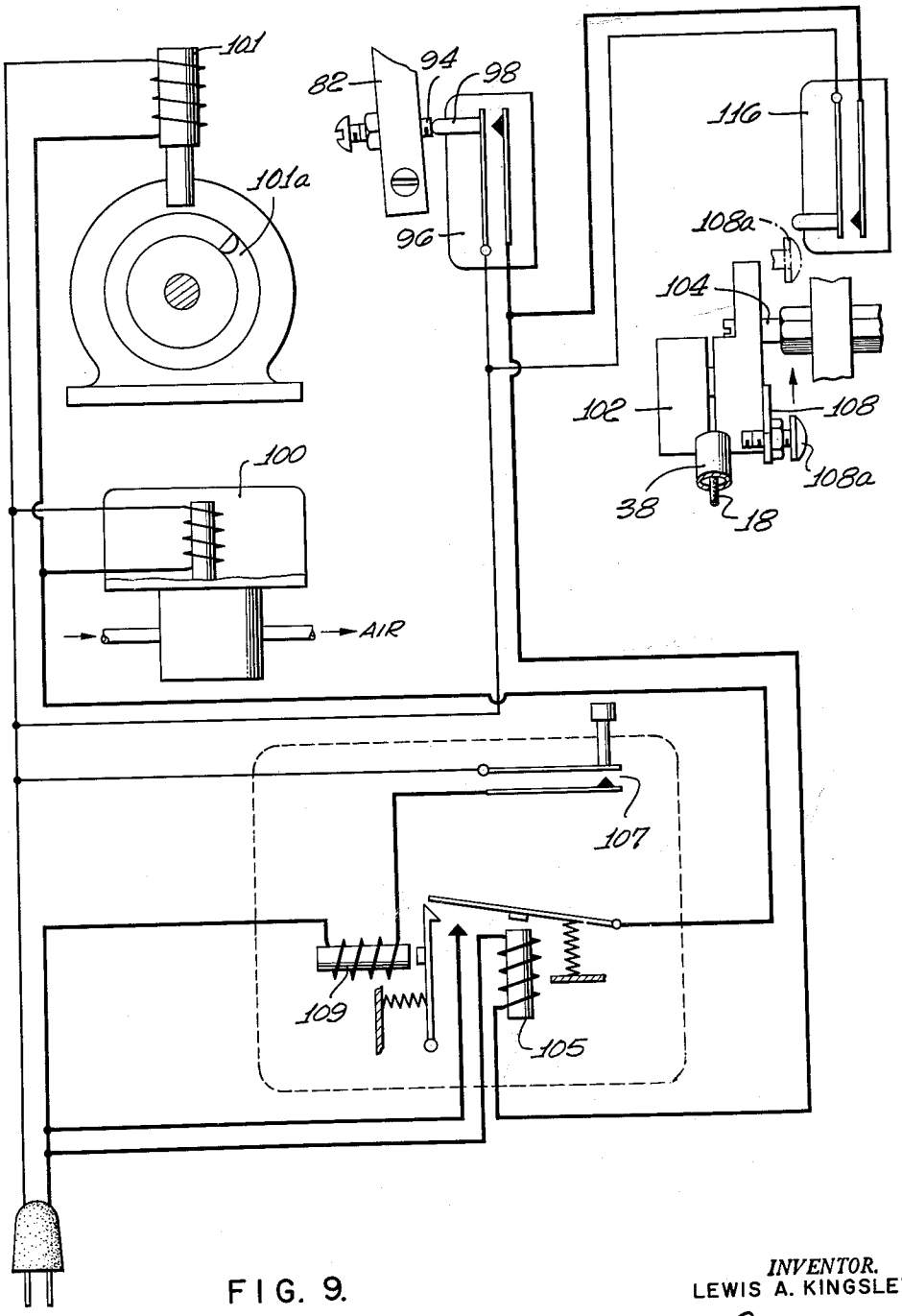


FIG. 9.

INVENTOR.
LEWIS A. KINGSLEY

BY Lyon & Lyon

ATTORNEYS.

United States Patent Office 3,088,642 Patented May 7, 1963

3,088,642

WIRE PRE-FEEDER

Lewis A. Kingsley, Beverly Hills, Calif. (% Kingsley Machine Co., 850 Cahuenga Blvd., Hollywood 38, Calif.)

Filed May 23, 1960, Ser. No. 30,927
5 Claims. (Cl. 226—43)

This invention relates to an improved wire feeding device particularly adapted to feeding insulated wire from a supply spool to a wire marking machine such as described in my Patent Number 2,517,493 which independently advances the wire periodically at various speeds and marks the wire at various spaced intervals throughout the length of the wire with normal start, stop and possible cut-off operations for various sections, lengths or sizes of wire.

It is an object of this invention to periodically withdraw insulated wire from a heavy or varying weight supply spool automatically as needed to form a loose loop of wire with adequate slack to allow an independent advancement of the wire by the marking machine in intermittent short increments between each marking. This type of operation is desired to allow a small section of the wire length to come to a complete stop free of strain during the actual contact of the wire with the stamping head of the marking machine and thereby prevent damage or scuffing to the wire.

