April 23, 1946. W. F. BURKE 2,398,777

STACKING APPARATUS

Filed May 2, 1942

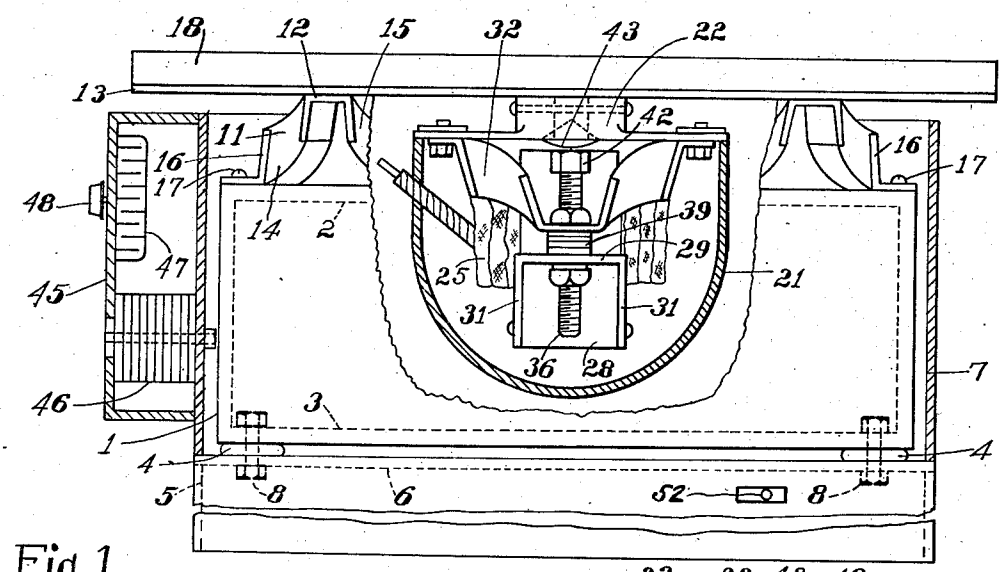


Fig. 1.

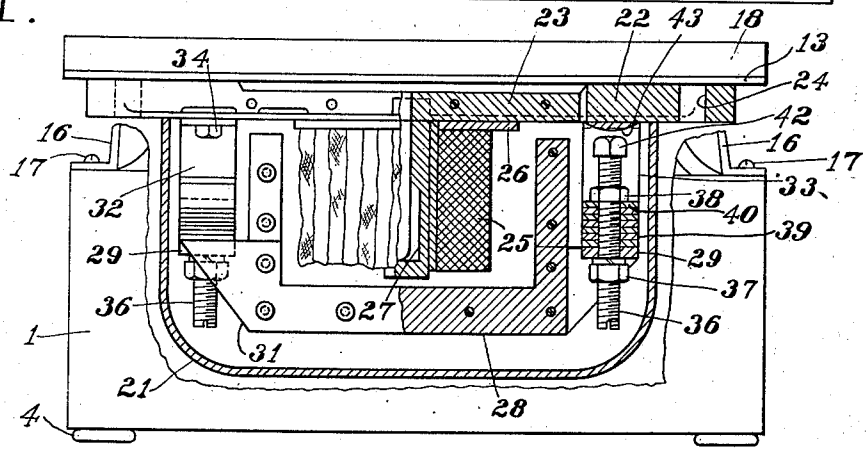


Fig. 2.

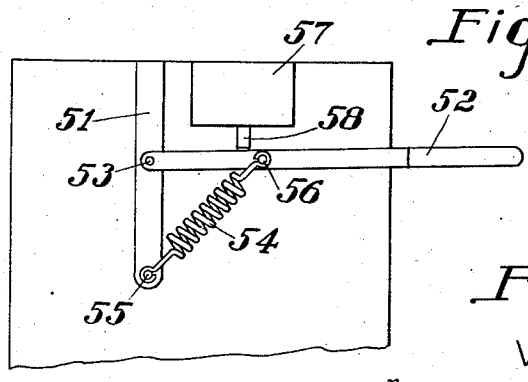


Fig. 3.

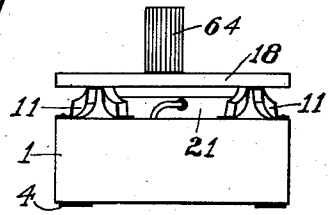


Fig 4

Inventor

William F. Burke

By Lewis D. Konigsford

Attorney

Patented Apr. 23, 1946 2,398,777

UNITED STATES PATENT OFFICE

2,398,777

STACKING APPARATUS

William F. Burke, Athens, Ohio, assignor to Syntron Company, Homer City, Pa., a corporation of Delaware

Application May 2, 1942, Serial No. 441,561

6 Claims. (Cl. 271—89)

This invention relates to an apparatus for producing stacks of laminae such as paper or cards, with the edges in alignment.

