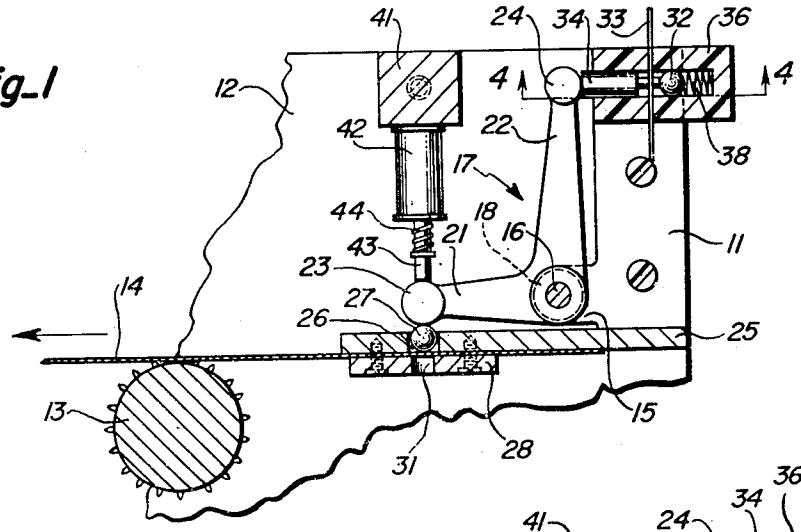
April 18, 1961 L. J. LAPOINTE 2,980,320

COMBINATION PUNCH AND READER UNITS

Filed May 22, 1959

Fig_1



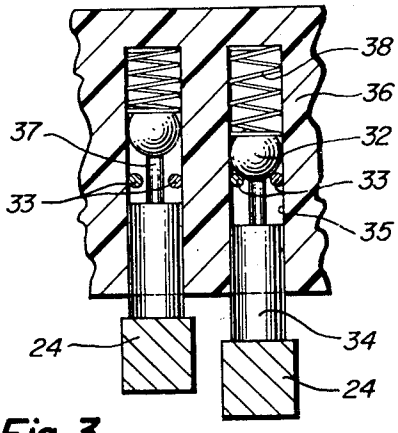


Fig_3

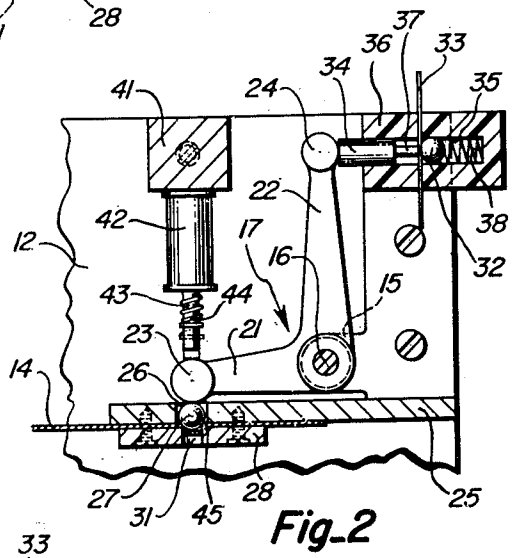


Fig_2

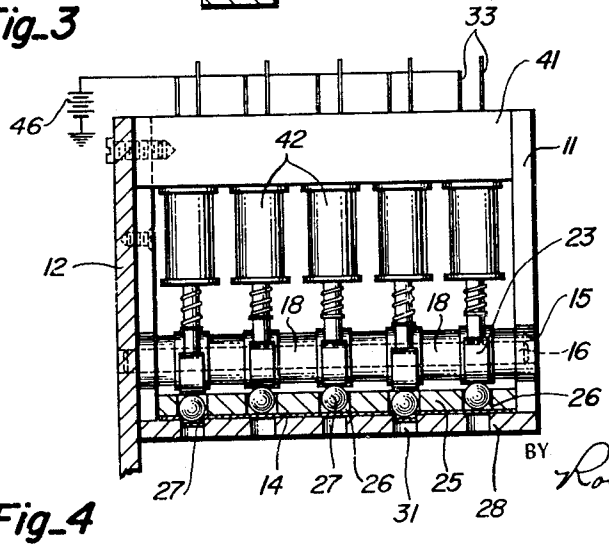


Fig_4

INVENTOR
LLOYD J. LAPOINTE

BY Ross, Spalla & Scribner
ATTORNEYS

United States Patent Office 2,980,320 Patented Apr. 18, 1961

2,980,320

COMBINATION PUNCH AND READER UNITS

Lloyd J. Lapointe, Manchester, Conn., assignor to Royal McBee Corporation, Port Chester, N.Y., a corporation of New York

Filed May 22, 1959, Ser. No. 815,101

3 Claims. (Cl. 234—41)

This invention relates to a combination punch and reader unit construction for perforating or sensing perforated records; more particularly it relates to a combination punch and reader unit construction having elements common to both perforating and sensing functions; and specifically to a punch and reader unit construction having common elements which are operable in part by the tape being punched or read.

