E. STOUT & W. HAIST.

RECORDER.

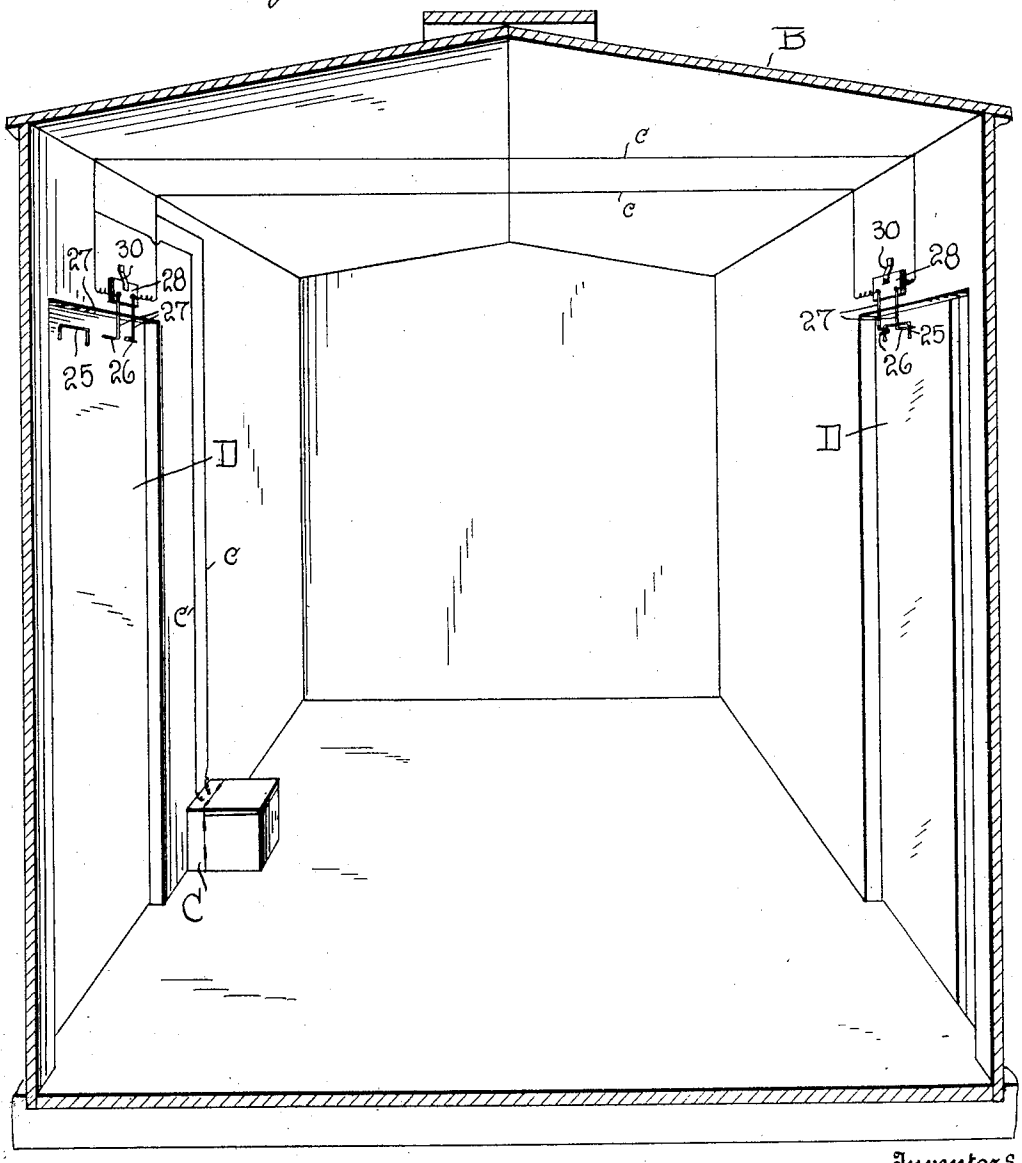
APPLICATION FILED JAN. 29, 1917.

