THE SPRING RESEARCH ASSOCIATION

A PNEUMATICALLY OPERATED MACHINE FOR END LOOPING EXTENSION SPRINGS

by

J. Oldham

Report No. 184

(January 1971)

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SUMMARY

A pneumatic end looping machine has been designed and built by SRA as a low cost automation device. It has been developed by BUD International and has now reached the production stage.

The following claims are made by the manufacturer. The production machine is capable of looping both right and left hand wound springs with coil diameters ranging from 3/16 in to 7/8 in and lengths down to 1/4 in. The types of loop which can be formed include central crossover loops, side loops, double coil loops and part coil loops. The machine is hand fed, ejection is automatic for most types of spring, and speeds of up to 1800 loops per hour can be achieved. A full tool change from one spring design to another requires only a few minutes.

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1. INTRODUCTION

For some time there has been a demand among spring manufacturers for an inexpensive yet versatile end looping machine. This is required to suit the case where springs are produced in quantities sufficient to benefit from automation, but insufficient to warrant the expense of a fully automatic machine.

To this end a pneumatic device has been designed and developed at SRA laboratories and a prototype machine has been produced. Further development work has been undertaken by BUD International who have increased the versatility and improved the appearance of the prototype and have recently produced a production machine.

2. THE PROTOTYPE MACHINE

This machine was made up from standard pneumatic components which are readily available from stockists and these were assembled on a channel sectioned base as illustrated in Figure 1. The pneumatic circuit can be seen in Figure 2. All the components are easily accessible, as is the means of adjusting the pneumatic trip valves.

The principle of operation is fairly simple. A spring is inserted into the support tube and rotated so that the spring end locates against a stop. Two tools are used to form the loop. The first tool separates and lifts the end coil and the second tool picks up the base of the side loop and pushes it across the centre line of the spring using the first tool as an anvil. In this way a central crossover loop is formed. The two types of central loop are shown in Fig. 3.

The machine was designed to form central loops, of both crossover and non-crossover type, on right hand wound springs with coil diameters ranging from 1/4 in to 1/2 in, lengths down to 1/4 in, and wire diameters up to 0.072 in. A graph will be produced by the manufacturer relating the combinations of spring index and wire diameter which can be looped. It is capable of forming up to 1600 loops per hour using roller trip valves to automatically control the sequence of operation.

3. THE PRODUCTION MACHINE

Opposite is the publicity leaflet produced by BUD International, which gives a general view of the production machine. It can be seen that the visual appearance is greatly improved, while the flexibility of the machine has also been increased and the method of adjustment simplified. Hand feeding has been retained.

The Manufacturer makes the following claims. Automatic ejection is possible for most designs and this enables production rates of 1800 loops per hour to be achieved. The frequency of operation is controlled by a variable electric timer which permits either continuous or individual cycles. Changing from one spring diameter to another involves changing only the locating bush, thus setting up time for a new spring takes less than five minutes. All the forming tools can be easily manufactured in a moderately equipped toolroom.

4. CONCLUSION

The production machine which will be marketed by BUD International was manufactured as the direct result of the work done on low cost automation devices by the SRA. The machine is sufficiently flexible to enable most types and sizes of tension springs to be looped successfully by an unskilled operator.

5. ACKNOWLEDGEMENT

The Spring Research Association wishes to thank BUD International for permission to publish details of their End Looping Machine.

