No. 860,386. PATENTED JULY 16, 1907.

W. H. JORDAN.

PAPER RULING MACHINE.

APPLICATION FILED JUNE 1, 1904.

3 SHEETS—SHEET 1.

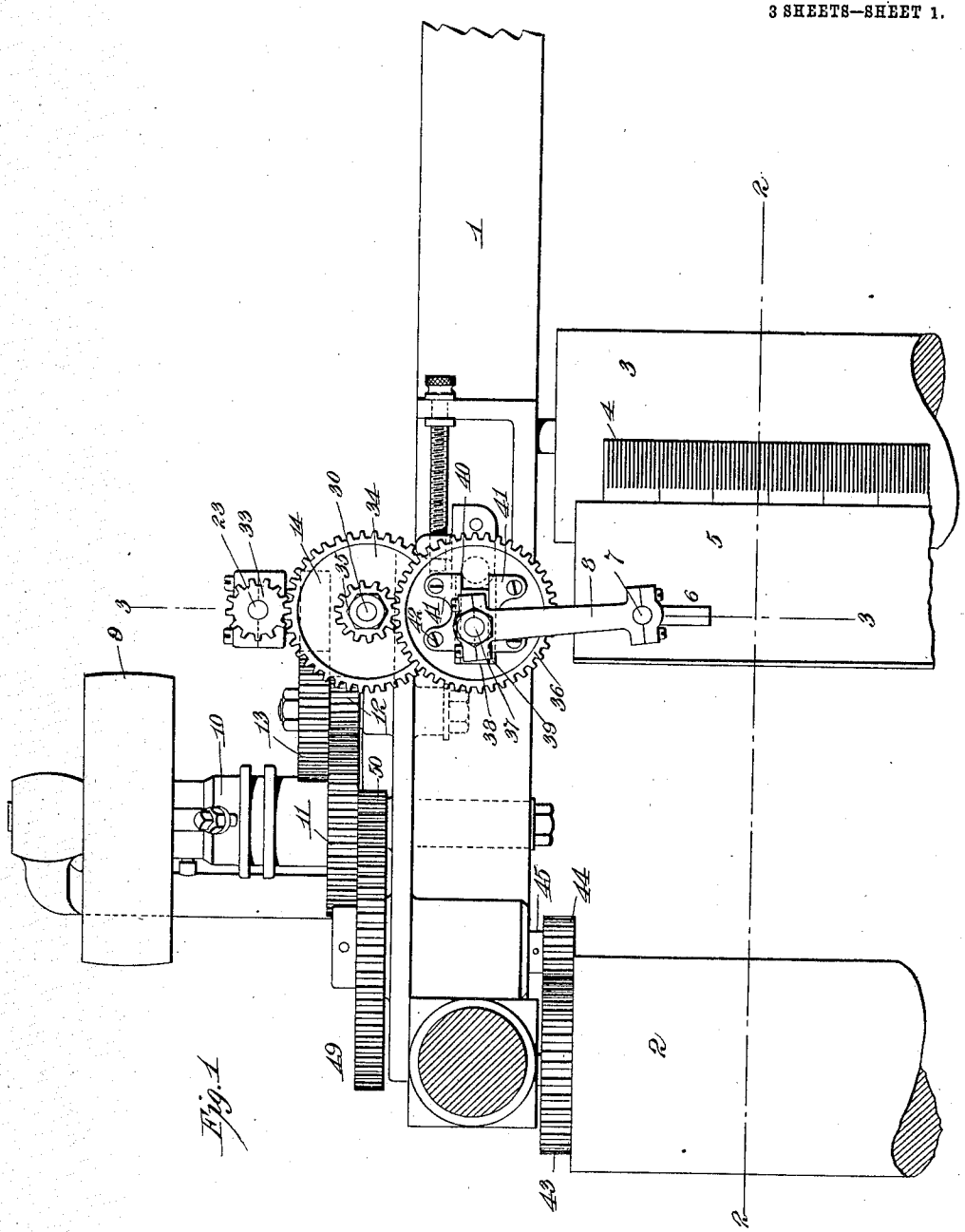


Fig. 1.