1,247,737.

Patented Nov. 27, 1917.

3 SHEETS—SHEET 1.

Fig. 1



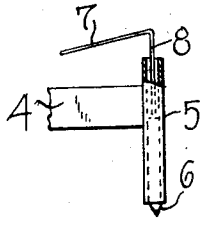


Fig. 6

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3 SHEETS—SHEET 2.

Fig. 2

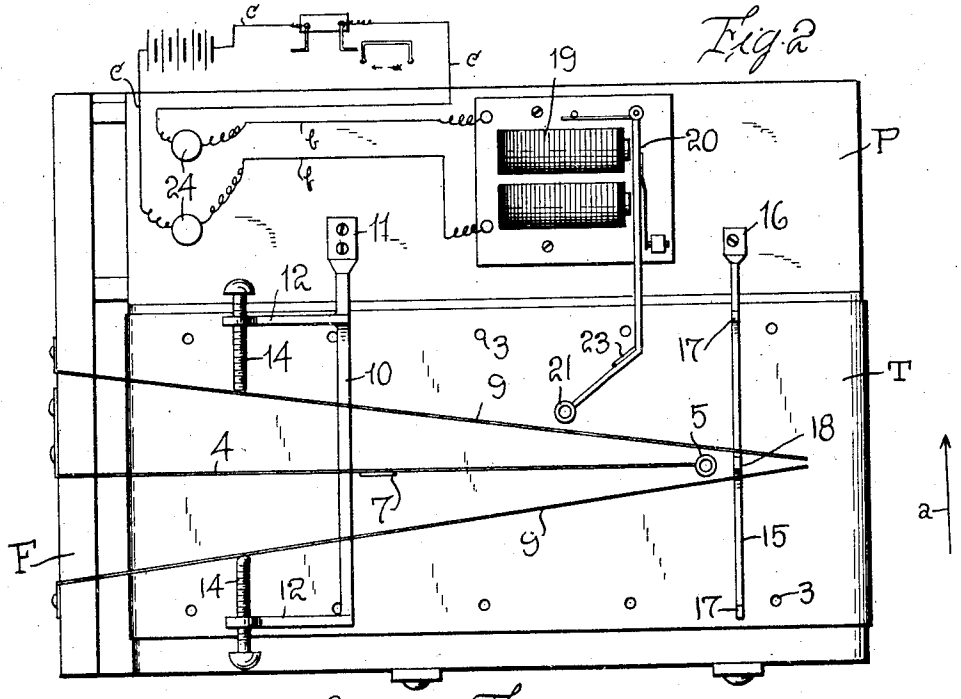


Fig. 7

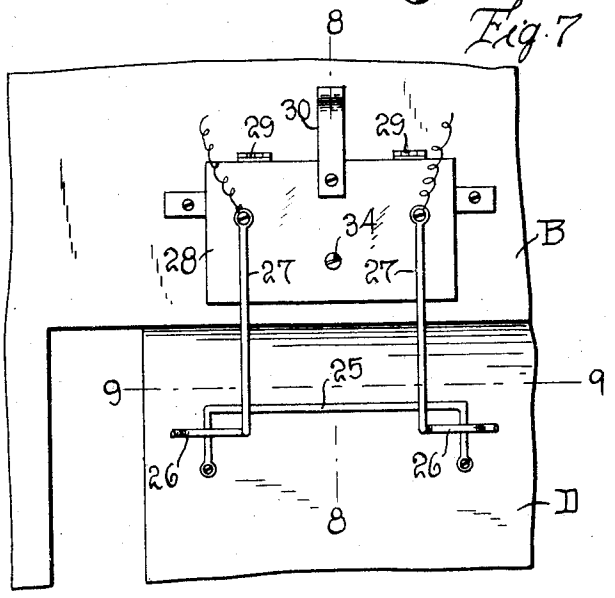


Fig. 8

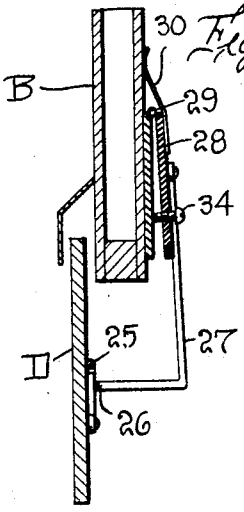
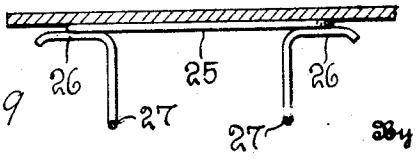