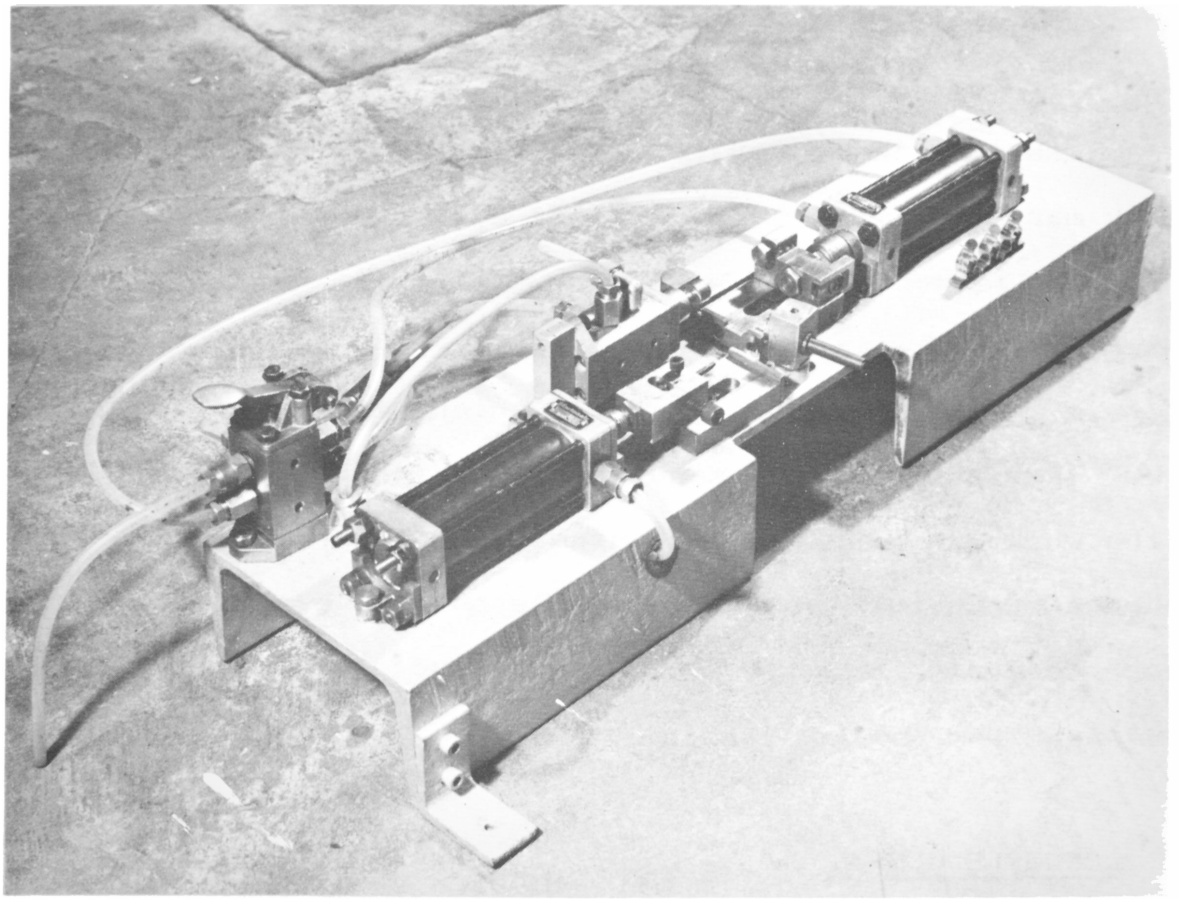

FIG. 1 GENERAL VIEW OF THE PROTOTYPE MACHINE

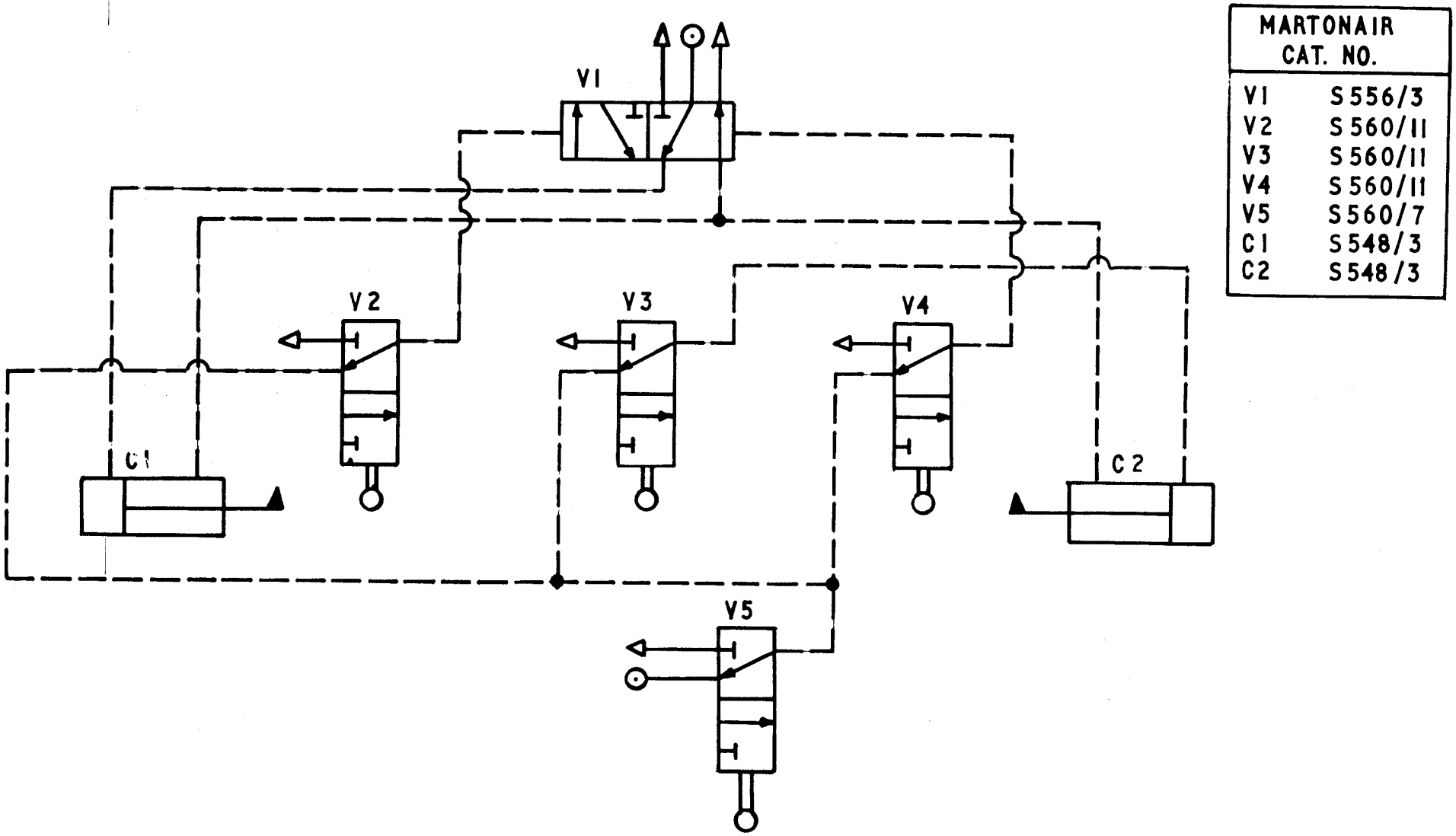