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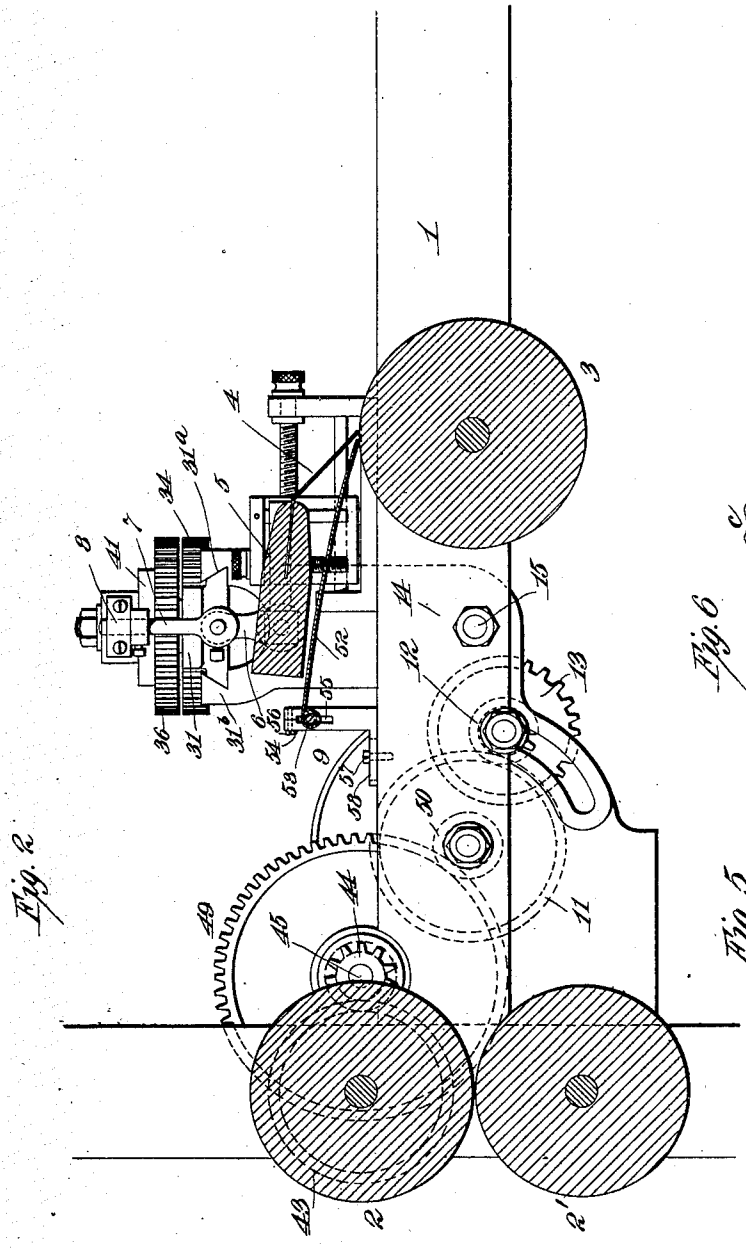


Fig. 2

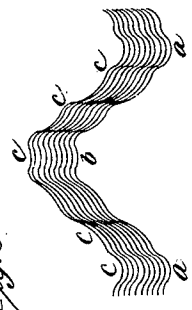


Fig. 6



Fig. 5

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3 SHEETS—SHEET 3.