Fig. 9



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3 SHEETS—SHEET 3.

Fig. 3

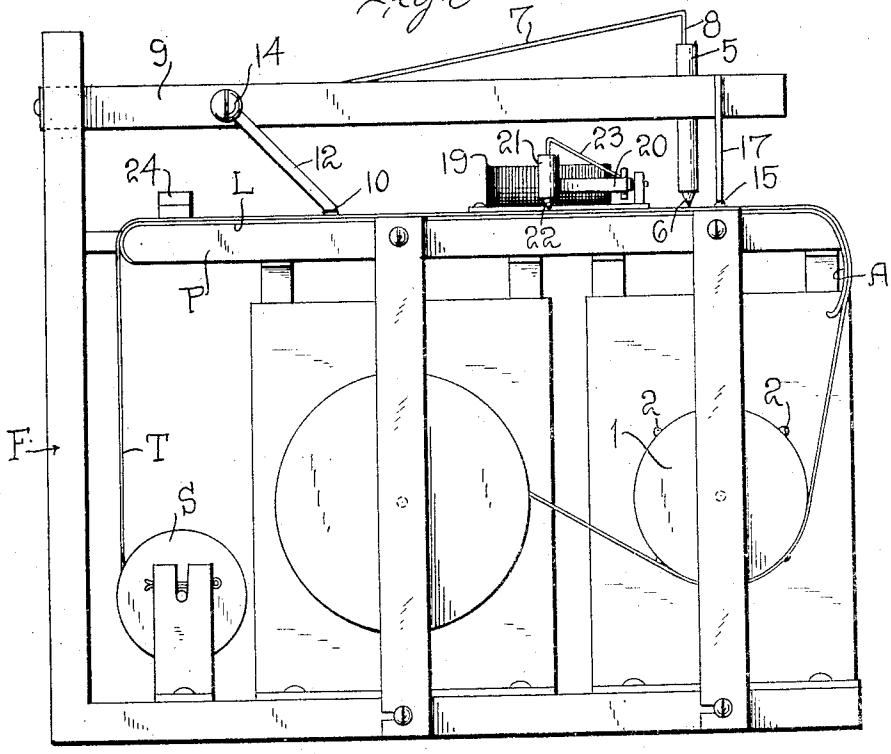


Fig. 4

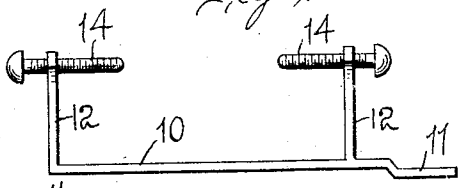


Fig. 5

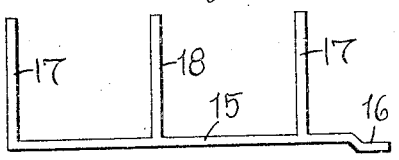


Fig. 10

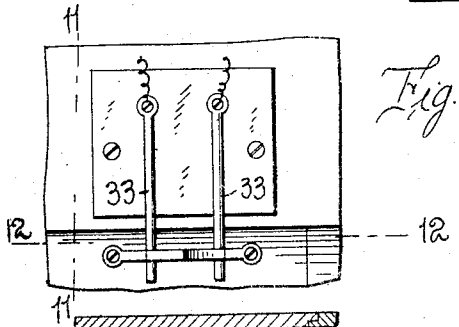


Fig. 11

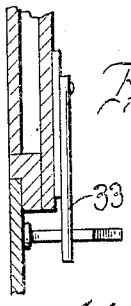
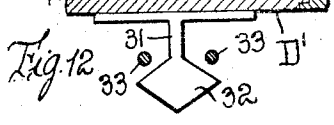