A further object is to stop withdrawal of wire automatically when a surplus in the slack supply loop has developed in excess of the immediate demand of the marking machine.

A further object of this invention is to supply wire in a manner that will require a minimum strain or pull on the independent wire advancing mechanism of the wire marking machine, and thereby enable the wire marking machine to pull larger and heavier wires than otherwise possible.

It is a further object of this invention to avoid feeding of knotted or kinked or otherwise damaged wire through the marking machine.

A further object of this invention is to provide a device which will shut off when a section of kinked or damaged wire attempts to pass through the same.

It is a further object of this invention to provide means whereby if either the feeder or the marking machine cease to operate, operation of the other will terminate.

Other objects and advantages will be readily apparent from the following description:

In the drawings:

FIGURE 1 is a side elevation of a unit embodying this invention.

FIGURE 2 is an enlarged side elevation of the feeder assembly.

FIGURE 3 is a schematic vew of the air operating controls.

FIGURE 4 is a plan view of the air motor gear train.

FIGURE 5 is a view taken along line 5—5 of FIGURE 2.

FIGURE 6 is a view taken along line 6—6 of FIGURE 2.

FIGURE 7 is a view taken along line 7—7 of FIGURE 2.

FIGURE 8 is a view taken along line 8—8 of FIGURE 2.

FIGURE 9 is a diagrammatic view of the electrical control circuit.

Referring first to FIGURE 1 a marking machine **10** of the air-operated type such as described in my copending application Serial No. 661,801 filed May 27, 1957 now Patent No. 2,960,024 and entitled "Air Operated

Stamping Machine" is illustrated mounted upon a table **12**. A bracket **14** supporting a flexible wire tube **16** is mounted adjacent the machine **10**. A supply of insulated wire **18** is fed from a spool **20** through a wire feeder generally designated **22** and through tube **16** to machine **10**. This invention is primarily concerned with the construction and application of the feeder and the remainder of the description will be directed thereto.

The feeder is mounted upon a bottom cross brace **24** and a vertical support plate **26** secured thereto while spool **20** has its shaft **28** fit in a slot in bracket **30** to rotatably support the spool. Wire from the spool is reeved through bushing **32** between wheels **34** and **36** through a semiflexible tube **38** and hence through flexible wire tube **16** and into the marking machine.

A variable speed air motor **40** is utilized to drive wheel **36** to drive the wire. The motor drives shaft **42** which is keyed by key **44** to gear **46**. Gear **46** meshes with idler gear **48** which in turn meshes with internal gear **50** and drives same. Wheel **36** is rotatably mounted upon bushing **52** and attached to internal gear **50** by screws **51** and hence driven by same.

Bushing **52** is rotatably mounted upon shaft **42** and held thereon by plug **54** and screw **56**. This driving arrangement functions as a speed reduction and to increase the pulling power on the wire.

A pair of rubber O rings **58** are secured on the periphery of wheel **36** between flange **60** and a ring plate **62** secured to wheel **36** by screws **64**. Upper wheel **34** has a flat surface **66** which grips the wire **18** between rings **58** so that rotation of wheel **36** pulls the wire off spool **20** and feeds same through tube **38**.

Wheel **34** is mounted upon the extremity of arm **68** which is pivotally mounted upon stub shaft **70** on plate **26** and is biased into contact with wheel **36** by spring **72**. The spring **72** seats in a suitable notch **74** in arm **68** and is mounted upon a shaft **76** which projects through arm **68** and screws through nut **78** on plate **26**. In this manner the spring pressure can be varied. A handle **80** on arm **68** permits same to be manually pivoted to move wheel **34** away from wheel **36** to permit the wire **18** to be positioned therebetween.

Bushing **32** is mounted on arm **82** by a set screw **83** which arm in turn is pivotally mounted by screw **84** on a bracket **86** in turn mounted on plate **26**. This construction permits use of interchangeable bushings to accommodate the size of the outside diameter of the wire being marked. A pin **88** on the bracket projects into a slot **90** on the arm thereby limiting pivoting thereof and a spring **92** is seated at one extremity in arm **82** and the other extremity in bracket **86** biasing the arm **82** to the leftmost position in FIGURE 2.

If a knot or the like in the wire attempts to pass through bushing **32** the arm **82** is pivoted to the right in FIGURE 2. The arm carrying a switch contact **94** and bracket **86** carries a micro-switch **96**. Contact **94** when it strikes the contact **98** on switch **96** opens the switch which in turn through suitable electrical circuitry closes the solenoid operated shutoff valve **100**, terminating flow of air to the air motor **40** shutting off same until the knot or the kink is straightened out. Opening of switch **96** also opens the circuit to solenoid **101** disengaging clutch **101A** terminating operation of the marking machine until switch **96** is again closed.

The operation of air motor **40** and wire drive wheel **36** is further controlled by air valve **103** which in turn is controlled by pivoting of wire guide tube **38**. Wire guide tube **38** is semiflexible and is mounted upon a block **102** which is pivotably mounted to rotate regulating stem **104** of air valve **103** mounted upon plate **106**.

