Dec. 21, 1954 A. THOMAS ET AL 2,697,601

MECHANISM FOR FEEDING PADS CONTAINING SUPERIMPOSED SHEETS FROM A MAGAZINE

Filed June 22, 1949 2 Sheets-Sheet 1

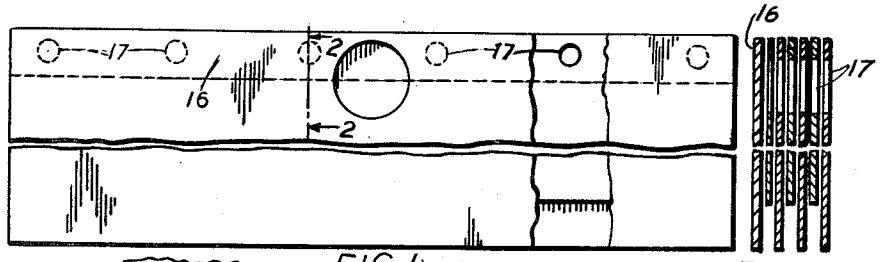


FIG. 1.

FIG. 2

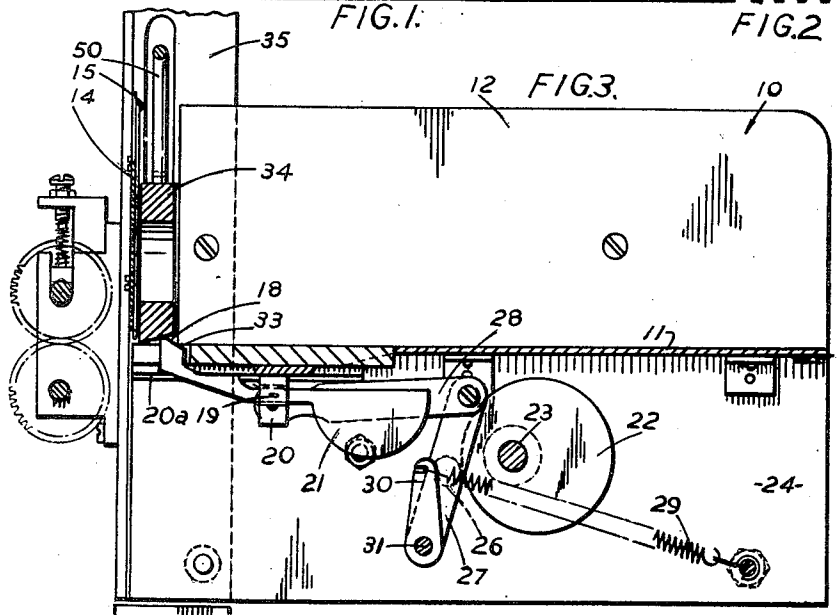


FIG. 3.

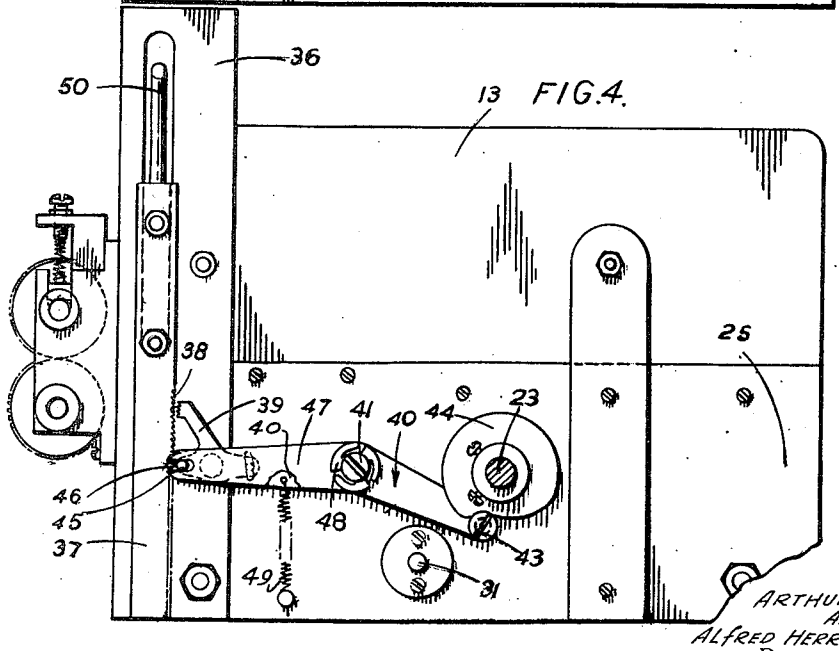


FIG. 4.