Fig. 12



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UNITED STATES PATENT OFFICE.

EDWARD STOUT, OF OSKALOOSA, AND WADE HAIST, OF BURLINGTON, IOWA.

RECORDER.

1,247,737. Specification of Letters Patent. Patented Nov. 27, 1917.

Application filed January 29, 1917. Serial No. 145,221.

To all whom it may concern:

Be it known that we, EDWARD STOUT and WADE HAIST, citizens of the United States, residing at Oskaloosa, Iowa, and Burlington, Iowa, resp., in the county of Mahaska and Des Moines, resp., and State of Iowa, have invented certain new and useful Improvements in Recorders, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to certain improvements in recorders and it is an object of the invention to provide a device of this general character adapted to be employed in connection with rolling stock and which embodies novel and improved means for recording rough treatment of the stock at the time of switching or in the handling of the train.

The invention also has for an object to provide a novel and improved device of this general character wherein the extent of the shock imposed upon the rolling stock will be recorded together with approximate time so that it may be possible to determine at what locality the record was made.

A still further object of the invention is to provide a device of this general character having novel and improved means whereby a record may be obtained of the opening or closing of the door of a car so that in the event of pilfering a calculation can be made as to the possible location where the act occurred.

The invention also has for an object to provide a novel and improved device of this general character including a movable tape driven at a fixed rate of travel and with which coacts a marking implement mounted for vibration together with means whereby the extent of vibration of the marking implement may be regulated in accordance with the requirements of practice.

The invention consists in the details of construction and in the combination and arrangement of the several parts of our improved recorder whereby certain important advantages are attained and the device is rendered simpler, less expensive and otherwise more convenient and advantageous for use, all as will be hereinafter more fully set forth.

The novel features of the invention will hereinafter be definitely claimed.

In order that our invention may be the better understood, we will now proceed to describe the same with reference to the accompanying drawings, wherein

Figure 1 is a fragmentary view in perspective of the interior of a box car having an embodiment of our invention applied thereto, said embodiment being of somewhat a diagrammatic character;

Fig. 2 is a view in top plan of our improved recorder as herein embodied with the inclosing case removed and with certain of the features disclosed diagrammatically;

Fig. 3 is a view in side elevation of the device as disclosed in Fig. 2 with the circuit closer and the coacting conductors as shown in the preceding figures omitted;

Fig. 4 is a view in elevation of the tension regulating member as herein embodied and employed in connection with certain of the vibratory members;

Fig. 5 is an elevational view of the stop member as herein employed for limiting the extent of movement of certain of the vibratory members;

Fig. 6 is a fragmentary view partly in elevation and partly in section illustrating the mounting for a marking implement as herein included;

Fig. 7 is a fragmentary view in elevation illustrating the circuit closer as herein embodied, and coacting with a door of a car;

Fig. 8 is a sectional view taken substantially on the line 8—8 of Fig. 7;

Fig. 9 is a sectional view taken substantially on the line 9—9 of Fig. 7;

Fig. 10 is a fragmentary elevational view illustrating a modified form of circuit closer and which is particularly adapted for use in connection with a swinging door;

Fig. 11 is a sectional view taken substantially on the line 11—11 of Fig. 10; and

Fig. 12 is a sectional view taken substantially on the line 12—12 of Fig. 10.

