E. B. McCORMICK.

RECORDER.

APPLICATION FILED JAN. 8, 1917.

1,266,292.

Patented May 14, 1918.

3 SHEETS—SHEET 1.

Fig. 1.

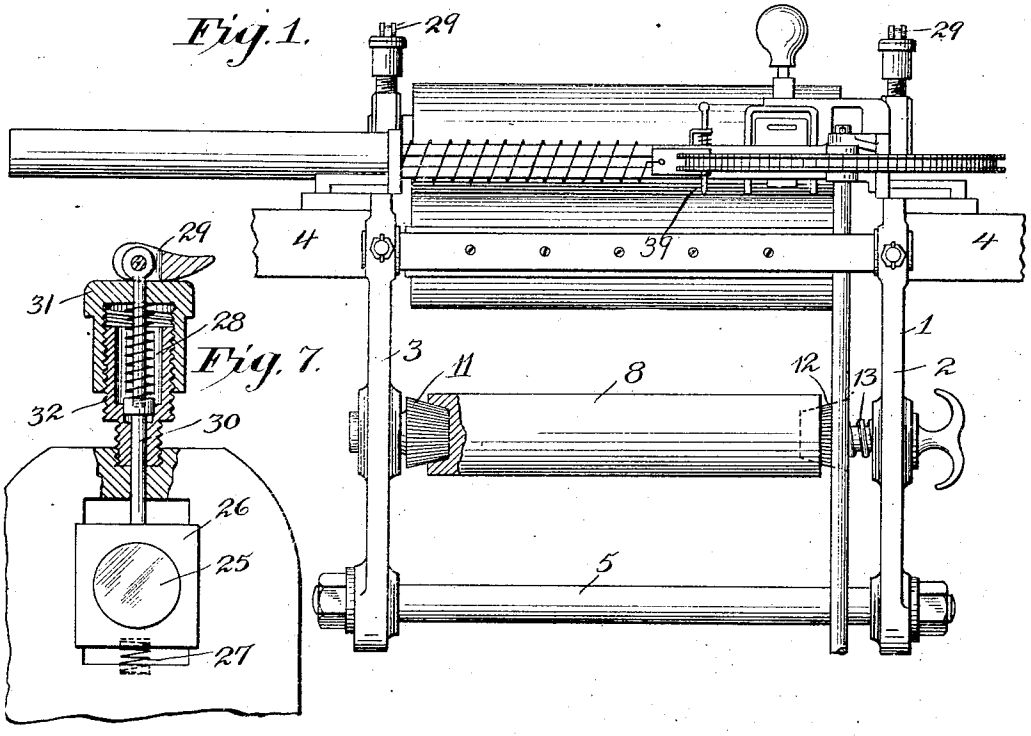

Fig. 7.

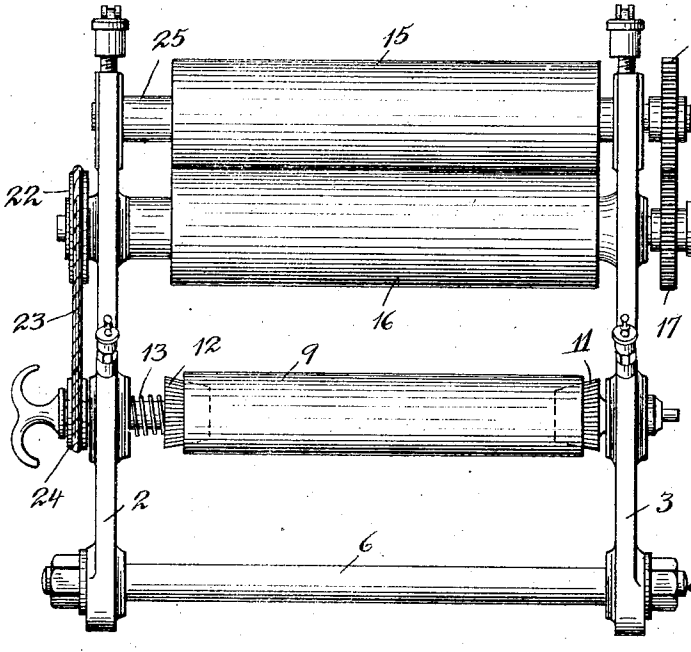

Fig. 2.

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3 SHEETS—SHEET 2.