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FIG.5.

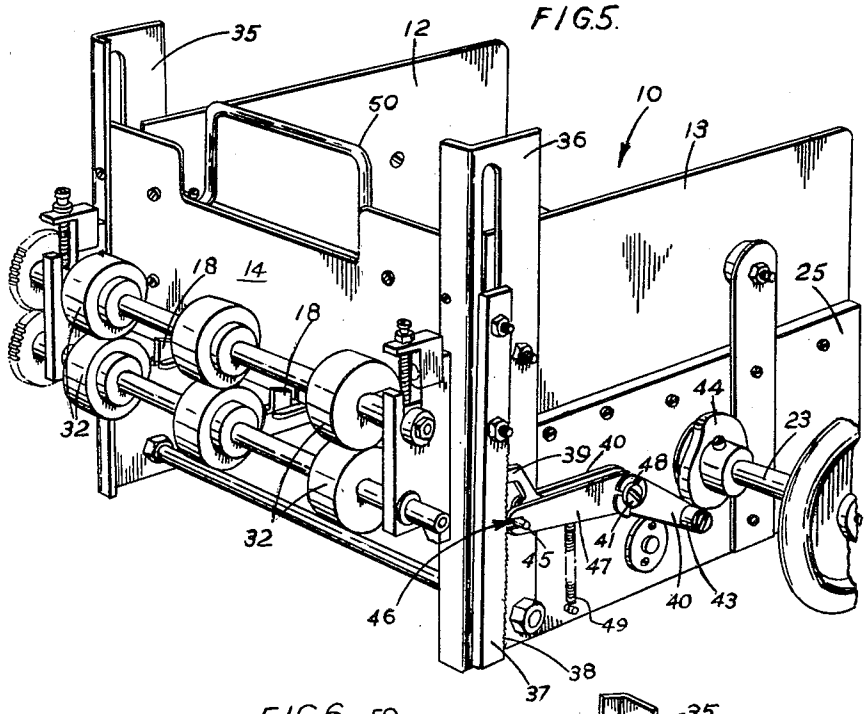
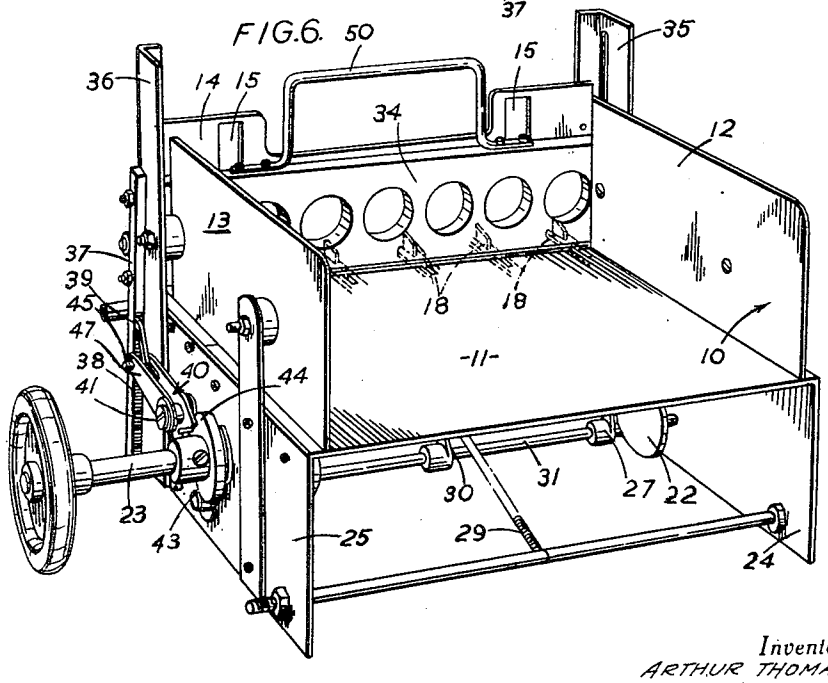


FIG.6.



