

March 27, 1928.

1,663,726

J. PFEIFER

ADDING MACHINE

Filed Dec. 8, 1924

2 Sheets-Sheet 1

Fig. 1

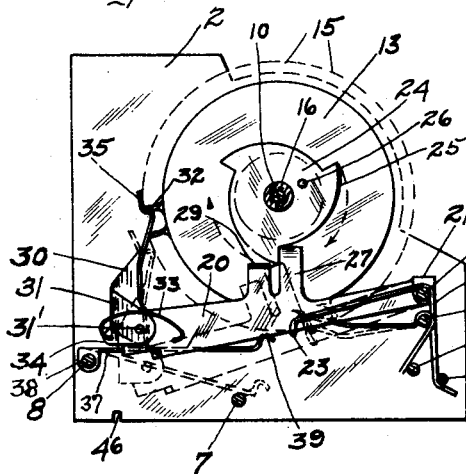


Fig. 2

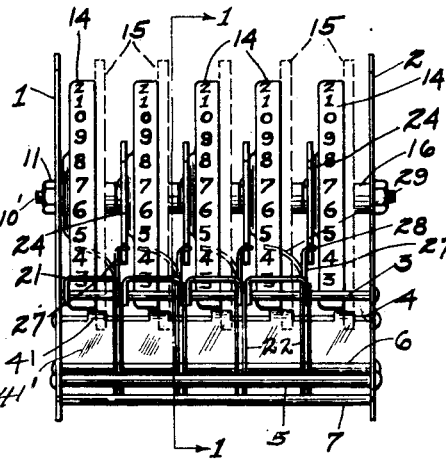


Fig. 3

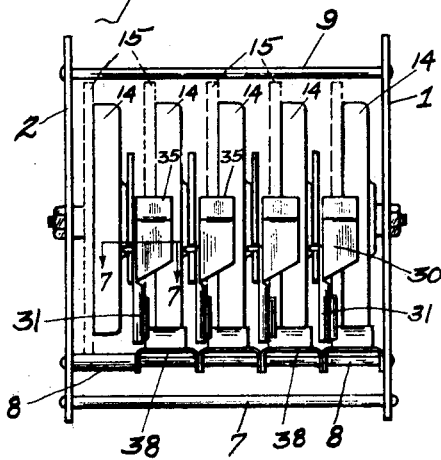
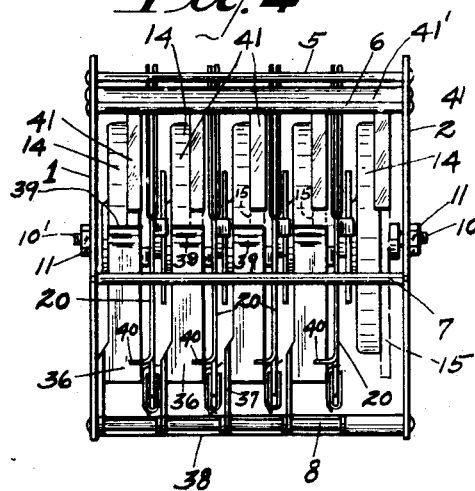