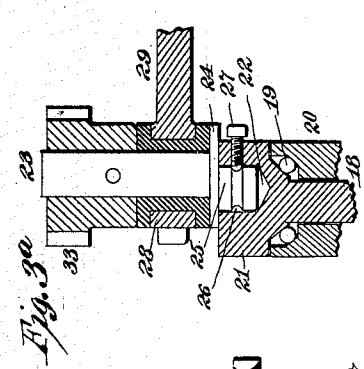


Fig. 3a

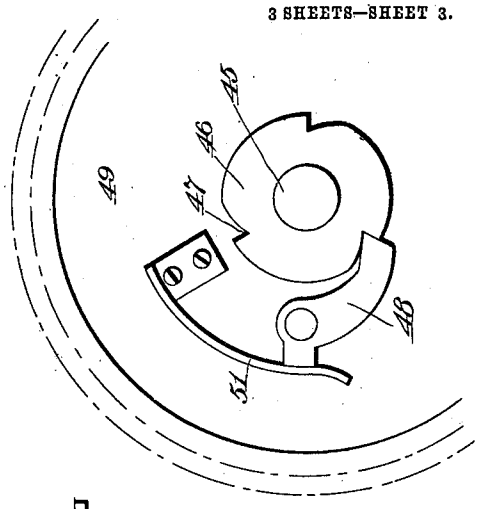


Fig. 4

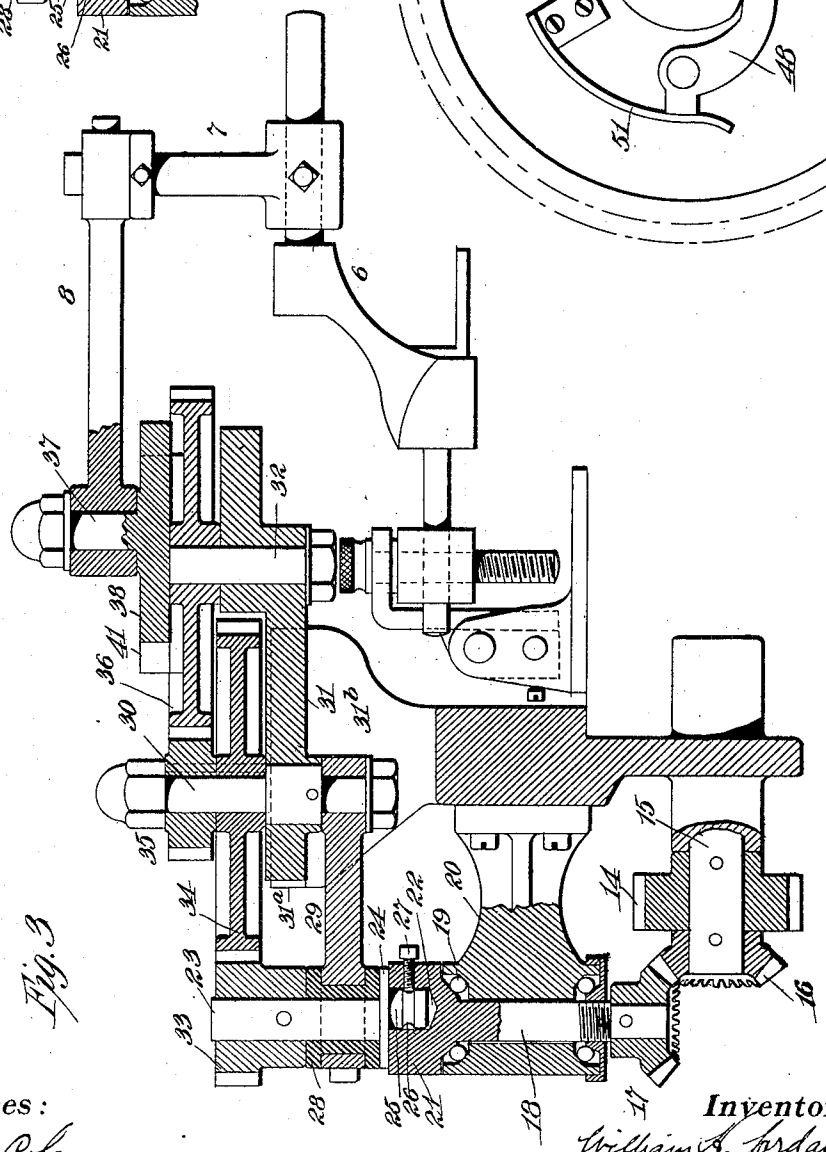


Fig. 3

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UNITED STATES PATENT OFFICE.

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PAPER-RULING MACHINE.

No. 860,386. Specification of Letters Patent. Patented July 16, 1907.

Application filed June 1, 1904. Serial No. 210,661.

To all whom it may concern:

Be it known that I, WILLIAM H. JORDAN, a citizen of the United States, residing in New York city, county, and State of New York, have invented a certain new and useful Improvement in Paper-Ruling Machines, of which the following is a specification.

This invention relates to improvements in machines for ruling paper with sinuous lines for the purpose of making checks, stock certificates, bonds, etc., such paper being generally known as safety paper.

The object of the invention is to produce means whereby the amount and character of the oscillations may be varied as desired, so that an endless number of designs may be made.

Another object of the invention is to produce a device which will make a pattern of novel character the said pattern being characterized by a complex movement of the pens.

Other objects are to produce a ruling machine within which sheets of paper may very readily be introduced to the action of the pens.