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MECHANISM FOR FEEDING PADS CONTAINING SUPERIMPOSED SHEETS FROM A MAGAZINE

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Claims priority, application Great Britain June 30, 1948

6 Claims. (Cl. 271—44)

This invention relates to mechanism for feeding pads containing interconnected superimposed sheets from a bottom of a pile contained in a magazine.

It is an object of the invention to provide mechanism for feeding pads from a pile contained in a magazine, e. g. from the bottom of the pile, so that only one pad is fed at a time from the magazine.

Accordingly, the invention provides mechanism for feeding pads one at a time from a pile in a magazine, comprising feed teeth to engage spaced perforations in a pad and to move the pad from the magazine, pressing elements to engage the top and bottom of a pile of pads to press together the leading edges thereof, and means operative in synchronism with the feed teeth to relieve the pressure exerted by said pressing elements when the feed teeth have engaged the perforations in a pad and to again apply the pressure when the teeth have removed the pad from the magazine.

Further, the invention provides mechanism for feeding pads from the bottom of a pile contained in a magazine and through a throat at the outlet end of the magazine, comprising a reciprocable carriage, feed teeth pivotally mounted for free movement on said carriage and counterweighted to urge the teeth to feeding position, a weight slidably mounted in juxtaposition with said throat to press together the leading edges of pads contained in the magazine, and a lifting device operative in synchronism with said carriage to engage and lift the weight when the feed teeth have been moved to pad engaging position and again to release the weight at the end of a feeding stroke of the carriage.

The lifting device comprises toothed pawls movable into and out of engagement with the teeth of racks formed on or secured to the weight. Preferably, the toothed pawls are pivoted on cam-operated pivoted bell-crank levers and are moved into engagement with the racks by the co-operation of pins extending laterally from the pawls and engaging in slots formed in arms movable with the bell-crank levers but having their initial movement retarded relative thereto.

In order that the invention may be clearly understood one embodiment thereof will now be described, by way of example, with reference to the accompanying drawings which illustrate a feed mechanism for feeding pads to a tabulator or similar statistical machine.

In the drawings:

Fig. 1 is a broken plan view, to a reduced scale, of a pad;

Fig. 2 is a section, to an enlarged scale, on line 2—2, Fig. 1;

Fig. 3 is a longitudinal section through the feeding mechanism;

Fig. 4 is a side elevation of the feeding mechanism, the opposite side elevation being identical;

Fig. 5 is a perspective view from the front and one side of the feeding mechanism, and

Fig. 6 is a perspective view from the rear and the same side of the mechanism.

Referring to the drawings, the feeding mechanism comprises a magazine **10** having a bottom **11** to support a pile of superimposed pads and side walls **12, 13** to engage the sides of the pile. A front wall **14** is provided to the magazine and fitted on the front wall are two throat elements **15**, Fig. 3 and Fig. 6, which control the space

between the front wall **14** and the bottom **11** of the magazine, which comprises the outlet from the magazine through which the pads are to be fed one by one in succession.

The pads are superimposed in the magazine so that in each instance the upper sheet **16** thereof is disposed to be uppermost. By so arranging the pads the lowermost pad of the pile always presents to the bottom of the magazine the perforations **17** formed in the lowermost pad and these perforations are to be engaged by feed teeth **18** which are pivoted at **19** so as to be mounted for free movement on a carriage **20** slidable between the undersurface of the bottom **11** of the magazine and guide plates **20***a* secured thereto. Six feed teeth **18** are provided on the carriage, one for co-operation with each group of superimposed perforations **17** formed in a pad to be fed, and the feed teeth, as stated above, are freely movable about their pivot **19** and are counter-weighted, as at **21**, in a manner such as to urge the teeth to feeding position. Thus, as the carriage **20**, which is reciprocable, is moved forwardly during the feeding stroke, the feed teeth **18** enter the perforations **17** in the lowermost pad of the pile, engage the forward end thereof and move the pad through the throat out of the magazine.

