Feb. 17, 1942. H. A. LEEDY 2,273,491

BUSINESS MACHINE

Filed April 28, 1939 3 Sheets-Sheet 1

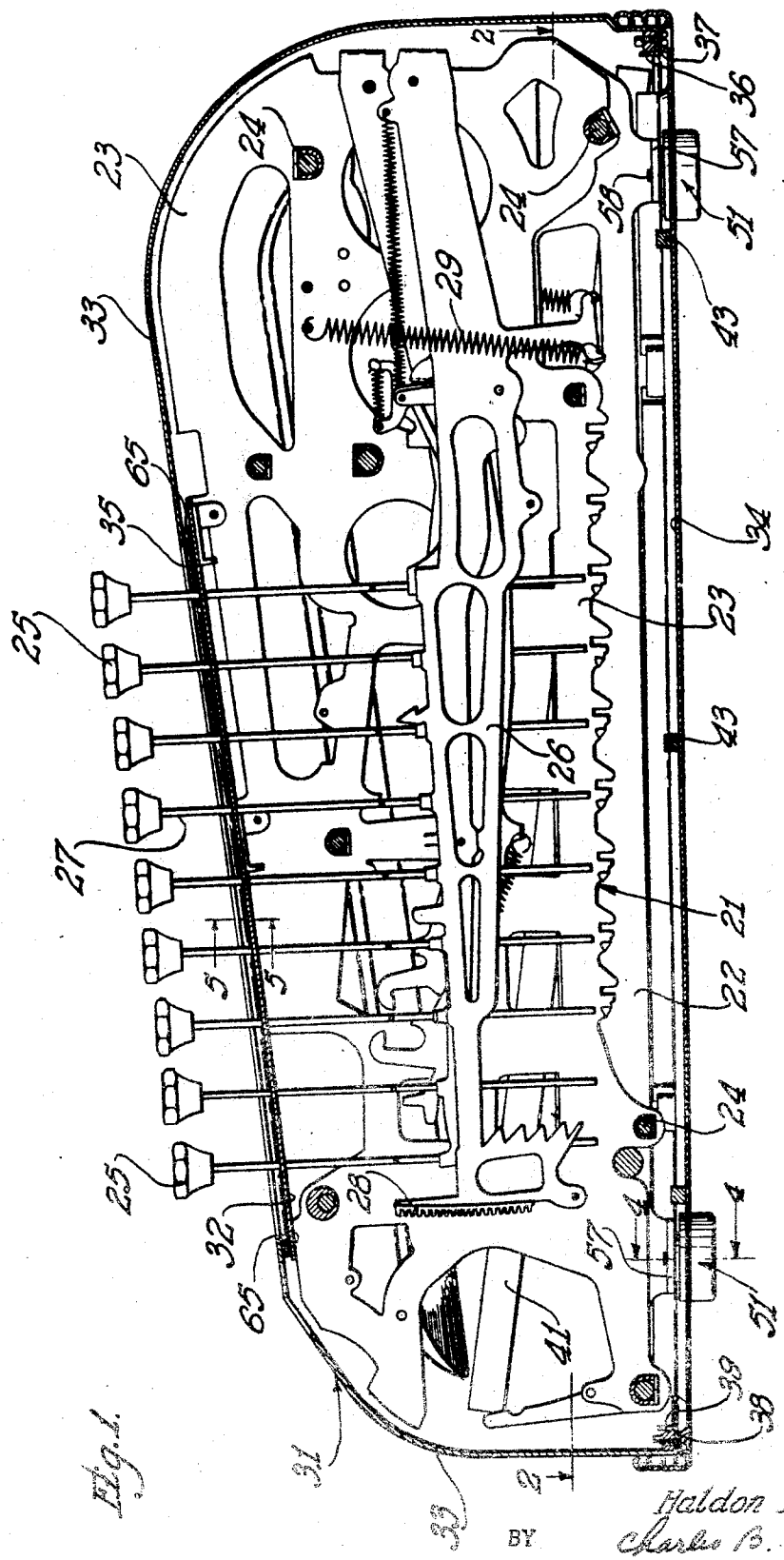


Fig. 1.

