No. 816,552. PATENTED APR. 3, 1

W. BAXTER, JR.

TYPE WRITER.

APPLICATION FILED MAY 20, 1902.

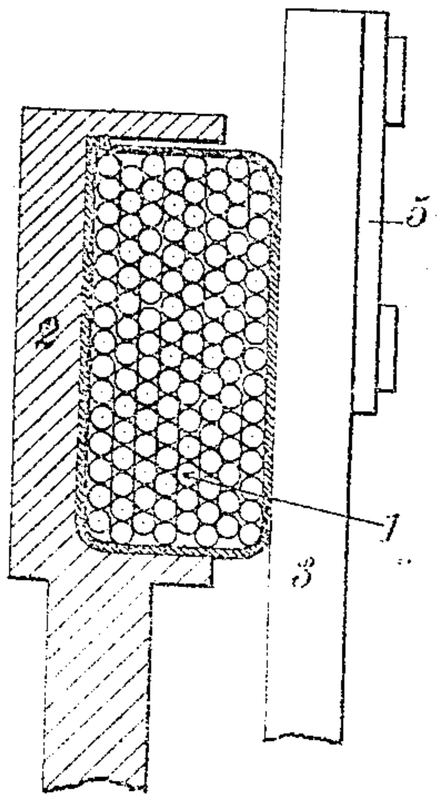

FIG. 3.

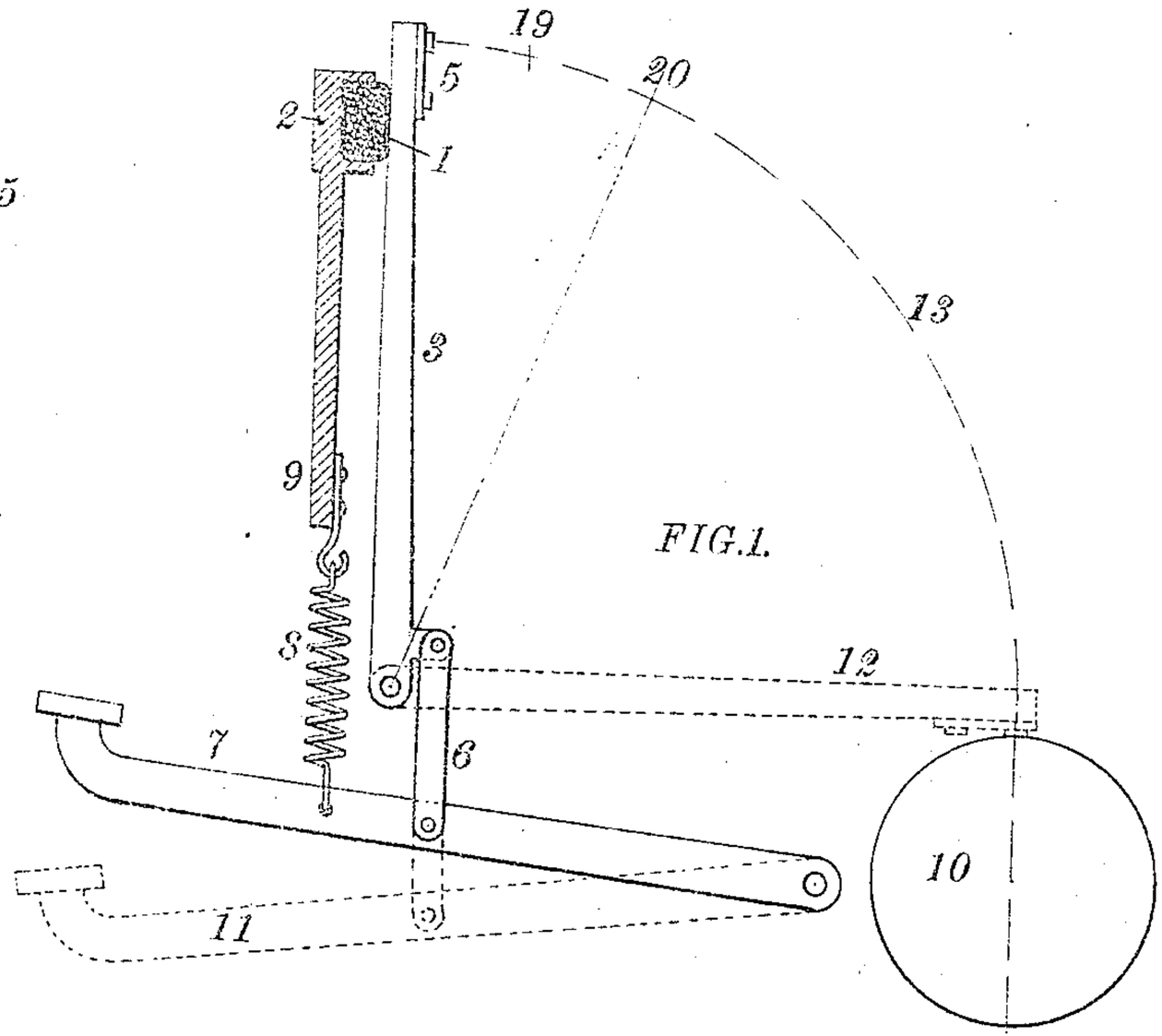

FIG. 1.