The carriage **20** is reciprocated by cams **22** secured to a spindle **23** mounted in the side frames **24, 25** of the machine and the cams **22** engage rollers **26** supported on levers **27** which are in turn connected by links **28** with the carriage **20**. A spring **29** mounted between the levers **27** is attached to an arm **30** secured to the spindle **31** on which the levers **27** are fixed so as to maintain the rollers **26** carried by the levers in engagement with the cams **22**. The stroke of the cams **22** is such as to move the carriage **20** forwardly so that the feed teeth **18** move the lowermost pad of the pile through the throat of the magazine and deliver the leading edge thereof to feed rollers **32**, Fig. 5, which thereafter continue the movement of the pad and also complete the withdrawal of the pad from the pile, and deliver it to the tabulating machine. The spindle **23** and feed rollers **32** are driven by any suitable driving mechanism, not shown.

Due to the feed teeth **18** being freely pivoted on the carriage **20**, when the teeth are moved into the perforations **17** formed in the lowermost pad of the pile, the feed teeth are arrested by the imperforate upper sheet **16** of the pad and are prevented thereby from passing into the perforations formed in the pad next superimposed thereon. The feed teeth **18** are formed with a cam face, as at **33**, Fig. 3, which as the pad is grasped and fed by the feed rolls **32** rocks the teeth **18** out of the perforations **17** with which they are engaged and permits the pad to be fed and the carriage **20** to return to initial position.

To ensure that each pad is properly engaged by the feed teeth so as to be fed thereby a weight **34** is provided and is disposed on the top of the pile of pads contained in the magazine so as to press the marginal portions of the pads against the bottom **11** of the magazine. This weight **34** is disposed to be in juxtaposition with the throat of the magazine and to engage only the upper marginal portion of the pads, and it is mounted in vertical guides **35, 36** so as to be slidable in said guides and to rest by gravity on the superimposed pile until the feed teeth **18** have been moved to a position at which they engage the perforations **17** in the lowermost pad of the pile. At this time it is desirable to relieve the weight on the pile in order to facilitate the feeding of the pad therefrom and to this end a rack member **37** having fine ratchet teeth **38**, Fig. 4, formed thereon is secured to each of the opposite vertical ends of the weight **34**. To lift the weight **34** when the lowermost pad has been engaged by the feed teeth **18** there is provided for co-operation with each of the racks **37**, a toothed pawl **39** which is freely pivoted on the horizontal arm of a bell-crank **40** there being two of these bell cranks one on each side pivoted at **41** to the side frames **24, 25** of the machine. The other arm of each of the bell-crank levers carries a cam roller **43** which is engaged by a cam **44** mounted on the spindle **23** so that the weight **34** is lifted in synchronism with the movement of the carriage **20**.

A pin **45** extends laterally from each of the pawls **39** and is engaged in a slot **46** formed in the end of an arm **47** which is mounted for movement with the bell-crank lever **40** about the pivot **41** therefor, but which is yieldably held in position relatively thereto by a spring friction clip **48** which retards the movement of the arm **47** so that the initial movement thereof is slightly later than that of the arm of the bell-crank lever **40** supporting the toothed pawl **39**. The toothed pawl **39** is normally out of engagement with its rack **37** so that the weight **34** may rest by gravity on the pile of pads contained in the magazine. The movement of the bell-crank lever **40** in a clockwise direction will through the retarding action of lever **47** on the pin **45** rock pawl **39** in a counter-clockwise direction into engagement with the teeth **38** of the rack **37** and thereafter continued movement of the bell-crank lever **40** causes the rack **37** to be lifted so that the weight **34** secured thereto is lifted out of engagement with the pile of pads contained in the magazine. The cam **44** is so formed that after the lowermost pad has been removed from the magazine the bell crank **40** is rocked counter-clockwise by a spring **49** and again the drag of arm **47** on pin **45** will rock the pawls **39** in a clockwise direction out of engagement with the racks **37** and the weight **34**, which is then released, falls due to gravity until it is again in engagement with and bearing on the pile of pads.

If desired, the weight may be provided with a handle **50** whereby it may be manually lifted between its vertical guides **35**, **36** for the purpose of recharging the magazine.