Other objects relate to details of construction as will more fully appear in the following specification.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which

Figure 1 is a top view of a portion of a ruling machine, partly in section, showing the mechanism for oscillating the pens. Fig. 2 is a sectional view thereof, taken on the lines 2—2 of Fig. 1. Fig. 3 is an enlarged sectional view taken on the lines 3—3 of Fig. 1. Fig. 3^a is a view of a portion of the mechanism illustrated in Fig. 3, showing the parts in a different position. Fig. 4 is a face view of the driving clutch. Fig. 5 is a view of ruled lines made with one eccentric in operation; and Fig. 6 is a view of lines made with both eccentrics in operation.

Like parts are designated by the same reference characters.

In carrying out my invention, I provide the usual ruling machine, of which a side frame 1 and feed rollers 2, 2′ and guide roller 3 is shown. The pens 4 are supported upon a board 5 in the usual manner so that they may be reciprocated, and is provided with an arm 6 and adjustable pin 7 thereon, to which the pitman 8 is attached. Means is provided to oscillate this pitman such means giving, if desired, a complex movement to the pen support 5. This means comprises the driving pulley 9 provided with a clutch 10 and a gear wheel 11. The gear 11 meshes with a pinion 12, carrying a gear 13 supported upon a stub shaft. The gear 13 meshes with a pinion 14 carried by the stub shaft 15. The pinion 14 is connected to and drives a beveled pinion 16, which meshes with a beveled pinion 17, carried by a vertical shaft 18. The shaft 18 is mounted in ball bearings 19 within a bracket 20 secured to the frame 1 of the machine. The upper portion of the shaft 18 is enlarged at 21 as shown, and is provided with a circular opening 22 such opening being eccentrically arranged in relation to the shaft 18. Upon the upper surface of the enlargement 21 rests a shaft 23 having a flange 24 at the bottom and a short stub shaft 25, preferably, though not necessarily, integral therewith. The stub shaft 25 is eccentrically arranged with relation to the shaft 23 and is provided with a groove 26 within which engages the locking bolt 27 which passes through a threaded opening in the enlargement 21 of the shaft 18. The stub shaft 25 is prevented from turning in the opening 22 by the engagement of the locking bolt 27. The shaft 25 may be turned within the opening 22 by first loosening the bolt 27 and the amount of eccentricity of the shafts 23 and 18 may be then adjusted. Both shafts are in line, as shown in Fig. 3, and there is no eccentricity, and in Fig. 3^a the shaft 23 is shown as adjusted as far to one side as possible, so that the maximum eccentricity is secured. The shafts 18 and 23 and the stub shaft opening and lock bolt form an adjustable eccentric, which I term the main eccentric.

The shaft 23 is mounted within a bearing 28 carried by a pitman 29, the bearing serving to connect the shaft to the pitman. Upon the pitman 29 is a stub shaft 30, and upon the shaft 30 is a plate 31 provided with a stub shaft 32. The plate 31 is provided with beveled bearing faces which engage with correspondingly shaped ways 31^a formed in a support 31^b carried by the frame 1. The stub shaft 30 serves as a pin for the attachment of the pitman 29 to the plate 31, and by means of which it may be oscillated. Above the bearings 28 on the shaft 23 is a pinion 33, which engages with and rotates a gear 34 mounted on the shaft 30. This gear is connected to and rotates a pinion 35 on the same shaft and engages with a gear 36 carried by the shaft 32. The gear 36 is provided with an adjustable crank pin to which is attached the pitman 8. The crank pin 37 is provided with a base 38 having dove-tailed side edges 39 which engage within ways 40 formed upon the plates 41—41. The plates 41—41 are secured to the face of the gear 36 by screws 42 by means of which they may be loosened and the base 31 moved from one side to the other of the center of the gear and the throw of the pin 37 thereby adjusted thus forming an adjustable eccentric, which I term the auxiliary eccentric.

The roller 2 is provided with a gear 43 which is engaged with and rotated by a pinion 44 carried by a shaft 45 mounted in bearings in the side frame 1. The other end of the shaft 45 is provided with a ratchet gear 46, having teeth 47 which are engaged by a dog 48 carried by a gear 49. This gear is rotated by engagement with a pinion 50 attached to or formed inte-

gral with the gear 11 and rotated thereby. The dog 48 is held in engagement with one of the teeth 47 by a spring 51. By this construction the feed roller 2 will be positively rotated by the pulley 9 at the proper speed, but owing to the dog 48 and ratchet 46, the roller 2 may be manually turned to feed the paper forward without actuating the oscillating mechanism.