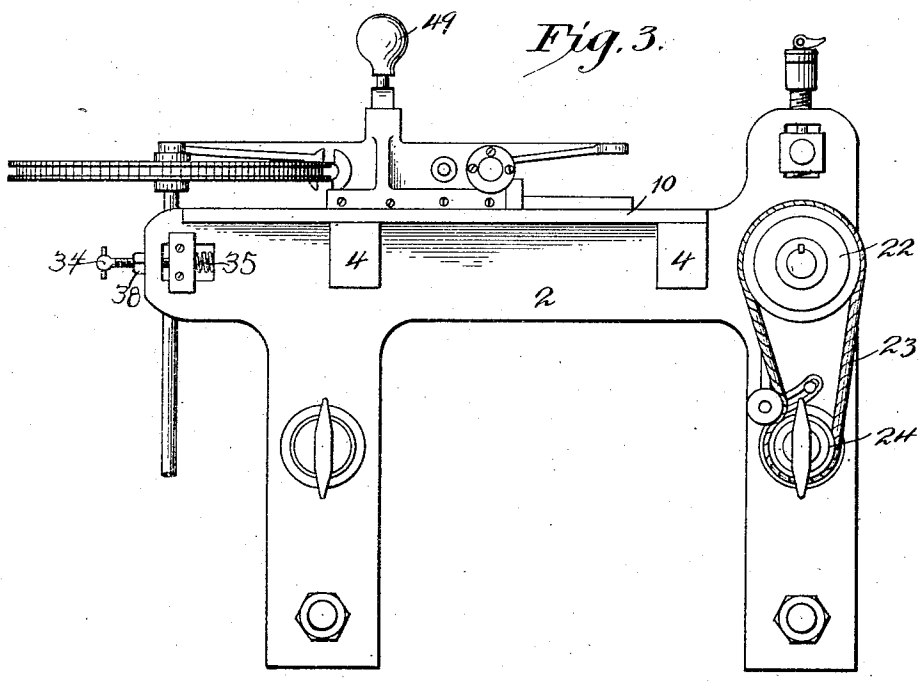

Fig. 3.

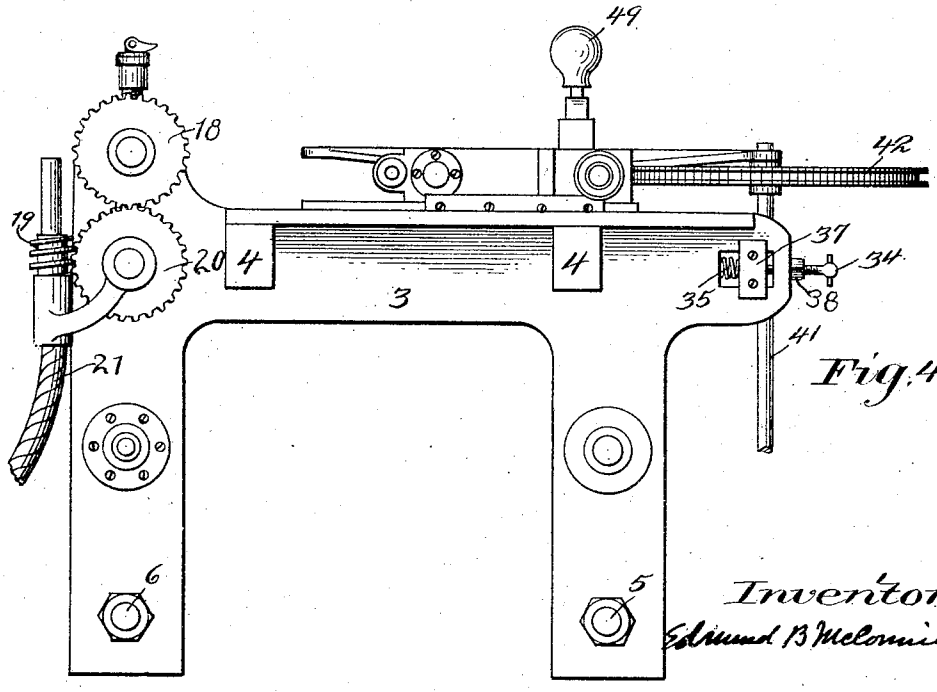

Fig. 4.

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3 SHEETS—SHEET 3.