As illustrated in the accompanying drawings, B denotes a car body of a box type provided with the sliding doors D of any preferred construction, and C denotes a casing in which is positioned our improved recorder.

Our improved recorder, as is particularly illustrated in Figs. 2 and 3, comprises a suitable supporting structure or frame F including the platform or table P which is horizontally disposed and has traveling over its upper face the tape T. In order to facilitate the travel of the tape T across the platform

or table P we find it of advantage to provide the upper surface of the platform or table with the metallic lining L terminating at the delivery end of the platform or table P in the depending apron A.

The tape T leads from a spool S loosely supported for rotation by the frame F and preferably at a point below the receiving end of the platform or table P. From the table or platform P the tape T passes under a drum 1 operated by a suitable clock mechanism and which is adapted to make one revolution per hour. The opposite end portions of the drum 1 are provided with the outstanding protuberances or teeth 2 adapted to be received within the openings 3 produced in the marginal portions of the tape T. As is herein disclosed, the protuberances or teeth 2 at each end of the drum 1 are spaced apart at an angle of 90° so that the space between adjacent marginal openings 3 is indicative of fifteen minutes of time.

In the practical operation of our invention it is preferred that a trainman identify a marginal opening immediately in advance of a marking implement with the time at which the train starts whereby it will be perceived that the record imposed upon the tape T may be readily calculated from such point, although if preferred the marginal portions of the tape may be provided with time indications. However as this does not constitute an essential feature of our invention, it is thought that a detail illustration thereof is unnecessary.

Suitably anchored to the portion of the frame F above the platform or table P and in advance of the receiving end of said platform or table, is the elongated flat spring 4 which constitutes a vibratory member, and the free end of said spring 4 is provided with the vertically disposed tubular member or sleeve 5 in which is adapted to be inserted a marking implement 6 such as a pencil and which marking implement 6 is maintained in contact with the tape T under the influence of the spring arm 7 suitably secured at one end to the spring 4 at a predetermined point inwardly of the tubular member or sleeve 5 and having its opposite end portion terminating in the depending extension 8 which is disposed within the tubular member or sleeve 5 through the upper end thereof and which contacts with the upper end of the marking implement 6 and serves to constantly urge said member 6 downwardly or in a direction toward the tape T.

It will be at once self-evident that if the car is subjected to undue shock during the handling of the train or in switching, the excessive vibration of the spring 4 will result in the implement 6 making the required record thereof upon the tape T and the extent of said shock may be estimated by the extent of the length of the laterally directed lines upon the tape as produced thereon by the implement 6. It is to be noted at this time that the tape T travels in a direction at right angles to the travel of the car, said travel of the car being in the direction of the arrow as indicated at *a* in Fig. 2 or in the opposite direction.

Arranged substantially in the same horizontal plane as the spring 4 and disposed on opposite sides thereof are the flat springs 9 secured at corresponding end portions to the frame F and which converge toward their outer or free ends and terminate at a point beyond the tubular member or sleeve 5. The springs 9 serve as tensioning members whereby undue vibration of the spring 4 is prevented under normal conditions so that a shock beyond the ordinary is required in order to cause the implement 6 to make a record to indicate said shock.

It has also been found in practice that in order to meet the conditions of travel means must be provided to regulate the tension of the springs 9 and for this purpose we employ the arm 10 which is disposed above and transversely of the tape T and provided at one end portion with the offset foot 11 whereby the arm 10 may be suitably anchored to the platform or table P.

Extending upwardly from the arm 10 adjacent the opposite ends thereof are the posts 12 herein disclosed as arranged on a predetermined incline toward the receiving end of the platform or table P. The posts 12 are positioned outwardly of the springs 9 and threaded through the upper portions of said posts 12 are the screws 14 adapted to contact with the springs 9 in a manner and for a purpose which is believed to be clearly apparent to those skilled in the art to which our invention appertains.