Fig. 4



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2 Sheets-Sheet 2

Fig. 5

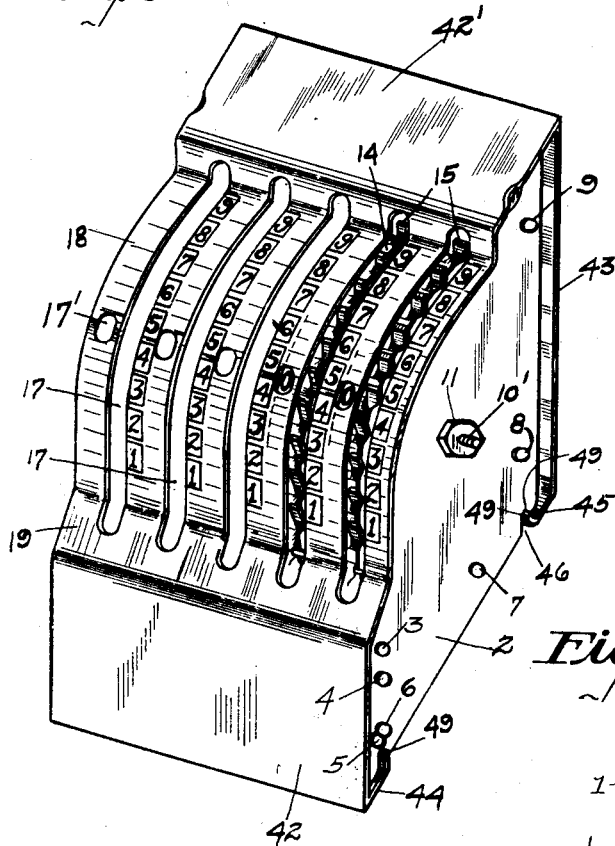


Fig. 7

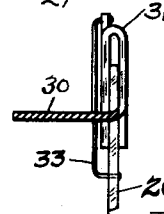


Fig. 8

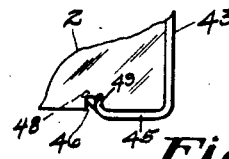


Fig. 9

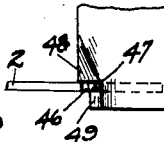


Fig. 6

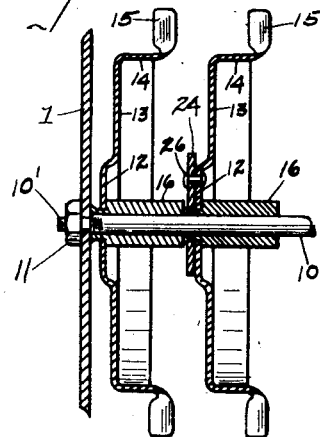
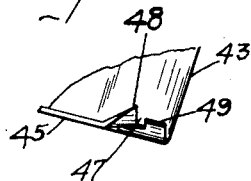


Fig. 10



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UNITED STATES PATENT OFFICE.

JOHN PFEIFER, OF SPRINGFIELD, OHIO.

ADDING MACHINE.

Application filed December 8, 1924. Serial No. 745,455.

My invention relates to improvement in adding machines and particularly relates to an adding machine employing a series of adding wheels mounted upon a common axis and directly operated by the fingers of the operator.

An object of the invention is to provide an adding machine so arranged that it can be very cheaply manufactured; a further and more specific object in this connection being to provide a machine, practically all the parts of which can be stamped from sheet metal and assembled without the necessity of machining, drilling or threading any of the parts.

A further object of the invention is to provide a simple form of transfer mechanism between the adding wheels.

A further object of the invention is to provide a very simple and cheaply constructed casing for the mechanism of the machine.

In the accompanying drawings:

Fig. 1 is a section on the line 1—1 of Fig. 2.

Fig. 2 is a front elevation with a portion of the casing removed.

Fig. 3 is a rear elevation with a portion of the casing removed.

Fig. 4 is a bottom plan view with a portion of the casing removed.

Fig. 5 is a perspective view of the machine, but two of the adding wheels being shown.

Fig. 6 is a vertical section of a portion of the machine.

Fig. 7 is an enlarged view showing the manner of connecting one of the transfer pawls with its finger, the pawl being shown in section.

Fig. 8 is an enlarged side elevation of the rear lower corner of the casing illustrating the manner of connecting the casing sections together.

Fig. 9 is an enlarged bottom plan view of the parts shown in Fig. 8.

Fig. 10 is a perspective view of the same parts.

Referring to the drawings, 1 and 2 represent two side plates stamped from sheet metal and connected together by a series of rods 3, 4, 5, 6, 7, 8 and 9, the ends of which are riveted. These frame plates support a shaft 10 which has reduced threaded ends 10' which project through apertures in the frame plates and receive nuts 11. The adding wheels, five of which are shown in the

present case, are all rotatably mounted upon the shaft 10. Each adding wheel is stamped from sheet metal and consists of a dished central portion 12, an outer web portion 13, a laterally projecting peripheral flange 14 which forms a rim, and a series of fingers 15 stamped or cut from the edge of the rim and bent at right angles so as to project in a radial direction and equally spaced about the entire periphery thereof, thirty of these finger pieces being formed on each wheel, each finger piece being given a quarter turn so that a flat face will be presented to the finger of the operator. Each of the rims is provided in the present case with three series of indications from 0 to 9 to represent three series of units of the denomination corresponding to the wheel. The dished central portion 12 of the wheel is perforated and within this perforation is secured preferably by riveting the reduced end of a hub 16. These hubs not only act to journal the wheels upon the shaft 10 but also serve as spacers for the wheels.

