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K. W. JONES

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APPARATUS FOR KNOCKING UP SHEETS OF PAPER

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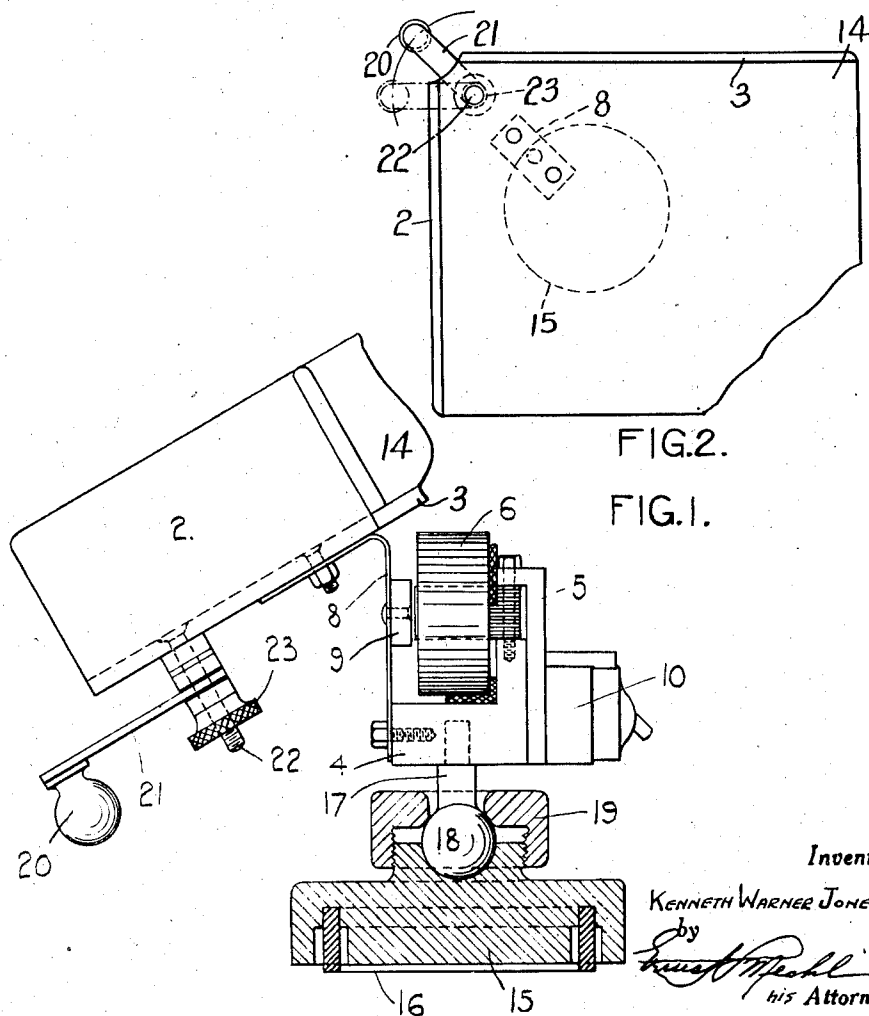


FIG. 2.

FIG. 1.

Inventor

KENNETH WARNER JONES

by
Ernest Mehl
his Attorney

UNITED STATES PATENT OFFICE

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APPARATUS FOR KNOCKING UP SHEETS OF PAPER

Kenneth Warner Jones, Bush Hill Park, Enfield, England

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3 Claims. (Cl. 271-89)

This invention relates to vibrating or jogging means employed for knocking-up sheets of paper placed upon or fed onto a table so that the sheets become superposed or piled thereon, the sheets' edges being brought into register with two side lays, disposed at an angle, usually a right angle, to each other.