We also find it of particular importance to provide means whereby the extent of the relative movements of the springs 9 may be limited and for which reason we employ the arm 15 disposed transversely of the tape T adjacent the free ends of said springs 9 and as herein disclosed the arm 15 has the offset foot 16 to afford means whereby the same may be suitably anchored to the platform or table P.

Extending upwardly from the arm 15 adjacent its opposite ends are the vertical posts 17 which serve to limit the outward relative movements of the springs 9, and extending upwardly from the arm 15 at substantially the transverse center of the tape T and in alinement with the spring 4, when inactive, is the post 18 which extends between the free end portions of the springs 9 and serves to prevent said springs from operating one against the other. It will also be self-evident that by limiting the outward relatives movements of the springs 9 the

marking implement 6 is prevented from passing beyond a marginal portion of the tape T.

It is also the purpose of our device to make a record of the opening or closing of a car door and as herein embodied we mount upon the platform or table P at one side of the tape T the electromagnet 19 with which coöperates the armature 20 which constitutes a vibratory member. The armature 20 overlies the tape T and has its outer or free end also provided with the vertically disposed tubular member or sleeve 21 in which is adapted to be arranged a marking implement 22 preferably of the same character as the marking implement 6 hereinbefore referred to. The marking implement 22 within the tubular member or sleeve 21 is also adapted to be constantly urged in a direction toward the tape T through the medium of a spring arm 23 of substantially the same character as the spring arm 7 hereinbefore referred to. As is particularly disclosed in Figs. 2 and 3, it will be noted that the spring arm 23 is carried by the armature 20.

The platform or table P is provided with the binding posts 24 of a conventional type and which are electrically connected with the electromagnet 19 through the medium of the conductors *b*.

Each of the doors D has secured to the inner surface thereof adjacent the top, the stationary contact member 25 substantially in the form of an inverted U and the side arms of said contact 25 are adapted to be engaged by the lateral extensions 26 of the spaced spring arms 27 depending from the plate 28 hingedly connected, as at 29, to the inner face of the side wall of the body B above the door opening. The plate 28 is constantly urged toward the wall of the car through the medium of the flat spring 30 as is particularly illustrated in Figs. 1, 7 and 8.

The pairs of spring arms 27 are electrically connected in parallelism through the medium of the conductors *c* with the binding posts 24 hereinbefore referred to. When a door is in closed position the side arms of the contact member 25 are out of contact with the extensions 26 but when the door is open it will be perceived that the extensions 26 will be brought into engagement with the side arms of the contact 25 and resulting in a closing of a circuit which will cause the armature 20 to vibrate and thus make a record upon the tape T that the door has been opened. Should the opening of the door be unauthorized the approximate time of the occurrence may be readily calculated and the approximate point on the line at which the opening occurred can also be calculated as the location of a car can always be determined if the time is given.

While the marking implement 22 serves to record the unauthorized opening of a car door, it also serves to record any opening of the car but as the time of an authorized opening can be readily determined it will at once be self-evident that an unauthorized opening of a door can be discovered with equal facility by an inspection of the record upon the tape T.

In order that no confusion may be caused by the record of the marking implements 6 and 22, it is to be noted particularly in Fig. 2 that the marking implements 6 and 22 are arranged in parallel planes longitudinally of the platform or table P.

In the form of our invention illustrated in Figs. 10, 11 and 12, we show an arrangement whereby a circuit may be closed for operating the armature 20 when a car is provided with a swinging door. As set forth in these figures a swinging door D′ is provided with the inwardly directed member 31 having its outer end portion provided with the head 32 substantially diamond-shape in top plan.

Depending from the portion of the side wall of the car above the door opening are the spaced parallel spring arms 33 adapted to be electrically connected with the electromagnet 19′. When the door D′ is in closed position the spring arms 33 are arranged inwardly of the head 32 but upon the door D′ being swung into open position, the head 32 is brought into contact with the arms 33 whereby the requisite electrical circuit is closed. A circuit will also be closed when the door D′ is swung into closed position.