It is an object of the invention to quickly form stacks of laminae with the edges in alignment from a rough stack or pile of paper, cards or the like.

Another object is the provision of a vibratory apparatus adapted to receive a stack of laminae for rapidly vibrating the stack to cause the edges to become aligned.

Another object is the provision of a vibrating apparatus which is relatively noiseless, compact and readily controlled by the operator.

These and other objects of the invention will be apparent from a consideration of the following specification taken in connection with the annexed drawing showing a preferred embodiment of the invention by way of example, and wherein:

Figure 1 is an end view of the parts broken away showing a preferred embodiment,

Figure 2 is a side view of Figure 1 with certain parts in section,

Figure 3 is a diagrammatic view of the control switch, and

Figure 4 is a diagrammatic view showing the operation of the method.

Referring to the drawing, there is shown a casing 1 having flanges 2 and 3 at the top and bottom respectively. The casing rests on suitable vibration absorbing members 4 on the bottom of a cabinet or housing 5 constructed of angle irons 6 suitably secured together and having an exterior wall 7 suitably secured thereto. If desired, the casing 1 may be suitably bolted to the cabinet 5 by means of bolts 8.

At the top of the casing 1 are four vibratory members 11, each comprising an inverted channel-shaped metal strip 12 with a hole therethrough (not shown) by which the strip may be bolted or otherwise secured to a top plate 13, and rubber pads 14 and 15 have one of their respective faces secured to each side of the channel strip 12 by vulcanization or in any other suitable manner. The pads are right and left hand and the faces thereof are substantially parallel. Angle strips 16 are vulcanized to the opposite sides of pads 14 and 15 and bolts 17 passing therethrough into the flange 2 secure the vibratory members in position to the casing. It will be seen thus that the top plate 13 is capable of vibratory movement when vibrated by a suitable actuating force. A table 18 may be suitably secured to the plate 13, this table preferably being of hard wood, pressed fibrous composition or of any other suitable material.

The unit for vibrating the table 18 comprises a vibratory motor indicated generally by the numeral 21 and in the preferred embodiment consists of a base 22 of cast steel or other suitable material having a laminated electromagnet 23 secured therein by rivets or in any other suitable manner. The base has holes 24 bored through the ends by which it may be secured to the plate 13. The electromagnet 23, which preferably is in the form of a T, is surrounded by a coil or winding 25 which may rest on a cushioning pad 26 of rubber or other suitable material, and a suitable clip 27 engaging the under side of and insulated from the coil and secured to the central core of the electromagnet holds the coil in place.

The armature 28 is of laminated construction and is substantially in the shape of a C. The laminated plates of the armature are enclosed in thicker side plates 31 on either side, which extend partway along the legs of the C and beyond the armature proper, all the plates being held in assembled position by rivets or in any other suitable manner. Cross bars 29 having suitable bolt holes therein, are positioned between the side plates 31 and are welded or otherwise secured thereto. Adjacent each end of the base 22, and secured thereto by bolts 34, are two vibratory members similar to members 11 which are indicated generally by the numerals 32 and 33 and the armature is secured to these vibrator members by bolts 36 passing through the holes in bars 29, and nuts 37 and 38 and spacing washers 39 in between. The spacing washers are interposed between horizontal bars 29 of the armature and the top channel members 40 of the vibratory members (corresponding to channel members 12).

There is thus provided a proper air gap between the armature and the electromagnet in assembled position, and the bolts 36 preferably are adjusted so that their heads 42 are not in contact with the base 22. By reason of the nonmagnetic properties of the armature supports 32 and 33 the possibility of the electromagnetic flux being shunted around the air gap into the armature is eliminated. Ordinarily, when the armature is vibrating the amplitude of vibration is such that the heads 42 do not strike the base 1. However, striking surfaces 43 of "Stellite" or other suitable hard material may be positioned on the base 22 to prevent damage in case accidental impact occurs.

In a compartment or case 45 which preferably is secured to the cabinet 5 housing the apparatus, there is located a rectifier 46 which in the preferred embodiment is of the copper oxide or other dry disk type and is diagrammatically shown in Figure 1. The cabinet also contains a rheostat 47 controlled by a knob 48 extending outside of the cabinet. The cabinet also includes a manually controlled switch 57, diagrammatically shown in Figure 3. An arm 51 extends from the cabinet and has a switch lever 52 pivoted thereto as at 53 to allow the lever to be horizontally pivoted, and a spring 54 secured on a pin 55 in arm 51 and a pin 56 in lever 52 tends to bias the lever 52 in one direction. The switch lever 52 extends

from the cabinet at a suitable point so that it may be operated by the knee or any other portion of the operator's body. A switch 57 which preferably is of the snap acting type is secured to the cabinet, and a rod or button 58 for actuating the switch extends into the path of lever 52. Thus, when lever 52 is moved in one direction it contacts the switch rod 58 to close the switch and thus actuate the vibrator, and when moved in the opposite direction it opens the switch to stop operation of the vibrator.