In some knocking-up devices the tables are movably or flexibly mounted and may be capable of being tilted into various angles with the horizontal, and the side lays may be adjustable; reciprocating movement of the table and its side lays as one unit, set up by suitable means, causes the sheets and the side lays to contact repeatedly with each other so that the sheets last fed onto the table are brought into register with the previously knocked-up sheets below them, the construction being such that any sheet or sheets which overhangs or overhang the pile is or are brought into register with the already knocked-up sheets by the shocks or impacts imparted to the said sheet or sheets and to the adjacent sheets of the pile by the rapidly repeated contact between the sheet or sheets and the side lays in consequence of the reciprocations of the latter and the table.

In knocking-up apparatus as heretofore constructed, the movement imparted to the side lays and table, at each reciprocation thereof, is relatively large and the frequency or periodicity of the reciprocations relatively low, resulting in shocks or impacts between the sheets and lays which are unnecessarily heavy, as well as calling for more power than should be required to obtain the results aimed at.

The present invention seeks to provide simple and relatively inexpensive electrically actuated means for knocking-up sheets of paper which means shall require little power to operate and be such as to impart a high rate of vibration to the appropriate side lays and table with a relatively small movement of the lays and table at each vibration.

The apparatus according to the invention for knocking-up sheets of paper superposed on a table, comprises electro-magnetic means adapted when energised and de-energised in rapid succession by a repeatedly interrupted electric current to vibrate the table or tray carrying the superposed sheets by the alternate attraction and return movement, when released, of the armature means of said electro-magnetic means, said armature means being operatively associated with said tray and the apparatus including means for effecting the return movements of the armature

means when released by the deenergisation of the electro-magnetic means, the resulting rapid vibrations of the said tray causing rapidly repeated contact between the side and end lays of the tray and the sheets to be knocked-up.

The electro-magnet means are anchored to an appropriate base and associated with spring reed means anchored to the electro-magnet means, the tray being fixed to and carried by the reed means.

The operating and energising current may be alternating or direct, and where the former is employed use is made of the period-cycle to effect the vibration. With direct current an interrupter is included in the apparatus.

In the accompanying drawing—

Fig. 1 shows in side elevation an embodiment of the invention, the device illustrated being a portable apparatus suitable for knocking-up relatively small sheets of paper, and

Fig. 2 shows in plan to a smaller scale than Fig. 1 the table or tray of the apparatus shown in that figure and an adjusting or tuning arrangement which will be described.

Referring to the drawing, the sheets of paper to be knocked-up are fed onto the table or tray 14, which has end and side lays marked 2 and 3, respectively, disposed at right angles to each other.

The vibrating unit for the tray comprises a block or body 4 carrying a yoke 5 forming the cores or pole pieces of electro-magnet coils 6. To the body of the unit a spring reed 8 is secured at its lower end, its upper end carrying the tray 14. Intermediate its ends the reed 8 carries the armature 9 of the electro-magnet.

Any convenient means may be employed for connecting the electric leads to the magnet coils 6, there being shown for this purpose a socket 6 for a two-pin plug combined with a switch 10.

When the reed 8 is tuned to the frequency of the repeatedly interrupted electric current employed for operating the vibrating unit, for example, to the period-cycle of an alternating current supply, and when current is supplied to the unit, the armature 9, which normally stands an appropriate distance from the pole face of the electro-magnet, will be attracted against the resistance of the spring reed. The armature will be attracted and released at every period-cycle of the alternating current, thus causing the armature and reed to be continuously in motion whilst the magnet circuit is closed.

As the tray 14 is carried by the reed 8, the repeated movements of the latter set up a rapid

vibration of the tray with its side and end lays which are repeatedly moved into and out of contact with the sheets to be knocked-up, and in consequence of the vibration of the two lays in question, the pile of sheets will be knocked-up to two edges.

The knocking-up means already described may be permanently associated with a printing machine, or occupy a fixed position, but the invention is more especially intended to provide portable arrangements for knocking-up sheets of paper, such an arrangement being shown in Fig. 1. In this figure the tray 14 is shown mounted on the downturned upper end of the reed 3 of the vibrating unit and the body block 4 of the unit is secured to a heavy base 15, which preferably has at its under side a projecting ring 16 of india rubber or other resilient material.