The adding wheels project partly through slotted openings 17 in a circular-shaped front casing member 18 which is provided at the side of each slot with indications from 1 to 9, and also with a series of openings 17' arranged in line with the rims 14 on the adding wheels to expose the indications on the rims 14 thereof so that the total amount added on the wheels can be read. This casing member is bent downwardly and forwardly at the lower ends of these slots to form a stop 19 for the finger of the operator, the side frame members being correspondingly shaped as shown in Fig. 1 to accommodate these casing members 18 and 19. It will be noticed from Fig. 5 that a finger 15 stands at the bottom of each indication and to manipulate the machine the operator simply places his finger opposite the desired indication and turns the wheel until his finger comes in contact with the stop ledge 19 which serves to expose through the opening 17' the proper indications to represent the total amount added upon the wheels, these openings 17' being located at the zero points of the wheels.

The transfer mechanism for transferring amounts from the wheels of one denomination to the wheels of the next higher denomination will now be described. Associated with each adding wheel excepting the wheel of highest denomination is a pawl carrying

arm 20 the forward end of which is formed with a yoke 21 which is journaled upon the frame rod 3. A spring wire 22 coiled about the frame rod 3 with one of its ends engaged by the frame rod 5 and its other end bent beneath the lower edge of the pawl arm as indicated at 23, serves to normally project the rear end of the pawl arm upwardly. Connected with each adding wheel except the one of highest denomination is a cam wheel 24 having a series of equally spaced cam faces 25 (Fig. 1), one cam for each series of units on the wheel. This cam wheel is riveted to the dish portion 12 of the adding wheel by a rivet 26. Projecting from the pawl carrying arm 20 is a finger 27, the outer end of which is bent at right angles as indicated at 28 (Fig. 2) and extends in the path of the cams 25. The pawl carrying arm 20 also has another finger 29 (Figs. 1 and 2) which is curved toward the web portion of the adjacent adding wheel and lies in close proximity thereto, this finger 29 acting as a spacer to hold the bent portion 28 of the finger 27 at all times in proper position in relation to the cams. The arm 20, its yoke 21, and fingers 27 and 29 are all formed integrally of sheet metal which might easily be sprung out of position so that the purpose of this spacing finger 29 becomes apparent. Pivoted to the rear end of the pawl carrying arm 20 is a pawl 30 formed of sheet metal, the lower portion of which is formed with a return bend to provide a yoke shaped portion 31 which embraces the rear end of the arm 20 and is pivoted thereto by a rivet 31'. (Fig. 7 for detail). The upper portion of the pawl is bent to form a shoulder 32 (best shown in Fig. 1) which is normally projected in the path of the adding wheel fingers 15 by a spring wire 33 one end of which is connected to the arm 20 and the other end to a small ear 34 projecting from the lower end of the yoke shaped portion of the pawl. Above the shoulder 32 the pawl is extended as indicated at 35 so as to cooperate with the ends of the fingers 15 and form a stop so as to cause the shoulder 32 to engage the fingers 15 at the outer ends thereof and thus obviate any danger of the pawl becoming caught between two of the fingers.

Pivotal mounted upon the frame rod 8 is a series of overthrow preventers. Each overthrow preventer consists of a flat sheet metal finger 36 having an integral rearwardly projecting bent flange 37 (Fig. 4) terminating in a yoke shaped part 38 which is journaled upon the rod 8, a spacing sleeve 8' (Fig. 3) being placed upon these rods to hold the yokes in proper position. The forward portion of the finger 36 is bent upwardly as indicated at 39. Integrally formed with each pawl carrying arm 20 is a laterally projecting finger 40 (Fig. 4)

which lies beneath the finger 36 so that when the pawl arms are released to effect a transfer, the finger 36 will be thrown upwardly to cause its bent end 39 to engage with one of the fingers 15 of the adding wheel with which it is associated and arrest the movement of that wheel after it has been moved by the pawl.