In brief this invention provides a combination punch and reader unit construction which is simple, reliable and inexpensive; one which has a minimum of working parts; and one wherein close accuracy in fabrication is not necessary.

The above desirable features are obtained through the employment of spherical elements carried within holes in a plate and biased toward registering dies in a die block vertically spaced from the plate. In accordance with the invention the spherical elements, when functioning as sensing elements, are adapted to be moved into and out of columnar perforations in a record as it moves columnwise past the elements; the latter movement being effected by record portions between columns of perforations. Switch means operable in response to and simultaneously with the movement of the elements are employed to initiate electrical signals representative of the code sensed. When functioning as perforating elements, the spherical elements are adapted, in combination with a die plate, to be driven and to cut through an unperforated record and thereafter to be moved out of the holes perforated by the record as it moves columnwise to present succeeding columns.

A further feature of the invention is the fact that signals representative of the holes being punched may be simultaneously developed and employed to verify the accuracy of the information punched.

An object of the invention is in the provision of a reliable punch and reader unit having a minimum of working parts.

Another object of the invention is to provide a novel construction which may be employed as a punch and as a reader.

Still another object of the invention is to provide a combined punch and reader unit construction employing the record to be punched or read as a working element.

A further object of the invention is the provision of a combined punch and reader unit which may be employed to punch or sense perforated tape or the chadless variety of perforated tape.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

Figure 1 is a cross sectional view of the combined punch and reader showing the normal relationship between the parts with a record operatively disposed therein;

Figure 2 is a view similar to Figure 1 showing the relationship of the parts immediately after a hole has been punched in a record;

Figure 3 is a fragmentary exploded cross sectional view showing the ball switch construction; and

Figure 4 is a front elevational view of the combined punch and reader.

Referring now to the drawings wherein like reference characters designate like or corresponding parts throughout the several views thereof and wherein is shown a preferred embodiment, there is shown in Figure 1 a U-shaped support bracket **11** secured as by screws or by any other suitable means to a frame member **12** in spaced relationship with a record feed drum **13** adapted, as will be appreciated by those skilled in the art, to periodically and incrementally feed a record **14** in synchronization with the punching or sensing of the record. The U-shaped support bracket **11** is provided with ears **15** for supporting a shaft **16** upon which are mounted for rotation a plurality of levers generally designated **17** spaced predetermined distances apart by collars **18**. The number of levers corresponds to the number of levels employed to code information; the instant showing being that of a five level punch or reader. Each lever has a laterally extending leg **21** and an upwardly extending leg **22**. Legs **21** and **22** are terminated respectively by cylindrical projections **23** and **24**. A plate member **25** integral with the base of the U-shaped support bracket **11** or otherwise suitably secured thereto extends to the left as seen in Figures 1 and 2. The plate member **25** is provided with a plurality of aligned holes **26** disposed immediately below the projections **23**. In each hole is a spherical element or ball **27** normally maintained by its respective projection **23**. Mounted on and spaced from plate member **25** is a die plate **28** having a plurality of die holes **31** corresponding in number to those in plate member **25** and aligned therewith. The holes **31** in the die plate **28** are of smaller diameter than the balls **27** and more particularly of a diameter relative to the balls such that standard .072" holes will be perforated in the record **14**.

Projections **24** of levers **17** are adapted to operate switches each comprising a movable ball contact **32** and a pair of stationary wire contacts **33**. The ball contacts **32** are operated through plungers **34** mounted in bores **35** of a block **36** of insulating material, such as nylon. The block of insulating material is suitably secured to the support member so that the plungers **34** will push against projections **24**. Each plunger is formed with a reduced end portion **37** adapted to move between contact wires **33** and to engage its respective ball contact. Each ball contact is biased toward its respective plunger by a spring **38** such that it normally contacts its associated pair of stationary contact wires **33** (Figure 3) and maintains the plunger **34** biased outwardly of the bore such that lever **17** is biased counter-clockwise and the sensing/perforating elements **27** are in turn biased toward associated die holes **31**. The pairs of stationary contact wires **33** are fitted into holes in the insulating block and cemented therein whereby they are insulated from one another and from the wires of other pairs.

