June 2, 1942. K. R. STAUSS 2,285,371

PAPER SHEET TESTING DEVICE

Filed March 4, 1940

Fig. 1.

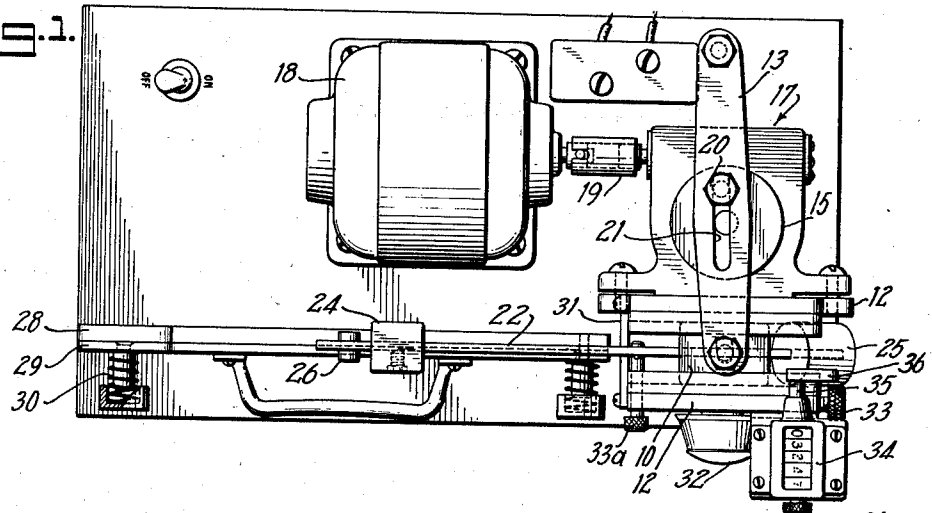
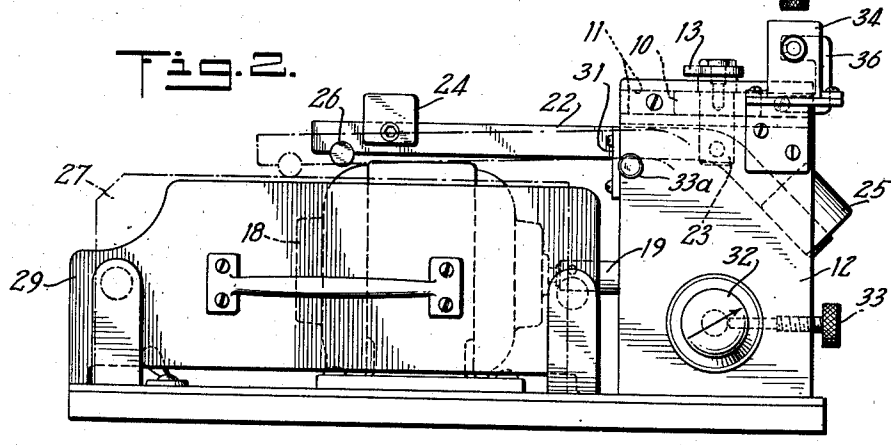


Fig. 2.



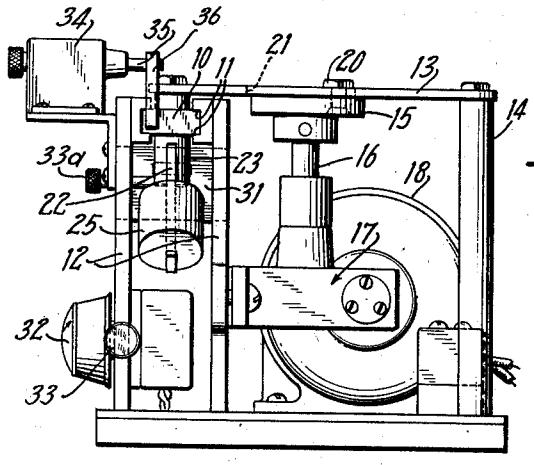


Fig. 3.

INVENTOR
Karl R. Stauss
BY
W. M. Wilson
ATTORNEY

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PAPER SHEET TESTING DEVICE

Karl R. Stauss, Vestal, N. Y., assignor to International Business Machines Corporation, New York, N. Y., a corporation of New York

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3 Claims. (Cl. 73—51)

This invention relates to a device for testing and determining the edge resistance and durability of paper sheets.