To prevent backward movement of the adding wheels there is provided a series of flat spring sheet metal fingers 41, one for each wheel, the free ends of which rest in yielding contact with the adding fingers 15 to cooperate with the fingers to prevent backward movement of the wheels. These fingers 41 are integrally formed with a flat sheet metal plate 41', the lower edge of which rests against the frame rod 6, with the finger bent over and resting against the frame rod 4, with their inner free ends in yielding contact with the finger 15 of the adding wheels.

The side plates 1 and 2 serve to enclose the sides of the machine and the front upper portion and rear of the machine are enclosed by a casing member formed from a single piece of sheet metal of which the slotted portion 18 and the stop portion 19 form a part. This sheet metal plate is shaped to provide a vertical portion 42 which encloses the lower part of the front of the mechanism, a horizontal portion 42' which encloses the upper rear portion of the machine and a vertical portion 43 which forms the back of the casing. The lower edge of the portion 42 is bent rearwardly to form a flange 44 and the lower edge of the portion 43 is bent forwardly to form a flange 45. Both of these flanges 44 and 45 are interlocked with the side members 1 and 2 in the manner shown in Figs. 5, 8, 9 and 10. In Figs. 8, 9 and 10 the manner of interlocking one end of the rear flange 45 is illustrated which will suffice for the description of the flange 45, the joint between the flange 45 and the side member being illustrated in these figures. The side member 2 is provided with a vertical notch 46 while the flange 45 is provided with a rearwardly extending notch 47, the side walls of which are bent upwardly to form prongs 48 and 49. In assembling the casing 2 the notched portions are caused to engage which results in the upturned prongs 48 and 49 straddling the sides of the frame portion 2 just above the upper end of its notch 46. This serves to lock the parts 42 and 43 both against lateral and longitudinal movement and also provides a very simple method of assembling the casing parts.

The operation of adding and transferring is as follows: The operator by inserting his finger between any two of the fingers 15 of any adding wheel at the point bearing the indication of the amount desired to be add-

ed presses downwardly until his finger strikes the ledge 19 which arrests the further movement of the wheel. As an adding wheel rotates the cam carried thereby depresses the pawl carrying arm 20 corresponding thereto against the tension of the spring 22 to the dotted line position shown in Fig. 1 by acting upon the bent end 28 of the finger 27. When the lip 28 rides off of the cam the spring 22 projects the arm upwardly to an extent to cause the pawl 30 to move the adjacent adding wheel a distance of one unit and at the same time by reason of the lateral projection 40 throws up the proper finger 36 to engage the finger 15 of that adding wheel to prevent overthrow of the wheel. By reason of the fact that each wheel is provided with a series of unit indications from 0 to 9, three series being shown for each wheel in the present case, this insures fingers 15 corresponding to nine units being exposed on each wheel through the slots 17.

The frame, adding wheels, transfer mechanism, overthrow preventers and pawls for preventing backward movement of the wheels are all constructed of sheet metal which may be formed in dies and the parts so far as possible are riveted together. The hubs 16 may be of tubing with one end shouldered. The arrangement provides a

machine of an accurate character so far as adding is concerned and it may be manufactured and assembled very cheaply after the dies have been made. In fact it has been my intention to provide a machine which may be constructed so cheaply that it may be given away in some cases by banks or other commercial houses to their customers.

Having thus described my invention, I claim:

1. In an adding machine, an adding wheel, a pivoted arm cooperating with said wheel, and a pivoted spring-pressed transfer pawl carried by said arm and cooperating with the wheel of the next higher denomination, said arm having a projecting finger cooperating with adjacent parts to form a spacer for said arm.

2. In an adding machine, an adding wheel constructed from a piece of sheet metal shaped to form a web having an integral laterally projecting flange to form a rim, said flange being cut and bent to provide integral fingers which extend outwardly in a radial direction from said rim, each of said fingers being also bent in an angular direction so as to present a flat face to the finger of the operator in turning the wheel.

In testimony whereof, I have hereunto set my hand this 24th day of November, 1924.

JOHN PFEIFER.