Suitably mounted on a bar or plate **41** secured to the frame are a plurality of solenoids **42** adapted to be selectively energized in accordance with electrical impulse combinations representative of data; which impulse combinations may be derived from a reader or from an encoder associated with an input device such as a typewriter. Each solenoid has associated therewith a movable armature **43** biased in its normal position by a spring **44** as shown in Figure 1. The armatures are disposed immediately above their respective projections **23**. Upon ener-

gization of the solenoids 42 the armatures 43 will move downwardly against the tension of springs 44 as shown in Figure 4 striking the projections 23 and thereby driving the ball sensing/punching elements 27 which in combination with the die holes 31, perforate a record passing between plate member 25 and die block 28.

Figure 1 shows the position of the parts with an unperforated portion of a record passing between the elements 27 and plate 28; the ball switches being open as shown by the switch to the left in Figure 3.

Figure 2 shows the position of the parts when a perforated portion of a record is between elements 27 and plate 28; the ball switch associated with the element in the perforation being closed as shown by the switch to the right in Figure 3. Figure 2 also is an illustration of the position of the parts immediately after element 27 has been forced through the record by armature 43; the paper being cut by the element and the area of contact with the opening of the die hole 31 which may if desired be shaped to produce chadless tape as will be understood by those skilled in the art. After a punching operation or after a perforation in a record has been sensed the record will move column-wise and in doing so the edge 45 of the record (Figure 2) will cam the element upward in preparation for punching or sensing succeeding columns of the record.

As will be understood as a record is being sensed the elements 27 will move in and out of perforations in succeeding columns whereby the ball switches associated therewith will be opened and closed, a closed switch being representative of a perforation in the record. As will be understood when the ball switches are closed, circuits including the pair of wires associated therewith, one each of which is connected to a power supply 46 as shown in Figure 4, will be energized. These circuits as will be understood by those skilled in the art may include the set up solenoids of a decoder, the output of which may be connected to actuate an automatically operated typewriter or the like.

Obviously the ball switches may be similarly employed during punching operations whereby the data punched could be simultaneously verified at the typewriter.

It should be understood, that the foregoing disclosure relates to only a preferred embodiment of the invention and that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention claimed is:

1. Apparatus of the type described which is capable of sensing and perforating a record having data items in columns transverse to record movement, said record being adapted to be moved past a sensing/perforating station; comprising a frame, a pair of spaced plate members mounted on said frame and forming a channel through which said record is moved columnwise, a plurality of elements mounted within a first of said plate members for movement into and out of contact with the other plate member, means comprising switch means mounted on said frame for normally yieldably biasing said elements into contact with said other plate member, said switch means being operable simultaneously with the movement of said elements toward and away from said other plate member, said elements being moved out of contact with said other plate member when unperforated portions of said record pass through said channel, perforated portions of said record permitting said elements to move into contact with said other plate member under the action of said biasing means, means for selectively driving said elements and an unperforated portion of a record in said channel into contact with said other plate member, and means on said other plate member co-operating with said selectviely driven elements to effect a circular line of contact whereby the record therebetween is perforated.

2. Apparatus of the type described for perforating and sensing records having data items coded in columns transverse to the direction of motion of said records, said records being adapted to be moved through a sensing/perforating station; comprising a frame, a pair of spaced plate members mounted on said frame and forming a channel through which a record is to be moved columnwise, a column of aligned holes in each of said plate members, a plurality of spherical elements disposed within the holes of one of said plate members, the holes on said other plate member having a diameter smaller than that of said spherical elements, a shaft mounted on said frame transverse to the direction of tape movement, a plurality of levers pivotally mounted on said shaft; means comprising switch means associated with one extremity of each of said levers for normally yieldably biasing the other extremity of said levers into contact with said spherical elements whereby said spherical elements are in contact with edges of said smaller diameter holes in said other plate member, said elements being movable out of contact with said other plate member by unperforated portions of a record passing through said channel thereby operating through said levers said switch means, and means for selectively driving said other extremities of said levers, whereby said elements and unperforated portions of a record passing through said channel are forced into contact with the edges of the holes in said other contact plate to effect perforation of said record.

3. Apparatus as recited in claim 2 wherein said means for selectively driving said levers comprises the armatures of solenoids mounted on said frame.

References Cited in the file of this patent

UNITED STATES PATENTS

1,578,717	Daubmeyer	Mar. 30, 1926
1,608,493	Daubmeyer	Nov. 30, 1926
1,649,635	Willard	Nov. 15, 1927
2,475,307	Brand	July 5, 1949