It is well known that in certain types of accounting machines individual control records or sheets are employed for controlling the actions of the machines. These control records usually consist of cards made from predetermined paper stock. Due to the fact that the cards are handled repeatedly by the card handling mechanisms of the machines and that the cards are subjected to unusual physical stresses, it is of extreme importance to determine the true characteristics of the cards in order to ascertain whether or not the cards as manufactured meet the required specifications for use in such machines.

Since the card handling mechanisms act upon the edges of the cards to feed them from the supply hoppers to the machines it is necessary to be able to determine accurately the card edge resistance and durability of the different types of suggested cards. The edges of inferior grade of cards tend to fray or burr after being used in the machines a short period of time. A damaged card of this nature causes the normal action of the card feeding mechanism to be blocked and interfered with. Heretofore, it has been customary to test the cards by passing them continuously through the actual card feeding mechanisms to determine the tendencies of the card edges of fraying or burring when exposed to the physical actions of the card handling mechanisms thereupon.

It is now suggested to test and determine the card edge resistance and durability by subjecting the edges of the cards to the action of the present invention which enables one to measure the edge strengths of different types of cards in an extremely short period of time. The timed period required to test the cards by the device to be described presently is but a fraction of the time required to test the same cards by the actual card handling mechanisms.

Therefore, an object of the present invention resides in the provision of an improved and simplified device for testing the resistance and durability of sheet or card edges.

Another object of the present invention resides in the provision of a reciprocating weighted contact arm which is brought into cooperative relationship with the card edges so that the influence of a predetermined force is brought to bear on the edges of the cards for a predetermined time interval.

Another object of the present invention resides in the provision of counting means for determining and indicating the number of complete reciprocations and operations the said contact arm effects upon the edges of the cards to be tested.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawing, which discloses, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawing:

Fig. 1 is a plan view of the operating mechanism of the testing device.

Fig. 2 is a front elevation of the mechanism of the testing device.

Fig. 3 is an end view of the testing device.

Referring now to Figs. 1 to 3 a preferred embodiment of the testing device is shown to comprise a positionable member **10** slidably mounted in the channels **11** which are formed in or as part of the supporting plates **12**. A connecting link **13** is provided, having one end thereof loosely connected to the upper side of the member **10** and the other end thereof pivotally mounted on a suitably disposed post **14**. The said connecting link is driven by an eccentric drive wheel **15** which is secured to the shaft **16** protruding from a gear reduction unit generally indicated by the numeral **17**. The gear reduction unit is connected to a suitable motor **18** by means of a coupling member **19**. The eccentric wheel drives the connecting link by means of stud **20** secured to wheel **15** and cooperating with an elongated slot **21** formed in the said link. In view of the described connections it is understood that the rotating drive wheel **15** is effective to reciprocate the slidable member **10** in the channel-way formed in the supporting plates.

An operating arm **22** is pivotally supported by a bifurcated member **23** depending from and secured to the slidable member **10**. Obviously the said bifurcated member and slidable member can be formed as an integral unit, if desired. The said operating arm carries a suitable test weight **24**, a complementary counter-balance weight **25**, and a contact roller or insert **26**. The said contact insert is adapted to engage and ride over the edge of a sheet or card **27** which is rigidly held in place between a fixed backing plate **28** and an adjustable clamping plate **29**, the latter being urged by the suitably disposed springs **30** to exert a steady pressure against the card.

From the description up to this point it is seen,

when the contact insert carried by the operating arm is permitted to bear upon the edge of a card inserted between the clamping and backing plates, that the said contact insert travels back and forth over a predetermined length of the card edge. The said length of travel depends upon the dimensions of the eccentric drive wheel **15** and the slot in the connecting link **13**.

The reciprocating movement of the contact insert over the card edge is continued, during a test operation, for a predetermined time, or stated in other words, until a predetermined number of complete reciprocations of the contact stud over the test card have been effected. Upon completion of this test operation the condition of the card edge can be determined visually or by examination with suitable gauges.

The number of complete reciprocations made by the contact stud **26** and operating arm **22** is indicated by a counting device **34**. The said counting device is suitably disposed with respect to the slidable member **10** and fixed to one of the supporting plates **12** as shown. To the operating shaft **35** of the counting device is secured a depending counter operating pawl **36** which is normally disposed in the path of the reciprocating member **10** so that the said member **10** is effective during its reciprocating movement to cause rotation of the counter shaft due to the engagement of the member with the operating pawl. In this manner each complete reciprocation is counted by the device **34** whenever the testing device is set into operation for testing the cards.