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Fig. 2.

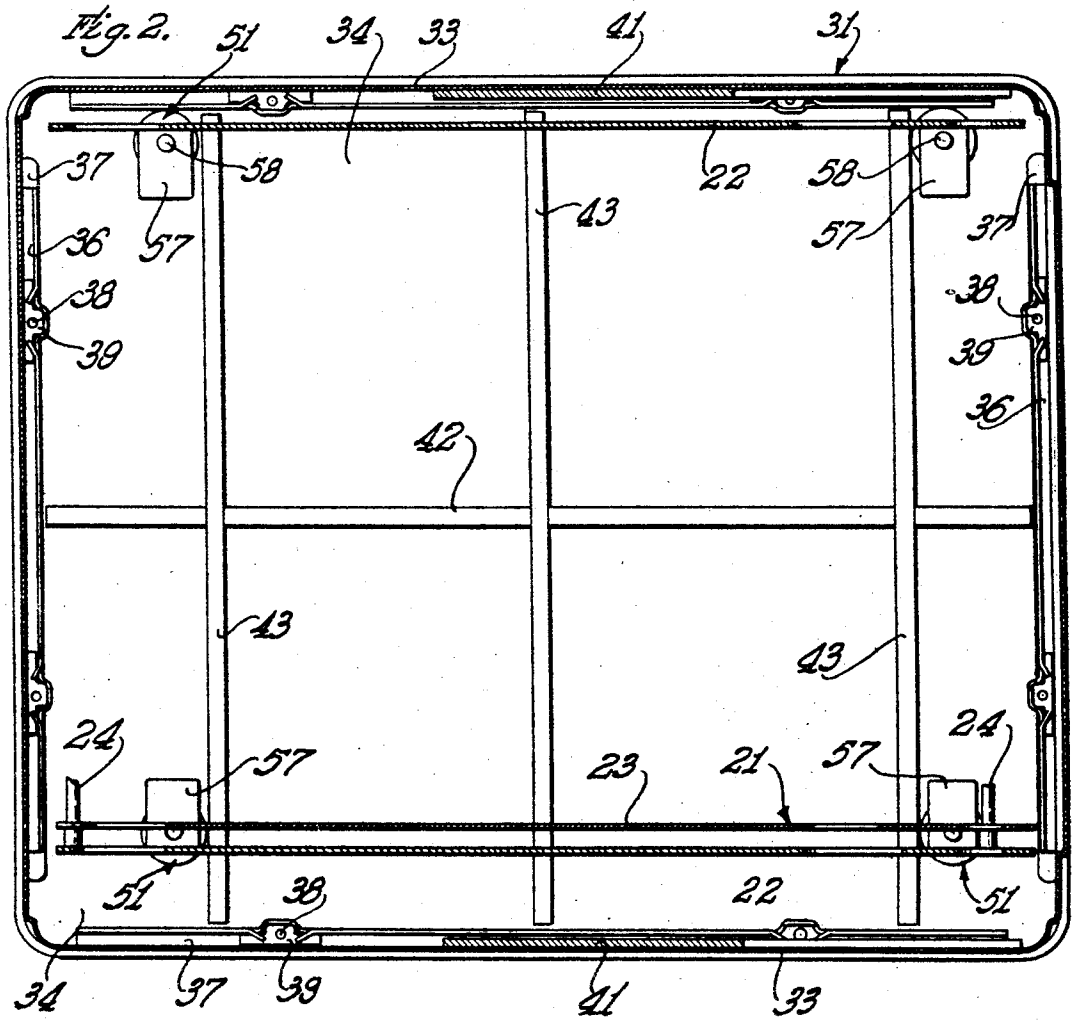
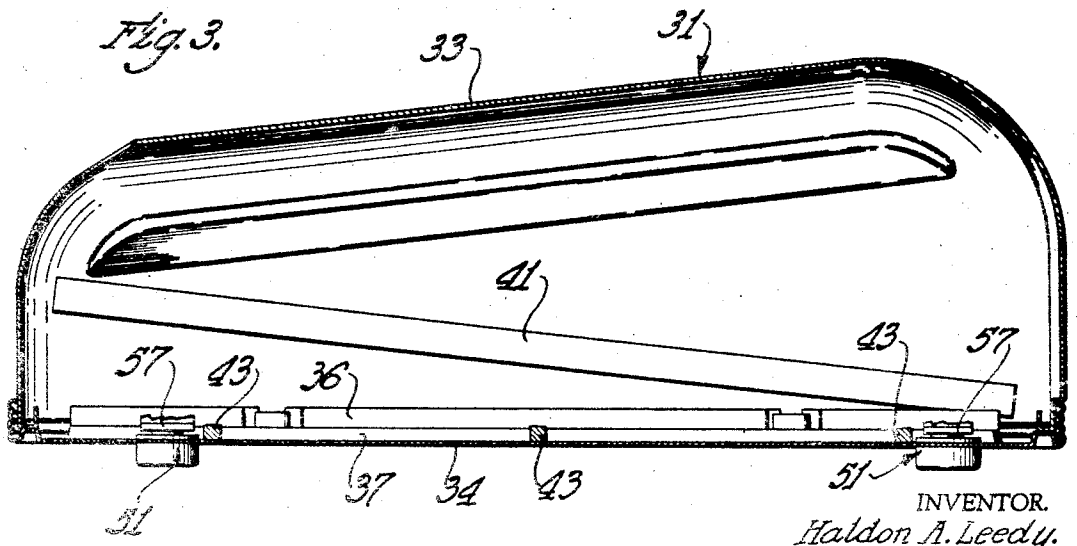