The operation of the device is as follows:—The paper is introduced between the rollers 2, 2′ in the usual manner and is fed upon the cords, not shown, to the roller 3, and in position to be in engagement with the pens 4, as before described, the pawl and ratchet mechanism allowing the roll 2 to be rotated in the proper direction to permit this being done. The gear wheels being started by the application of the clutch 10, the gears will be rotated, rotating the shaft 18 and oscillating the pen support 5 as depends upon the adjustment of the amount of throw of the main and auxiliary eccentrics.

As shown in Fig. 3, the main eccentric is so adjusted that there is no lateral movement of the shaft 23. If the auxiliary eccentric is adjusted so that there will be no movement of the shaft 37, the pen support will be oscillated solely by the main eccentric, producing the pattern indicated in Fig. 5. If the main eccentric be arranged as shown in Fig. 3ª so as to give an oscillatory movement to the shaft 23, and the auxiliary eccentric arranged to give an oscillatory movement to the shaft 37, the auxiliary eccentric will be bodily moved from side to side and at the same time will impart its own oscillations to the pen support. Owing to the reduction in speed caused by the gears 34 and 35 and 36, the pin shaft 37 will be oscillated by the main eccentric many times more than by the auxiliary eccentric. The pattern illustrated in Fig. 6 will thereby be produced, the long oscillation indicated from *a* to *b* being made by the auxiliary eccentric, and the shorter oscillations *c* being made by the main eccentric.

The two eccentrics being adjustable, from no throw to the maximum, the pattern traced on the paper may be varied infinitely and may consist of small oscillations made by the main eccentric, large oscillations made by the auxiliary eccentric and an infinite number of combinations of the two.

By supporting the shaft 18 in ball bearings and forming the two rows of balls at some distance apart as shown, the system of arms and gears actuated by the shaft 18 will not be subject to minor oscillations, caused by the scraping of the gear teeth together, etc. The shaft 18 will run smoothly as the use of ball bearings permits the cones to be adjusted closely to the balls, and side play will be prevented.

In order to assist in holding the paper smoothly over the roller 3, while in engagement with the pens, I may provide a plate 52. This plate is pivoted at 53 preferably to a standard 54 secured to each of the side beams 1. The plate may be adjusted vertically by having its supporting pivot 53 passed through a slot 55 in the standard 54, such slot being provided with a screw 56 for clamping the pivot in place. The standard may be secured to the side beams by bolts 57 which enter slots 58 in the standards and permit adjustment in a horizontal direction.

The invention may be modified in many ways. As an example, one of the eccentrics may be omitted and the oscillatory movement of the pens made entirely by one eccentric, this eccentric being adjustable as to throw.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a ruling machine, the combination with means for relatively moving the paper and pens to produce lines. eccentrics, one eccentric being bodily moved by another, for oscillating the pens, such oscillating movements being compounded of a plurality of movements.

2. In a ruling machine, the combination with means for relatively moving the paper and pens to produce lines, eccentrics, the eccentrics being moved at different rates of speed, one eccentric being bodily moved by another, for oscillating the pens, such oscillating movements being compounded of a plurality of movements.

3. In a ruling machine, the combination with means for relatively moving the paper and pens to produce lines, eccentrics, said eccentrics being adjustable as to throw, one eccentric being bodily moved by another for oscillating the pens, such oscillating movements being compounded of a plurality of movements.

4. In a ruling machine, the combination with means for relatively moving the paper and pens to produce lines, eccentrics, the said eccentrics being rotated at different rates of speed and being adjustable as to throw, one eccentric being bodily moved by another, for oscillating the pens such oscillating movements being compounded of a plurality of movements.

5. In a ruling machine, the combination with feeding rolls, means for rotating the rolls, and a pen beam operated by the rotating means, of a clutch between the feeding rolls and the pen beam, to permit the rolls to be rotated without producing movement of the pen beam.

6. In a ruling machine, the combination with feeding rolls, means for rotating the rolls, and a pen beam operated by the rotating means, of a ratchet clutch between the feeding rolls and pen beam, to permit the rolls to be rotated without producing movement of the pen beam.

7. In a ruling machine, the combination with a main eccentric, means for rotating it, and means for varying its throw, of an auxiliary eccentric oscillated by the main eccentric and connected therewith for oscillating the pens, and means for varying the throw of the eccentric.

This specification signed and witnessed this twentieth day of May, 1904.

WILLIAM H. JORDAN.

Witnesses:
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