It should be mentioned that a slotted guide member **31** is provided, through which the operating arm extends, for the purpose of maintaining the line of travel of the operating arm in a straight line; an adjustable rheostat **32** with a companion locking screw **33** is provided so that with the former connected in the motor circuit it can be used to obtain the desired speed control of the reciprocating members; and an adjustable holding pin **33***a* serves as a support when positioned as shown in Fig. 1 for the operating arm **22**.

The operation of the testing device described should now be understood. Obviously before initiating a test run, it is advisable to check the speed of the mechanism, which can be adjusted and corrected to any desired value with the aid of the motor rheostat control and the observation of the number of complete reciprocations during a predetermined timed interval. Also, the edges of the cards to be tested should be examined for any broken or burred edges before insertion in the device so that erroneous results are not obtained. Insertion of the card in the device consists of raising the weighted operating arm **22** on the supporting pin **33**, withdrawing the clamping plate to permit insertion of the card between the backing and clamping plates, and then carefully lowering the said operating arm in position on the card edge. The motor is then connected to a suitable power supply to set the mechanism described in motion until the desired number of reciprocations of the operating arm and contact insert are indicated by the counting device. The card is then removed for examination.

The continuous action and influence of the weighted operating arm upon the card edge during a predetermined number of reciprocations thereover causes a fraying or premature breakdown on the edges of cards having inferior strength. Cards having the required edge resistance withstand the described testing operation without any evidence of a breakdown of the card edges. For definite assurance that the card edges have withstood the tests, they can be examined by suitable testing gauges.

The resistance of the edges of a card to mechanical stress and force exerted thereon is definitely indicative of the probable life of the cards when used in conjunction with the accounting machines referred to hereinabove. The device just described offers a quick, accurate, and simplified means for determining and testing the resistance of these card edges.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. A device for testing the edges of cards comprising card supporting means consisting of a fixed supporting member and a clamping member for holding the inserted card in an upright position to expose an edge of the card to be tested, an operating arm including an element attached to one end thereof for engaging the said exposed edge of the test card, said arm including a predetermined weight to cause the said element thereof to bear upon the card edge with a certain fixed pressure, a slidable member for actuating the operating arm, said slidable member having a depending bifurcated member to which the other end of said operating arm is pivotally connected, and means for reciprocating the slidable member to cause the element of the operating arm to bear back and forth over the exposed edge of the test card for determining the resistance of the card edge, said means including an eccentric drive wheel and a cooperating arm having one end thereof pivotally connected to the said slidable member.

2. A device for testing edge fed record cards comprising card supporting means consisting of a fixed supporting plate and a clamping plate for holding the inserted card in an upright position to expose an edge of the card to be tested, resilient means urging the said plates together upon the said card, an operating arm including a contact insert attached to one end for engaging the said exposed edge, the said arm having weights and counterweights to cause the said contact insert thereof to bear upon the said card edge with a certain stable pressure, a slidable member for actuating the said operating arm, the said slidable member having a depending bifurcated member to which the other end of the said operating arm is pivotally connected, and means for reciprocating the slidable member to cause the said contact roller to ride back and forth over the said exposed card edge for determining the durability of the card edge to the action of the said contact insert, the said means including an eccentric drive wheel and a cooperating arm having one end pivotally connected to the said slidable member.

3. A device for comparatively testing record cards normally fed into an accounting machine by a picker comprising card supporting means consisting of a fixed supporting plate and a clamping plate for holding an inserted card in a

position to expose an edge of the card to be tested, a pair of springs disposed at either end of the said clamping plate for urging the said plates together upon the said card, a pair of fixed supports for anchoring the said springs, an operating arm including a contact roller attached to one end for engaging the said exposed edge of the test card, the said arm including predetermined weights and counterweights to cause the said contact roller thereof to roll upon the said card edge with a certain fixed pressure, a slidable member for actuating the said operating arm, the said slidable member having a depending bifurcated member to which the other end of said operating arm is pivotally connected, and means for reciprocating the slidable member to cause the said contact roller to ride back and forth over the said exposed card edge for determining the relative durability of the card edge to the action of the said contact roller, the said means including an eccentric drive wheel and a cooperating arm having one end pivotally connected to the said slidable member.

KARL R. STAUSS.