A continued demand of the marking machine depletes

the normal inoperative slack and looseness from the supply loop and draws the loop of wire to a taut condition. A continued upward pull of the tautened wire raises wire guide tube **38** from the lowered inoperative position illustrated in FIGURE 2. Guide tube **38** and air regulating stem **104** rotate through an arc of approximately 135 degrees. The greater the rotation, the greater the flow of air through air valve **103** with increasing speed of air motor **40** and drive wheel **36** for faster withdrawal of wire from supply spool.

A compression coil spring **114** pulls against the upward movement of block **102** to keep air valve **103** closed upon minor jerking or whipping of the wire supply loop by the irregular demand of the marking machine. The spring tension and flexibility of tube **38** prevents premature opening of the air valve **103**. When the slack and excess wire in the supply loop is depleted, the direct pull of the taut wire offsets the spring tension and raises guide tube and block **102** to turn air valve regulating stem **104**. This allows flow of air for operation of air motor **40** to drive wheel **36** for withdrawal of wire from spool **20** to supply the demand at the speed required and only as needed by the marking machine.

A safety shut-off switch **116** is positioned on mounting plate **106** near the end of the arc of guide tube **38**. Guide tube support block **102** also carries switch actuating arm **108** and switch actuating button **108A**. Switch **116** is normally inoperative upon proper functioning of wire prefeeder. Any malfunctioning of supply spool, drive wheel, air motor, etc., will place an undue strain on wire **18**, and when pull on guide tube **38** is sufficient, the passage of switch actuating button **108A** across micro-switch **116** provides an impulse closing of electric contact to energize disconnect relay **105** to stop operation of marking machine and prefeeder in an identical manner to operation of micro-switch **96**.

A manual reset push button switch **107** is provided to restart operation after malfunction has been remedied by energizing latching relay **109** to close disconnect relay **105**.

For convenience the switches for starting and stopping the marking machine may be mounted upon housing **106**. While what hereinbefore has been described as the preferred embodiment of this invention, it is readily apparent that alterations and modifications may be resorted to without departing from the scope of this invention and such alterations and modifications are intended to be included within the scope of the appended claims.

I claim:

1. A device for feeding insulated wire to a wire marking machine comprising: a pair of wheels one of which has a flat periphery, a pair of rings positioned upon the periphery of the remaining wheel, means biasing the peripheries of said wheels into contact with one another, power means for driving one of said wheels, a bushing in advance of said wheels through which said wire is reeved, and switch means for shutting off said power means, said bushing having switch contacting means actuated by movement of said bushing upon contact with said bushing of a kink in said wire.

2. A device for feeding insulated wire to a wire marking machine comprising: a pair of wheels one of which has a flat periphery, a pair of rings positioned upon the periphery of the remaining wheel, means biasing the peripheries of said wheels into contact with one another, power means for driving one of said wheels, a tube between said wheels and the marking machine and mounted for pivotal movement upon wire being drawn therethrough by said marking machine, and switch means for deactuating said power means, said switch means responding to pivoting of said tube.

3. A device for feeding insulated wire to a wire marking machine comprising: a pair of wheels one of which has a flat periphery, a pair of rings positioned upon the periphery of the remaining wheel, means biasing the peripheries of said wheels into contact with one another, power means for driving one of said wheels, a bushing in advance of said wheels through which said wire is reeved, a tube between said wheels and the marking machine and mounted for pivotal movement upon wire being drawn therethrough by said marking machine, and switch means for deactuating said power means, said switch means responding to pivoting of said tube.

4. A device for feeding insulated wire to a wire marking machine comprising: a pair of wheels one of which has a flat periphery, a pair of rings positioned upon the periphery of the remaining wheel, means biasing the peripheries of said wheels into contact with one another, power means for driving one of said wheels, a bushing in advance of said wheels through which said wire is reeved, switch means for shutting off said power means, said bushing having switch contacting means actuated by movement of said bushing upon contact with said bushing of a kink in said wire, a tube between said wheels and the marking machine and mounted for pivotal movement upon wire being drawn therethrough by said marking machine, and a second switch means for deactuating said power means, said switch means responding to pivoting of said tube.

5. A device for feeding insulated wire to a wire marking machine comprising: a pair of wheels, power means for driving one of said wheels, a bushing in advance of said wheels through which said wire is reeved, switch means for shutting off said power means, said bushing having switch contacting means actuated by movement of said bushing upon contact with said bushing of a kink in said wire, a tube between said wheels and the marking machine and mounted for pivotal movement upon wire being drawn therethrough by said marking machine, and a second switch means for deactuating said power means, said switch means responding to pivoting of said tube.

References Cited in the file of this patent

UNITED STATES PATENTS

864,860	Randall	Sept. 3, 1907
1,828,506	Morse	Oct. 20, 1931
2,212,947	Myer et al.	Aug. 27, 1940
2,227,387	Borton	Dec. 31, 1940
2,909,341	Kingsley	Oct. 20, 1959
2,912,099	Brouse et al.	Nov. 10, 1959
2,950,520	Sonnino	Aug. 30, 1960