Referring back to the form of our invention as particularly disclosed in Figs. 7 and 8, it is to be noted that the plate 28 which is preferably of insulating material, has threaded therethrough the set screw 34 and which affords a means for regulating the limit of movement of the arms 27 toward the door D.

From the foregoing description, it is thought to be obvious that a recorder constructed in accordance with our invention is of an extremely simple and comparatively inexpensive nature and is particularly well adapted for use by reason of the convenience and facility with which it may be assembled, and it will also be obvious that our invention is susceptible of some change and modification without material departure from the principles and spirit thereof and for this reason we do not wish to be understood as limiting ourselves to the precise arrangement and formation of the several parts herein shown in carrying out our invention in practice, except as hereinafter claimed.

We claim:

1. A device of the character described comprising a table, means for moving a receiving element across said table, a vibratory member positioned above the table, a marking implement carried by the vibra-

tory member, tensioning members positioned at opposite sides of the vibratory member and normally free of the vibratory member for controlling the vibration thereof, and means for regulating the tension of said last named members.

2. A recorder comprising a table, means for moving a receiving member over said table, a vibratory member positioned above the table, a marking implement carried by the vibratory member, and springs positioned at opposite sides of the vibratory member and converging toward said vibratory member, said springs being normally free of engagement with the vibratory member.

3. A recorder comprising a table, means for moving a receiving member over said table, a vibratory member positioned above the table, a marking implement carried by the vibratory member, springs positioned at opposite sides of the vibratory member and converging toward said vibratory member, and means for limiting the movement of the springs.

4. A recorder comprising a table, means for moving a receiving member over said table, a vibratory member positioned above the table, a marking implement carried by the vibratory member, springs positioned at opposite sides of the vibratory member and converging toward said vibratory member, said springs being normally free of engagement with the vibratory member and means for limiting the movement of the springs in opposite directions.

5. A recorder comprising a table, means for moving a receiving member over said table, a vibratory member positioned above the table, a marking implement carried by the vibratory member, springs positioned at opposite sides of the vibratory member and converging toward said vibratory member, said springs being normally free of engagement with the vibratory member, and an endwise adjustable member coacting with each of the springs for regulating the tension thereof.

6. A device of the character described comprising a table, means for moving a receiving element across said table, a vibratory member positioned above the table, a marking implement carried by the vibratory member, springs positioned at opposite sides of the vibratory member and converging toward said vibratory member and terminating in advance thereof, and means coacting with the portions of the springs in advance of the marking element for limiting the movement thereof.

7. A device of the character described comprising a table, means for moving a receiving element across said table, a vibratory member positioned above the table, a marking implement carried by the vibratory member, springs positioned at opposite sides of the vibratory member and converging toward said vibratory member and terminating in advance thereof, an arm supported by the table and underlying the free end portion of the springs, and upstanding posts carried by the opposite end portions of the arm for limiting the outward movement of the springs.

8. A device of the character described comprising a table, means for moving a receiving element across said table, a vibratory member positioned above the table, a marking implement carried by the vibratory member, springs positioned at opposite sides of the vibratory member and converging toward said vibratory member and terminating in advance thereof, an arm supported by the table and underlying the free end portion of the springs, an upstanding post carried by the arm and positioned intermediate the free end portions of the springs for limiting the inward movement of the springs.

9. A device of the character described comprising a table, means for moving a receiving element across said table, a vibratory member positioned above the table, a marking implement carried by the vibratory member, springs positioned at opposite sides of the vibratory member and converging toward said vibratory member and terminating in advance thereof, an arm carried by the table and underlying the springs, upstanding posts carried by the arms, and endwise adjustable members carried by the arms, and co-acting with the springs for controlling the tension thereof.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

EDWARD STOUT.
WADE HAIST.

Witnesses:
W. H. KALBACH,
ED. A. BOWEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."