FIG. 4.

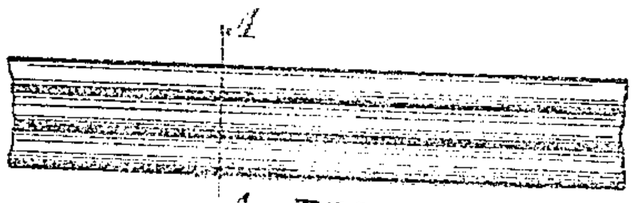

FIG. 5.

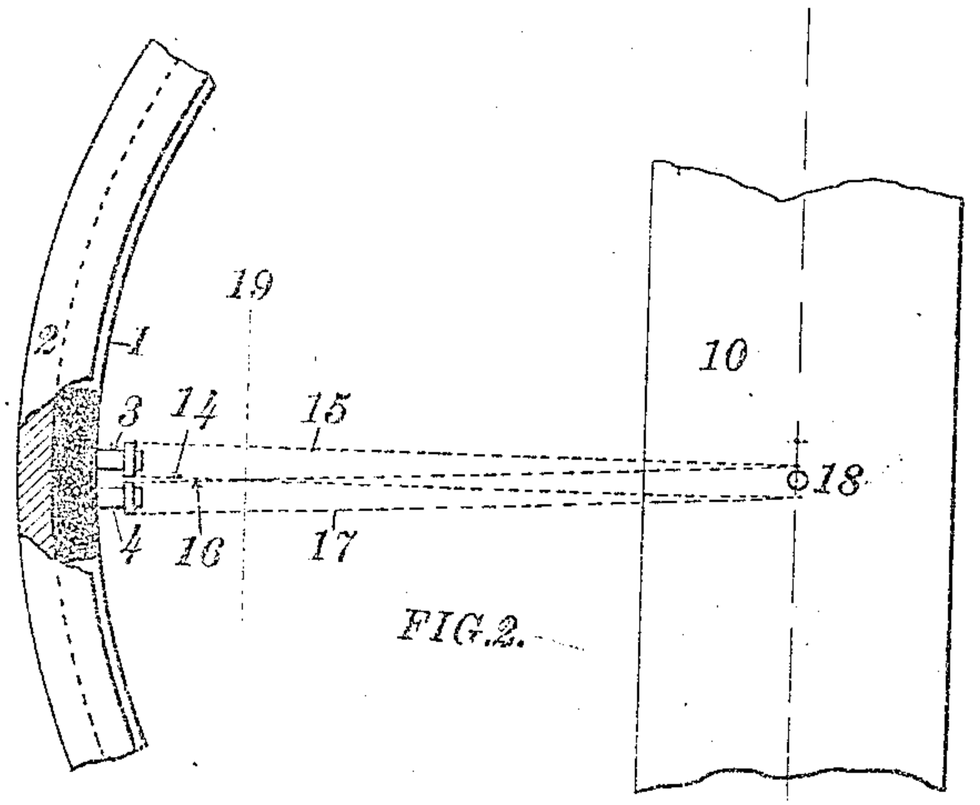

FIG. 2.

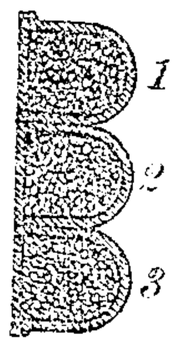

FIG. 6.

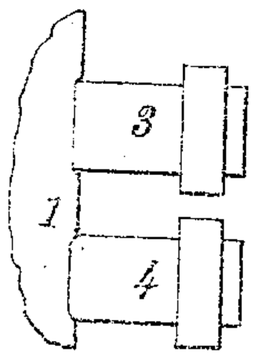

FIG. 7.

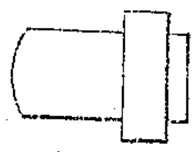

FIG. 8.

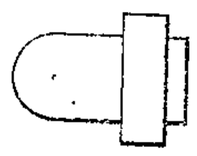

FIG. 9.

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UNITED STATES PATENT OFFICE.

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TYPE-WRITER.

No. 816,552. Specification of Letters Patent. Patented April 3, 1906.

Application filed May 20, 1902. Serial No. 108,245.