Fig. 3.



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Fig. 4.

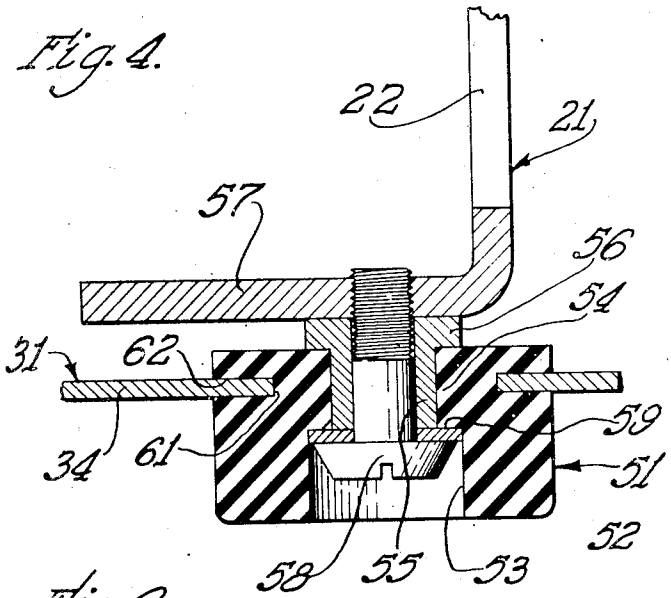


Fig. 5.

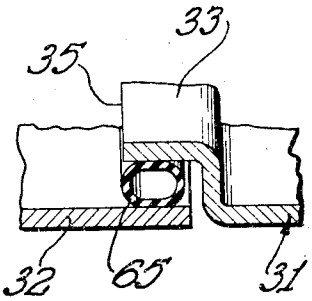


Fig. 6.

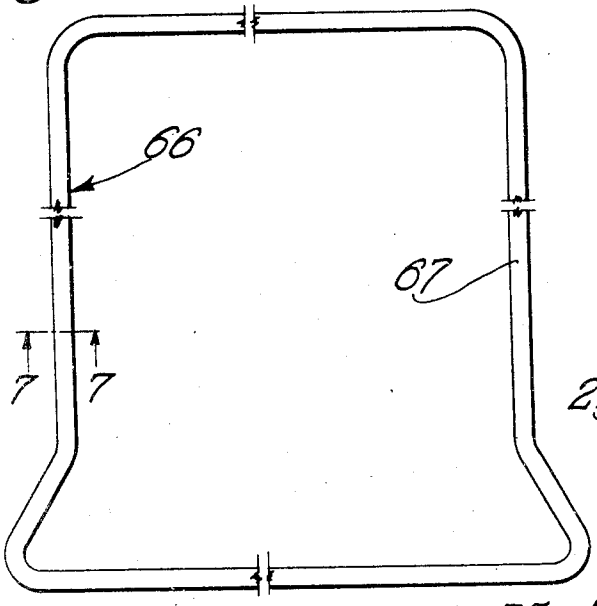


Fig. 7.