What we claim is:

1. Mechanism for feeding pads from the bottom of a pile contained in a magazine and through a throat at the outlet end of a magazine, comprising a reciprocable carriage, feed teeth pivotally mounted for free movement on said carriage and counter-weighted to urge the teeth to feeding position, means for reciprocating said carriage, a weight resting on said pads slidably mounted in juxtaposition with said throat to press together the leading edges of pads contained in the magazine, a rack connecting with said weight, a lifting pawl, and means to move said pawl into engagement with said rack and to lift the weight when the feed teeth have been moved to pad engaging position and again to move said pawl out of engagement with said rack to release the weight at the end of a feeding stroke of the carriage, said carriage reciprocating means and said pawl moving means being operated synchronously from a common power source.

2. Mechanism for feeding pads from the bottom of a pile contained in a magazine and through a throat at the outlet end of said magazine, comprising a reciprocable carriage, feed teeth pivotally mounted for free movement on said carriage and counter-weighted to urge the teeth to feeding position, means for reciprocating said carriage, a weight slidably mounted in juxtaposition with said throat to press together the leading edges of pads contained in the magazine, a lifting device, and means for operating said lifting device, said two means being synchronously timed to engage and lift the weight when the feed teeth have been moved to pad engaging position and again to release the weight at the end of a feeding stroke of the carriage, said device including a pawl movable into and out of effective lifting engagement with the teeth of a rack, said rack being integral with said weight.

3. Mechanism for feeding pads from the bottom of a pile contained in a magazine and through a throat at the outlet end of said magazine, comprising a reciprocable carriage, feed teeth pivotally mounted for free movement on said carriage and counter-weighted to urge the teeth to feeding position, means for reciprocating said carriage, a weight slidably mounted in juxtaposition with said

throat to press together the leading edges of pads contained in the magazine, a lifting device, and means for operating said lifting device, said two means being synchronously timed to engage and lift the weight when the feed teeth have been moved to pad engaging position and again to release the weight at the end of a feeding stroke of the carriage, said device including a reciprocable pawl pivotally mounted for engagement with a rack formed integral with the said weight, the means for operating said device including a cam actuated lever for moving said pawl to and from an effective weight lifting position, and a pawl enabling arm reciprocable under the influence of said lever, said arm yieldably bearing on said pawl for causing said pawl to engage said rack upon the initial movement of the pawl to said effective position.

4. A machine of the class described having a magazine for containing a plurality of sheets in stacked arrangement and formed with a feed throat at the outlet side thereof, which comprises a reciprocating carriage, means associated with said carriage and engaging the lowermost sheet in said stack for feeding said sheet through said throat, means for reciprocating said carriage, a weight mounted for sliding movement in said magazine, said weight bearing on the uppermost sheet contained in said magazine, a rack secured to said weight, a reciprocating pawl movable into and out of engagement with said rack for raising and releasing said weight, cam actuated means for rendering said pawl effective, said cam actuated means including a member yieldably bearing on said pawl and reciprocable under the influence thereof for periodically moving said pawl into effective lifting engagement with said rack, the means for reciprocating the carriage and the cam actuated means being synchronously timed.

5. A machine of the class described having a magazine for containing a plurality of sheets in stacked arrangement and formed with a feed throat at the outlet side thereof, which comprises a reciprocating carriage, means associated with said carriage and engaging the lowermost sheet in said stack for feeding said sheet through said throat, means for reciprocating said carriage, a weight mounted for sliding movement in said magazine, said weight bearing on the uppermost sheet contained in said magazine, a rack secured to said weight, a pawl movable into and out of engagement with said rack, a cam actuated lever pivotally supporting said pawl for reciprocating the pawl to and from effective weight raising position in synchronism with the feed stroke of said carriage, and an arm yieldably bearing on said pawl for resisting the movement of the pawl to said effective position, said arm causing said pawl to move into engagement with said rack upon the initial movement of said lever to said effective position, the means for reciprocating the carriage and the said cam being synchronously timed.

6. In a machine of the class described, a combination of a magazine for containing a pile of sheets, means to feed said sheets from the bottom of the pile, a weight resting on top of said pile, a rack connected with said weight, a pawl, means to move said pawl into engagement with said rack then to lift said rack to relieve the pressure of said weight and to release said pawl, and timing means to operate said pawl in synchronism with said feeding means.

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