In operation, current is supplied from any suitable source of alternating current through the rectifier 46 which passes successive current impulses of like polarity spaced by zero current intervals to the coil 25 surrounding the electromagnet. This intermittent pulsating current is controlled by rheostat 47 which is located in series with the rectifier and coil 25, and the electromagnet 23 causes the armature 28 to be intermittently attracted so as to vibrate and cause vibration of table 18 to which it is connected. The amplitude of vibration thus is regulated by the rheostat 47. For example, if a 60 cycle source of alternating current is employed (this being most commonly employed in commercial wiring) the armature and table will be vibrated at the rate of 3600 times per minute. If a current source of 25 cycles is used the table vibrates 1500 times per minute. The specific type of vibration members 32 and 33 shown is preferred because of the elimination of rattle in the apparatus and its long life, the rubber pads being vibrated in a state of shear or tension.

In stacking paper or cards, a stack of paper 64 is placed edgewise on the table 18 and is supported against toppling by the hands of the operator or by any other support, and the operator now pushes the switch lever 52, as seen in Figure 3, to actuate the electromagnet and cause table 18 to vibrate substantially vertically at a rate of 1500 times per minute or more. This rapid vibration of the table is transmitted to the paper stack and appears to free the individual sheets of paper so that they may fall until the ends of all of them rest on the table to form a smooth edge stack. The stack then may be turned at right angles to align the other edges of the paper and to prevent the papers getting out of alignment they may be supported edgewise against the surface at right angles to the table 18.

The snap acting switch 57 may be of the type disclosed in Patent No. 2,172,673, issued August 12, 1939, to Malcolm W. Eaton, or of any other suitable type.

If desired, the exterior cabinet 7 may be placed on vibration absorbing feet. Various other modifications may be made in the structure shown without departing from the spirit or scope of my invention.

What I claim as my invention and desire to secure by United States Letters Patent is:

1. In a paper jogger of the character described the combination of a horizontally disposed table resiliently supported for vibration, a vibratory motor having an armature and a field supported in operative spaced relation to provide a magnetic coupling therebetween, means for mounting the vibratory motor to the underside of the table, and means to energize the field to cause rapid relative movement between the armature and the field without contacting one another to silently vibrate the table in a rectilinear path normal to the table.

2. In a paper jogger the combination of a horizontally disposed table, spaced rubber means for resiliently supporting the table for vibration, a vibratory motor having an armature member and a field member supported in operative spaced relation to provide a magnetic coupling therebetween, means for securing one of said members to the underside of the table in fixed relation thereto, and means to electrically energize the field member to rapidly oscillate the member secured to the table relative to said other member without physical contact with one another to silently vibrate the table in a rectilinear path normal to the table.

3. In a paper jogger of the character described the combination of a horizontally disposed table resiliently supported for vibration, a vibratory motor having an armature member and a field member supported in operative spaced relation to provide a magnetic coupling therebetween, means for securing the field member of the vibratory motor to the underside of the table, and means to energize the field member to cause rapid relative movement between said members without contacting one another to silently vibrate the table in a rectilinear path normal to the table.

4. In a paper jogger the combination of a relatively heavy base, a horizontally disposed table of relatively less mass resiliently supported on said base for vibration relative thereto, a single vibratory motor having an armature member and a field member supported in operative relation to provide a magnetic coupling therebetween, means for securing one of said members to the central portion of the table, and means to rectify alternating current and electrically energize the field member to rapidly vibrate the table in a vertical rectilinear path relative to the base, the relatively greater mass of the base preventing absorption of vibration from the table.

5. In a paper jogger the combination of a horizontally disposed table resiliently supported for vibration, a vibratory motor having an armature member and a field member supported in operative spaced relation to provide a magnetic coupling therebetween, means for securing one of said members to the underside of the table, means for energizing the field member with intermittent current pulsations obtained by rectifying alternating current to rapidly oscillate the member secured to the table relative to said other member without physical contact with one another to silently vibrate the table in a rectilinear path normal to the table, and means to regulate the amplitude of vibration of the table while the operation of the motor subsists.

6. In a paper jogger the combination of a horizontally disposed table resiliently supported for vibration, a vibratory motor having an armature member and a field member supported in operative spaced relation to provide a magnetic coupling therebetween, means for securing one of said members to the underside of the table, means to electrically energize the field member and rapidly oscillate the member secured to the table relative to said other member without physical contact with one another to silently vibrate the table in a rectilinear path normal to the table, said securing means locating said member on the table to cause the whole of the table to vibrate uniformly, and means to regulate the amplitude of vibration of the table to adapt it to the character of the paper being jogged.

WILLIAM F. BURKE.