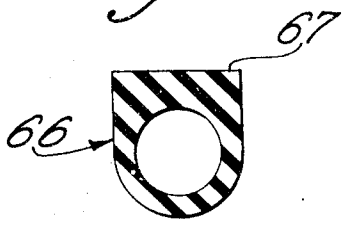
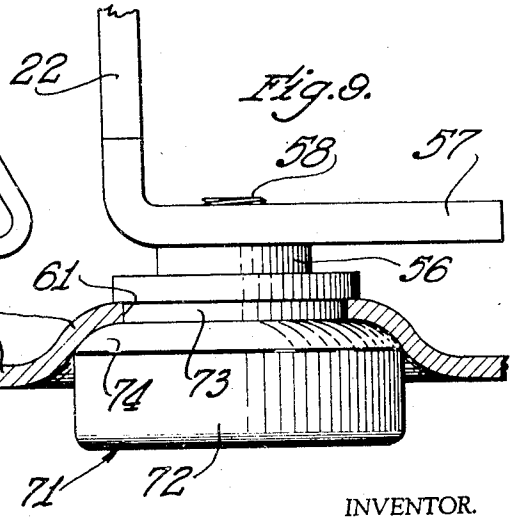


Fig. 9.



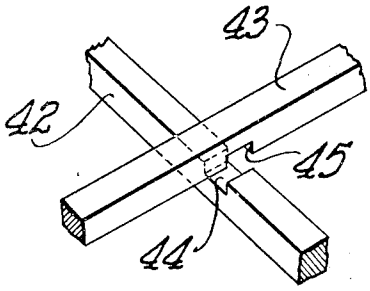


Fig. 8.

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Patented Feb. 17, 1942 2,273,491

UNITED STATES PATENT OFFICE

2,273,491

BUSINESS MACHINE

Haldon A. Leedy, Chicago, Ill., assignor to Felt & Tarrant Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application April 28, 1939, Serial No. 270,483

2 Claims. (Cl. 248—22)

This invention relates in general to business machines, and more particularly to calculating machines, such as those disclosed in United States Letters Patent No. 1,902,597, issued March 21, 1933, to J. A. V. Turck, and No. 2,063,962, issued December 15, 1936, to J. A. V. Turck.

In such machines, as well as numerous others, it has been the practice to support the operating mechanism upon a skeleton frame mounted upon the base portion of a casing surrounding the same. The operation of the machine has been attended by considerable noise and vibration with such an arrangement, despite the use of sound deadening material as a lining for the machine casings. This is primarily due to the intimate contact between the operating mechanism supporting frame and the outer casing, and is not satisfactorily eliminated by interposing resilient or vibration absorbing means between the machine supporting surface and the casing.

A principal object of the invention, therefore, is the satisfactory elimination of such noise and vibration normally attendant upon the operation of business machines.

Another important object of the invention is the provision of means for supporting the interior mechanism and the outer casing of a machine entirely independently of each other.

A further important object of the invention is the provision of an outer casing for a business machine formed from sheet metal and having simplified reinforcing means secured thereto for preventing vibration thereof.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, when taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

In the drawings,

Figure 1 is a vertical, longitudinal section of a calculating machine embodying the features of the invention, with parts of the interior mechanism of the machine omitted;

Fig. 2 is a horizontal sectional view taken through the machine of Fig. 1 substantially on the line 2—2 thereof, with most of the interior mechanism of the machine omitted;

Fig. 3 is a view similar to Fig. 1, with all of the interior mechanism omitted except the legs of one of the side supporting frames;