FIG. 2 PNEUMATIC CIRCUIT FOR THE PROTOTYPE MACHINE

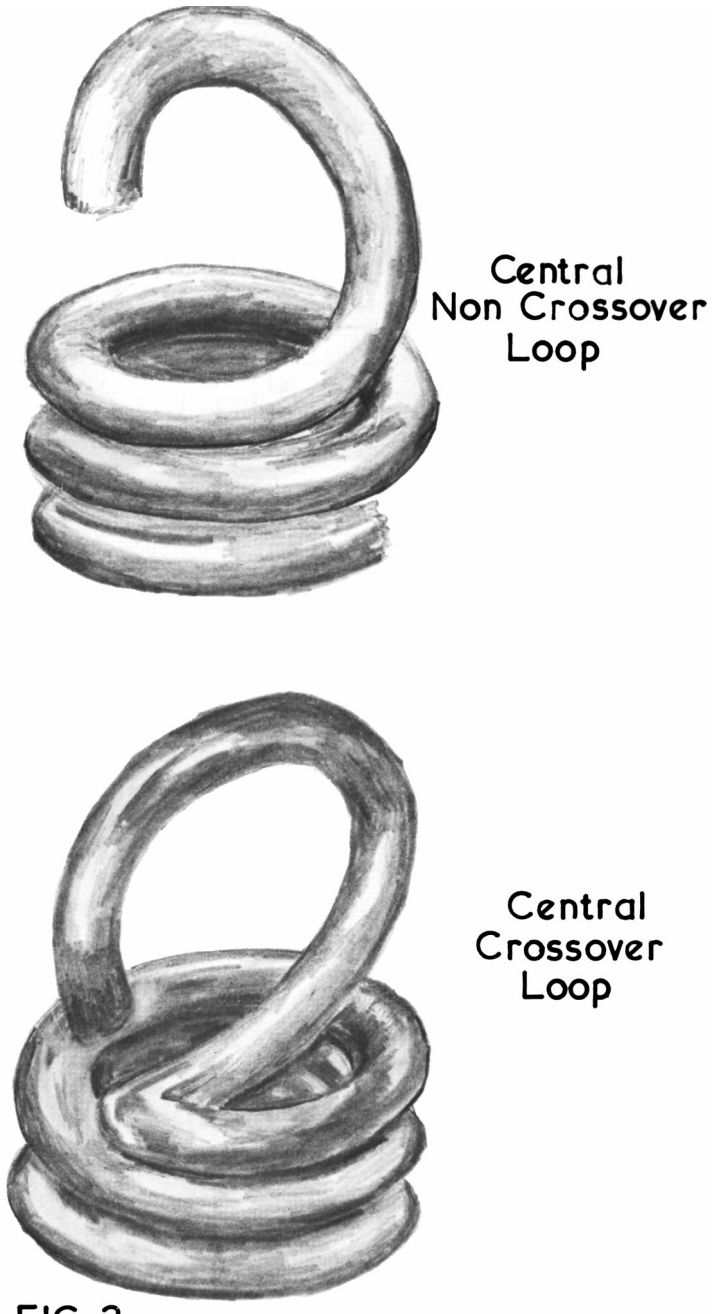

FIG. 3
TWO TYPES OF CENTRAL LOOP