The block 4 has a stem 17 terminating in a ball 18 which is clamped to the base 15 by a clamping ring 19. With the stem 17 vertically disposed, the tray 14 has a predetermined angle to the horizontal. By altering the setting of the ball 18 in its clamp the inclination of the tray 14 may be varied. The tray 14 usually will have only the two lays 2 and 3, which are fixed to it at right angles to each other, and the reed 3 will be attached to the tray in such a relation to the lays 2 and 3 that the direction of vibration will be substantially along one of the diagonals of the tray as clearly shown in Fig. 2.

There is associated with the tray means for adjusting or varying the vibrating effect transmitted to the tray, such means consisting of a weight 20 carried at the end of an arm 21 mounted on and movable about a pivot 22 suitably positioned and secured to the tray, for example to the corner of the tray near the reed 3 or on one of the side lays, a clamping nut 23 being provided for securing the arm 21 in an adjusted position. In the arrangement illustrated normal vibration of the table will take place when the arm 21, with its weight 20, lies parallel to the direction of vibration set up by the unit. By moving the arm 21 about its pivot, for example into the "dot and dash" position shown in Fig. 2, the extent of the vibrations may be varied as required.

Whilst alternating current provides a convenient power supply for operating the vibrating units of knocking-up means according to the invention, the repeatedly interrupted current required may be obtained by repeatedly interrupting a direct current, in which case the circuit arrangements would include an appropriately operated interrupter.

I claim:

1. Apparatus for knocking-up superposed sheets of paper, comprising a tray on which the said sheets are superposed, said tray including a side lay and an end lay for the sheets, an

electro-magnet on a mounting separate from said tray for vibrating the latter, an armature for said electro-magnet, a repeatedly interrupted supply of electric current to the winding of said electro-magnet to cause the latter to repeatedly and in rapid succession attract and release said armature, an oscillatable spring reed carrying said armature and anchored at one end to the frame of the electro-magnet and mounting the tray at its other end, said reed being tuned to the periodicity of the current and being effective when the armature is released to return the same into the position from which it was attracted, whereby the resulting rapid vibrations of the tray cause rapidly repeated contact between the sheets to be knocked-up and the lays of the tray, and an adjustably positioned weight on the tray for varying the extent of the vibrations imparted to the tray.

2. Apparatus for knocking-up superposed sheets of paper, comprising a rectangular tray on which said sheets are superposed, said tray including a side lay and an end lay for the sheets, an electro-magnet on a mounting separate from said tray for vibrating the latter approximately in the direction of a selected one of its diagonals, an armature for said electro-magnet, a repeatedly interrupted supply of electric current to the winding of said electro-magnet to cause the latter to repeatedly and in rapid succession attract and release said armature, an oscillatable spring reed tuned to the periodicity of the current and carrying said armature and tray and anchored at one end to the frame of the electro-magnet, said reed being anchored at its other end to the tray with its plane of oscillation approximately parallel with the said diagonal of the tray and being effective when the armature is released to return the same into the position from which it was attracted, whereby the resulting rapid vibrations of the tray cause rapidly repeated contact between the sheets to be knocked-up and the side and end lays of the tray, and an adjustably positioned weight on the tray for varying the extent of the vibrations imparted to the tray.

3. Apparatus as claimed in claim 2 for knocking-up superposed sheets of paper and having pivotally mounted on the tray a bar carrying at its free end a weight, the pivot of said bar lying in the plane of oscillation of the spring reed, and the bar being movable about said pivot in a plane parallel to the plane of the tray bottom to carry the weight towards, to or into, or a regulatable distance away from, the vertical plane in which the reed vibrates, to thus vary the distance of the weight from the reed and the extent of the vibration imparted to the tray, means being provided for securing the said bar and weight in an adjusted position.

KENNETH WARNER JONES.