Fig. 4 is a detail vertical section of the casing and interior mechanism supporting means, taken substantially on the line 4—4 of Fig. 1;

Fig. 5 is a detail vertical section of the resilient member for filling the space between the key plate and the casing, taken substantially on the line 5—5 of Fig. 1;

Fig. 6 is a top plan view of a resilient filler member of modified construction;

Fig. 7 is an enlarged vertical section taken substantially on the line 7—7 of Fig. 6;

Fig. 8 is an exploded view of the joining portion of two of the casing bottom reinforcing members; and

Fig. 9 is an end elevational view of a modified form of interior mechanism and casing supporting means, with the casing shown in section.

The embodiment of the invention shown in the drawings is particularly designed and adapted for use in the well-known "Comptometer" calculating machines, such as those disclosed in the patents hereinbefore referred to. However, the invention is readily susceptible of other valuable applications, the scope thereof not being confined to the specific use and embodiment herein described as an illustrative example. As the details of construction of this type of machine may be readily understood from said patents, a brief description of the general features thereof and such parts as are directly concerned with the instant invention will be sufficient for an understanding of the latter.

The operating mechanism of the calculating machine is supported by a frame, indicated generally by reference numeral 21, which comprises a pair of side skeleton plates 22, and intermediate skeleton plates 23 disposed between the various actuating mechanisms of the several denominational orders of the machine, all secured together at suitable points by tie rods 24. A similar operating mechanism supporting frame is employed in both the key-responsive and key-actuated types of calculating machines disclosed in the hereinbefore mentioned patents. In Fig. 1 of the instant drawings, part of the operating mechanism of a key-operated machine is shown.

A desired number of columns of nine keys are provided, each key being indicated by reference numeral 25, with a numeral wheel (not shown) and actuating devices associated in duplicate with each column of keys. Each column of keys 25 forms a part of the actuating mechanism for transmitting to its associated numeral wheel an amount or degree of travel proportionate to the digital value of the particular key operated. This denominational actuating mechanism includes a column actuator 26 pivoted at the rear of the machine (to the right in Fig. 1) and adapted to be depressed in different amounts, as determined

by the particular keys 25 actuated by the operator. Each key 25 is provided with a stem 27 extending down and bearing upon the corresponding column actuator 26. The column actuator for each denominational order is adapted to impart calculating movement to the accumulator (not shown) by means of a rack segment 28 formed at its forward end, which meshes with a ratchet pinion forming a part of an internal ratchet mechanism. The latter is part of the accumulator mechanism, and functions to impart movement to its associated numeral wheel only upon upward movement of the segment lever 26, the downward movement of the segment lever by a key 25 comprising an idle movement. A column actuator or segment lever 26 which has been moved downwardly by a key 25 is moved upwardly, upon release of the key, by column actuator springs 29 associated therewith. It will thus be understood how operation of the machine is effected by depression of the keys 25. In addition to the above-described mechanism, the machine is provided with the usual carrying mechanism, column actuator and key locks to prevent mismanipulation, and zeroizing mechanism.

All of this operating mechanism is mounted upon and supported by the skeleton frame 21, which is likewise true of the key-responsive "Comptometer" disclosed in the hereinbefore mentioned Patent No. 2,063,962. In these prior machines, the operating mechanism supporting frame is mounted directly upon the bottom portion of an outer casing surrounding the interior mechanism, and a key plate is provided which is attached to the upper part of the casing and has suitable apertures therein for accommodating the stems of the keys.

The instant invention, however, contemplates the use of an outer casing, indicated generally by reference numeral 31, which has no contact whatever with either the skeleton frame 21, that supports the operating mechanism of the machine, or a key plate 32. The key plate 32 (Fig. 1) is mounted directly upon the skeleton plates 22, 23 in any suitable manner, and is provided with the usual spaced apertures therein for slidably engaging the stems 27 of the keys 25. The casing 31 is preferably made in only two parts and from any desired light weight material, such as sheet metal, and comprises a hollow cover portion 33 and a base 34. The top wall of the cover 33 is provided with a substantially rectangular aperture 35 (Fig. 1) which is slightly smaller in dimensions than the key plate 32, and through which the keys 25 extend. At the lower edges of the front and side walls of the cover 33, and adjacent the margins of the base 34 (Figs. 1 to 3), cooperating flanges 36 and 37 are provided, respectively, the former resting upon the latter. Screws 38 extending upwardly through suitable apertures in the flanges 36, 37 engage nuts 39 mounted in the flanges 36 to rigidly secure the cover 33 and base 34 of the casing 31 together.