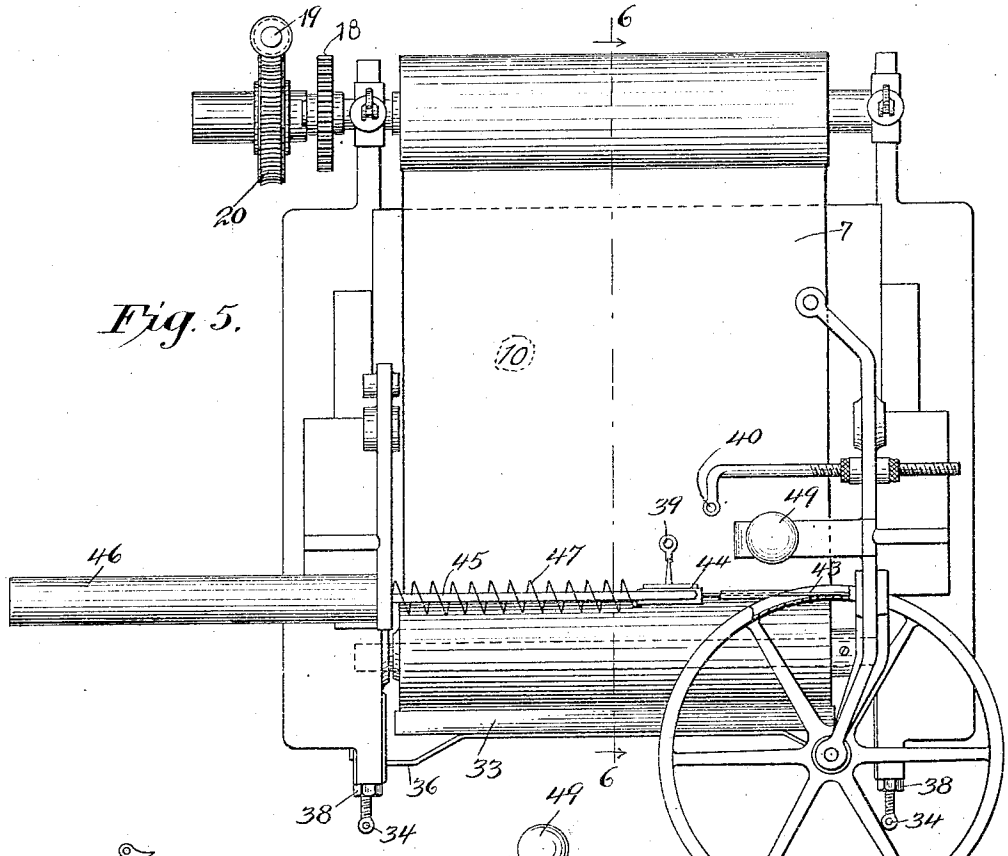

Fig. 5.

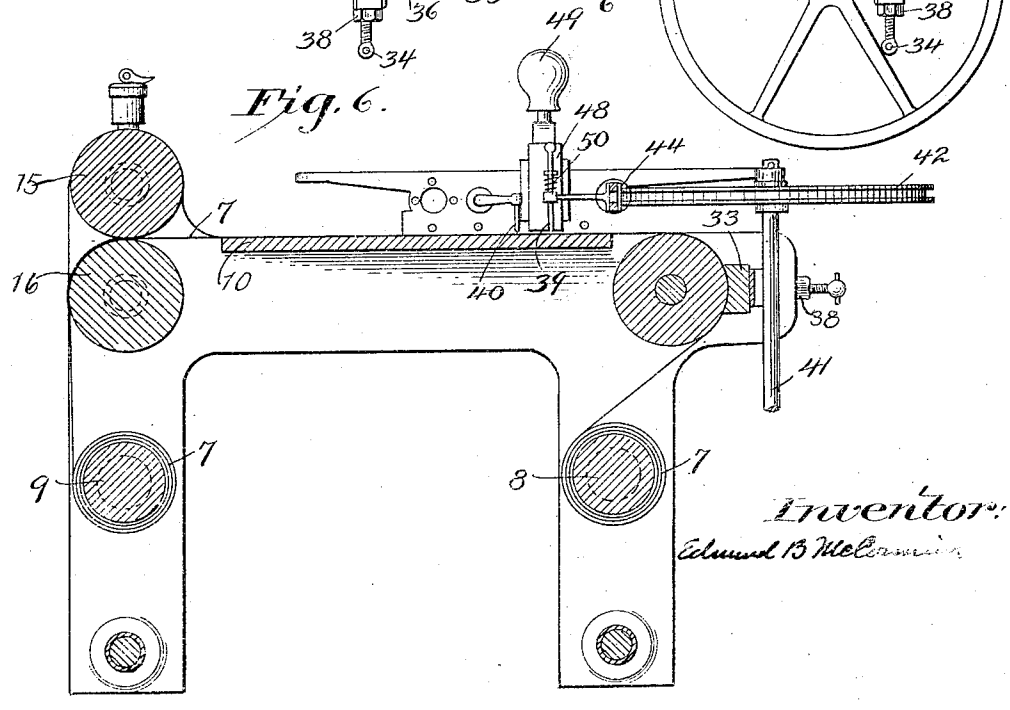

Fig. 6.