A metal bar 41 (Figs. 1 to 3) is rigidly secured in any suitable manner, such as by welding, to the inner surface of each of the side walls of the cover portion 33 of the casing 31, preferably extending at an angle to the base 34 forwardly of the casing. The base 34 has a metal bar 42 similarly rigidly secured to its upper surface (Fig. 2) and extending substantially along the longitudinal center line thereof. A plurality of cross bars 43, similar to the bar 42, are likewise rigidly secured to the upper surface of the base 34 transversely thereof and in spaced relationship to each other. At the points of junction with the bars 43, the bar 42 is provided with a cut-away portion or cross groove 44 in its upper surface of a width substantially equal to that of the bars 43 (Fig. 8). Each of the bars 43 is provided with a similar cross groove 45 in the center of its lower surface of substantially the same width as the bar 42. The grooves 44 and 45 are made sufficiently deep to permit the desired surface contact of the bars 42 and 43 with the base 34 for their full length. The several bars 41 to 43 comprise simplified reinforcing means for the sheet metal casing 31 which effectively prevent vibration thereof. As a result, the noise normally attendant upon operation of the machine housed within the casing is materially damped or deadened; in fact, to a much greater extent than is possible by using the usual casing lining of sound deadening material normally employed in the prior art machines.

Means are provided at the bottom of the machine for supporting the frame 21 and the casing 31 entirely independently of each other, comprising four pad units indicated generally by reference numeral 51 (Figs. 1 to 4). Each of the units 51 includes a cylindrical pad 52 of a suitable resilient material which is preferably impervious to oil, such as the oil impervious rubber designated by the trade-name "Neoprene." The pad 52 is provided with a vertical bore 53 which is enlarged at its lower end to form an annular shoulder portion 54 at the upper end and interiorly thereof. A sleeve or collar 55 is disposed in the upper end of the bore 53 and is provided with an outer flange 56 at its upper end which is adapted to rest upon the upper surface of the pad 52. Each of the side skeleton frame members 22 is provided with a pair of horizontally disposed, inwardly extending feet or pads 57 formed integrally therewith (Figs. 1 to 4). The pad units 51 are so positioned that each one of the frame feet 57 rests upon the flange 56 of one of the sleeves 55. A screw 58 extends upwardly through each of the sleeves 55 and is adapted to engage within a suitable tapped aperture provided in the associated frame foot 57. A washer 59 having an outer diameter substantially the same as the diameter of the enlarged lower portion of the bore 43 is interposed between the head of the screw 58 and the lower end of the sleeve 55. The length of the sleeve 55 below its flange 56 is substantially equal to the vertical length of the shoulder portion 54 of the resilient pad 52, so that tightening of the screw 58 will rigidly secure the sleeve 55 and collar 59 to the foot 57, while firmly engaging the shoulder portion 54 of the resilient pad 52 between the collar 59 and the flange 56.

The base 34 of the casing 31 is provided with an aperture 61 (Fig. 4) coaxially aligned with the tapped aperture in each of the two feet 57 of the two side skeleton frame members 22. Each of the resilient pads 52 of the units 51 is provided with a circumferential groove 62 adjacent its upper end in the outer surface thereof having a width substantially equal to the thickness of the base 34 and an inner diameter substantially the same as that of the associated aperture 61. With this arrangement, each of the pads 52 may be mounted upon the base 34 of the casing 31 by being sprung into the position of the drawings, in which position the marginal portion of the base 34 surrounding each aperture 61 is tightly engaged within the groove 62 in the

associated pad 52. The resiliency of the pad 52 permits its being so mounted, before the sleeve 55 is inserted in the bore thereof. The frame and the operating mechanism of the machine, which is supported thereby, may then be mounted upon the central portions of the pads 52 by means of the members 55, 58 and 59, as above described, and the cover portion 33 of the casing may then be secured to the base 34 by the members 38, 39.