Inventor:

Edmund B McCormick

UNITED STATES PATENT OFFICE.

EDMUND B. McCORMICK, OF MANHATTAN, KANSAS.

RECORDER.

1,266,292. Specification of Letters Patent. Patented May 14, 1918.

Application filed January 8, 1917. Serial No. 141,352.

(DEDICATED TO THE PUBLIC.)

To all whom it may concern:

Be it known that I, EDMUND B. McCORMICK, a citizen of the United States of America, and an employee of the Department of Agriculture of the said United States, and a resident of the town of Manhattan, county of Riley, State of Kansas, (whose post-office address is Washington, D. C., have invented new and useful Improvements in Recorders.

This application is made under the act of March 3, 1883, chapter 143 (22 Stat., 625), and the invention herein described and claimed may be used by the Government of the United States or any of its officers or employees in the prosecution of work for the Government, or any person in the United States, without payment to me of any royalty thereon.

This invention relates to recorders and is intended to be suitable for use with dynamometers and similar apparatus.

An object of the invention is to provide a recorder in which the paper shall be evenly and uniformly propelled across the table for the reception of the record.

A further object of the invention is to place uniform tension upon the paper that the same may be fed evenly across the table.

A further object of the invention is to provide ready means for the placing upon the recorder and removing therefrom the paper which is to receive the record; also to provide means which will roll up the used paper efficiently whether the roll be large or small.

A further object of the invention is to provide an improved stylus mechanism for producing the record and in combination therewith means for marking portions of the record curve with a view to their indentification.

For a complete understanding of the invention attention is called to the following description when read in connection with the drawings accompanying and forming a part of these specifications in which like reference characters refer to like parts and in which:

Figures 1 and 2 are end views of the device;

Figs. 3 and 4 are side views taken from the right-hand and left-hand, respectively, of the device as shown in Fig. 1;

Fig. 5 is a plan view;

Fig. 6 is a section on section line 6, 6, of Fig. 5; and

Fig. 7 is a detail partly in section.

The device is supported on a frame, 1, which comprises side plates, 2, 3, and a table plate, 10. The frame of the device may be supported upon supports, 4. Plates 2 and 3 are spaced at the bottom by bolts, 5, 6, properly equipped with lock nuts.

The record is preferably received upon metallized paper indicated at 7, and is held upon the machine before use upon feed roll 8, and after use is wound upon roll 9. For the ready placement and removing of the paper rolls, the rolls as received from the factory with a hollow center are placed upon the frusto-conical bearings, 11, 12. Of these, bearings 11 are stationary, while bearings 12 may be moved longitudinally against the resistance of springs, 13, for the purpose of the removal of the rolls. The paper is drawn across the table by means of rolls, 15, 16, which are driven by pinions, 17, 18, which in turn are driven by worm and wheel, 19, 20, and flexible shaft, 21. Flexible shaft, 21, is driven in any suitable manner preferably by the mechanism of the vehicle with which the recorder is designed to be used. Roll 16 bears upon the end of its shaft a pulley wheel, 22, driving by means of belt, 23, a pulley wheel, 24, provided upon the movable bearing, 12, of winding roll, 9. The result of this arrangement is that when rolls 15, 16 are caused to revolve thereby drawing the paper between them, winding roll 9 will be caused to revolve. Supposing that the speed of the roll when nearly empty is just sufficient to take up the paper as fed between rolls 15, 16, then when roll 9 became nearly full of paper its speed of revolution would be too great for the speed of paper coming through rolls 15, 16. However, since the drive of roll 9 is the belt and pulley referred to, slippage will occur which will not cause too great tension upon the paper and will merely wind the same firmly upon roll 9.