Referring particularly to Fig. 4, it will be seen that the resilient pads 52 of the units 51 support the frame 21 and the mechanism mounted thereon, and also support the casing 31, entirely independently of each other. In this manner, vibrations and shocks transmitted by the machine operating mechanism to the supporting frame 21 are not transmitted to the casing 31. In addition, depression of the keys 25 is cushioned to such an appreciable extent that it appears to the machine operator that less pressure is required in depressing the keys when the instant mounting is employed, as compared with the prior art method of mounting the supporting frame directly upon the base of the casing, when exactly the same operating mechanism is actually being used.

Since the cover portion 33 of the casing 31 is so dimensioned as to avoid contact at any point with the supporting frame 21, only airborne sound vibrations can be transmitted to the casing from the machine operating mechanism. As has been explained hereinbefore, such vibrations are effectively damped or deadened by the casing itself, due to the use of the reinforcing bars 41, 42 and 43. Because of the necessity of having the keys 25 extending above the casing and of mounting the key plate 32 in spaced relation to the casing, means are provided for filling the resulting space between the marginal portions of the cover portion 33 of the casing surrounding the aperture 35 and the key plate 32, for the purpose of preventing the entry of dirt and other foreign matter into the interior of the casing 31. This means comprises a filler member in the form of a substantially rectangular, hollow tube 65 (Figs. 1 and 5), of rubber or any other suitable resilient material, having a round or oval cross section. The use of such a hollow, resilient tube will also insure against the transmission of any vibrations from the key plate 32 to the casing 31.

In Figs. 6 and 7, a modified form of resilient filler member 66 is shown which is substantially identical to the tube 65, which the exception that the upper surface 67 thereof is flat. The tube 66 is so constructed to permit of its being secured by a suitable adhesive to the under surface of the marginal portions of the cover 33 surrounding the aperture 35, prior to assembly of the cover 33 upon the base 34 of the casing. The proper positioning of the resilient filler member is thus greatly facilitated, both in the original assembly of the parts and in the mounting of the cover portion 33 upon the base 34 after subsequent removal thereof for cleaning or repairing purposes.

In Fig. 9, a modified form of supporting or pad unit 71 is shown which is substantially identical to the unit 51 except for the shape of the resilient pad. This resilient pad 72 is similar to the pad 52 with the exception that an annular groove 73 is provided in lieu of the groove 62 in the latter and the outer surface of the pad below the groove is rounded off at 74. The purpose of this construction is to enable the positioning of the base 34 of the casing 31 closer to the supporting surface than is possible with the embodiment of Fig. 4, without sacrificing any of the advantages, and particularly the resiliency, of the latter. The base 34 is provided with the apertures 61 above described, but the marginal portions of the base surrounding the apertures are indented or curved upwardly at 75. The curved portion 75 of the base 34 of the casing 31 thus fits snugly against the curved portion 74 of the pad 72, and the plane of the main part of the base 34 is much more closely positioned to the machine supporting surface than in the embodiment of Fig. 4.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a machine of the class described having an outer casing, and an operating mechanism supporting frame disposed interiorly of said casing; resilient pad members having grooves in the outer surfaces thereof for receiving portions of said casing to support the same and said frame, and means for securing said frame to the central portions of said resilient pad members, the weight of said frame being taken in sheer by the pad members whereby transmission of vibrations therefrom to said casing is prevented.

2. In a machine of the class described having an outer casing, said casing having a plurality of apertures therein, and a machine frame disposed interiorly of said casing; resilient pad members, said members disposed in said apertures to support said casing and said frame and having grooves in the outer surfaces thereof for receiving the marginal portions of said casing surrounding said apertures, and means extending through the central portions of said pad members and spaced inwardly from said grooves for securing said pad members to said frame, the weight of said frame being taken in sheer by the pad members, whereby transmission of vibrations therefrom to said casing is prevented.

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