In order that rolls 15, 16 may place tension

upon the paper substantially uniformly throughout its breadth, individual tension is placed upon each end of the shaft carrying roll 15. To accomplish this, shaft 25, upon which roll 15 is carried, is supported in sliding journals, 26, which journals are supported upon springs, 27. Pressure is placed upon these journals by means of spring 28, and when movement of the paper is to stop, or when the machine is to be threaded with a new supply of paper, cams 29 are turned into an upright position thereby raising pin 30 which normally transmits the pressure of spring 28 to the movable journal. The pressure of spring 28 upon the journal is adjusted by turning housing 31 about its axis thereby screwing the same up or down upon the screw threads 32, as clearly indicated in Fig. 7. The result of this provision for tension is that the paper, even if thinner at one edge than the other, will be evenly drawn across the table and wound upon roll 9.

To place tension upon the paper, brake 33, shown in Figs. 4, 5 and 6, is provided, which brake is adjusted by means of screws 34 against the compression of springs 35. The springs, 36, which carry the brake, 33, are supported in blocks, 37, as indicated in Fig. 4. To maintain the screws 34, in their adjusted position, lock nuts, 38, are provided.

The lines formed upon the paper are produced by any suitable marking means, 39, 40, but I prefer to use for this purpose sharpened brass pins. Pin 40 is a stationary pin and is for the purpose of establishing a base line from which the indications of pin 39, which is the dynamometer record pin, will move to and fro to indicate the amount of power transmitted by the dynamometer.

The dynamometer (not shown) is connected with a shaft, 41, by suitable universal joints or flexible shafting. As the dynamometer yields to the force applied, shaft 41 will be turned and with it will turn wheel 42. Attached to said wheel, 42, is a flexible steel band, 43, which steel band is attached to block 44 sliding upon a rectangular slotted shaft, 45. Shaft 45 is rigidly fixed in cylinder 46, and acts not only as the guide and support for block 44, but also to support spring 47, which is secured at one end within cylinder 46 and at the other end to block 44, and is placed under tension sufficient to draw block 44 toward the cylinder far enough to indicate the greatest power expected to be applied by the dynamometer. Spring 47 is held normally under tension and is allowed to contract when force is transmitted by the dynamometer instead of being normally retracted and having tension applied to it by action of the dynamometer. The result of this arrangement is that any lost motion of the connections between the pin carrying block 44 and the dynamometer, is normally held up to its extreme position in one direction and more accurate records result. As block 44 is allowed to move under the influence of the dynamometer the same carries with it pin 39, above referred to, thereby tracing upon the paper the record desired. A numbering engine, 48, or other indicating mechanism of the nature is supported upon plate 2 rigidly so that a blow upon the handle, 49, will stamp the character upon the paper fastened beneath. When the vehicle equipped with the mechanism passes any point which is marked by some conspicuous object, as a road crossing, culvert, public building, etc., the handle, 49, may be struck and the number or character stamped upon the paper may be entered upon a notebook by an attendant, and in this manner the indications given by the record may be "tied down" so that particular portions of the road may be identified with particular portions of the record. A gradometer may also be attached to the device in any suitable manner if desired.

Pins 39 and 40 may be adjusted in their supports by screw threads, and are given a slight pressure upon the paper by means of springs 50.

What I claim as my invention is:

1. A recorder comprising means for holding unused paper, means for winding used paper, means comprising a pair of rollers independently spring pressed together at their respective ends for withdrawing paper from said holding means and friction means for operating said winding means whereby undue speed of winding due to growth in amount of used paper may be compensated for by slippage and a table across which said paper is drawn.

2. In a recorder in combination, paper supply holding means, paper receiving means, paper propelling means comprising rolls independently adjustably spring-pressed together at their respective ends and means independent of the spring adjustment for removing the pressure of the springs.

3. In a recorder in combination, paper supply holding means, paper propelling means and a tension device comprising means about which the paper is drawn, a brake to press the paper against said last named means each end of said brake being adjustably spring-pressed toward said means.

4. In a recorder, record paper supporting means, a stylus for coaction with record paper, stylus controlling means comprising a cylinder, a slotted shaft projecting from said cylinder, a spiral spring surrounding said shaft and fixed at one end within said

cylinder, a block connected to said spring supporting said stylus and sliding upon said slotted shaft and means holding said spring normally under tension and adapted to be actuated by a dynamometer to allow said spring to contract and move said marker.

In testimony whereof, I affix my signature in the presence of two subscribing witnesses.

EDMUND B. McCORMICK.

Witnesses:
A. M. DANIELS,
LAWRENCE L. BEEBE.