To all whom it may concern:

Be it known that I, WILLIAM BAXTER, Jr., a citizen of the United States, residing in Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Type-Writers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a machine embodying my invention and in which the type-bars are held in a vertical position. Fig. 2 is a plan of the same. Fig. 3 is a sectional detail view of the type-bar and the abutment and cushion. Figs. 4 and 5 are modifications of the cushion adapted for different constructions of machines. Fig. 6 is a cross-section on line A A of Fig. 5 and on line B B, Fig. 4. Fig. 7 is a top view of a pair of type-bars abutting against the cushion, and Figs. 8 and 9 are views showing modifications of the type-bars.

The object of my invention is the prevention of the colliding of the type-bars when adjoining bars are moved in succession. It is applicable to all forms of type-bar machines. In some of these machines the bars are located in a circular row, forming a cylinder that is generally in a vertical position. In other designs the bars do not form a complete cylinder, but only a portion thereof, covering an arc that may vary between sixty and one hundred degrees or more. In the latter type of machines the type-bars may rest in a vertical, a horizontal, or an inclined position. In some machines—as, for example, the "Oliver"—the bars are arranged in two groups, one on each side of the keyboard. Whatever the arrangement of the type-bars may be, they all swing to the same point or printing-center when moved by the depression of the keys. Therefore the paths of the several bars must lap over each other for a considerable portion of their length. This fact can be made more evident by reference to Figs. 1 and 2. In Fig. 1 the type-bar is shown at 3, the type (marked 5) being located at the upper end, while the pin around which the bar swings passes through the lower end. The circle 10 is the roller on which the paper is placed. When the key-lever 7 is depressed to the position 11, it swings the type-bar down upon the cylinder 10 into the position 12, the movement of 7 being conveyed to 3 through the connecting-link 6. After the bar has struck the paper on 10 it returns to the position in which it is drawn, resting against the cushion 1, that is supported in a recess in the abutment 2, this abutment being properly secured to the frame of the machine. In Fig. 2, which is a plan of Fig. 1, two type-bars, side by side, are shown at 3 and 4. Both these bars when moved swing toward the printing-center 18, and, as can be readily seen, the path of 3, which is defined by the lines 14 15, laps onto the path of 4, which is defined by lines 16 17 at the vertical line 19. If bar 3 is moved and 4 is moved immediately thereafter, 4 will strike 3 when 3 is on its return stroke, providing 3 does not cross line 19 before 4 reaches this position. If the machine is properly actuated, colliding cannot take place, because the operator will not depress the key that moves 4 until he has raised his finger from the key of 3, and the action in the machine is so rapid that the key moves upward as fast as the finger of the operator, so that the type-bar 3 will strike the cushion 1 before the key 4 is depressed. Notwithstanding this fact, the type-bars that are side by side, as 3 and 4 in the drawings, do collide very often in practice. The reason why they collide is that each bar when it strikes the cushion 1 on the return stroke rebounds, the distance through which it moves on the rebound being all the way from about one-fifth to one-half of the distance from 1 to the cylinder 10. When the bar strikes the cushion 1 on its return from the first rebound, it will move forward a second time, but through a much shorter distance, and, as can be readily understood, it will rebound a vast number of times before coming to an actual state of rest. The first rebound, however, is the only one that will carry the bar beyond the line 19. Suppose the bar 3 after striking the cushion 1 on the return stroke rebounds to the position of line 20 in Fig. 1, then if bar 4 is moved forward and crosses line 19 before 3 passes this same line, moving back toward 1, it is evident that bar 3 will be caught by bar 4. To prevent the second bar depressed from catching the first one, it is clear that means must be provided to prevent the bars from rebounding, or at least to so far prevent the rebound that the bar will not swing forward as far as line 19. The reason why the bars rebound is that they and the cushion or other abutment against which they rest are both elastic or re-

silient, and as a result the energy of impact of the blow struck by the bar is stored up and is returned in sending the bar forward on the rebound movement. This being the case, it is evident that to prevent the bars from rebounding it is necessary to provide an abutment that will absorb or dissipate the energy of the blow and not store it, for if the energy is absorbed there will be no energy left to move the bar on the rebound. Hence there will be no movement of the bar. To absorb the energy of the blow and not store it, the abutment must be yielding, but not elastic or resilient. If it is inelastic, but not yielding, then some of the energy of the blow will be stored in springing the type-bar or some of the connecting-links, and then when the elasticity of these parts returns them to their natural form the type-bar will have been thrown forward.

My invention consists in providing an inelastic or non-resilient yielding abutment for the type-bars to strike against. This abutment consists of the cushion 1 and its support 2. The essential part of the device, however, is the cushion. In Fig. 3 the cushion 1, the supporting-abutment 2, and the upper end of the type-bar 3 are shown on an enlarged scale, so as to more clearly illustrate the construction of the cushion. The cushion herein illustrated consists of a casing or sheath made of leather, cloth, or some similar material and a filling made of granulated or otherwise finely-divided material. I have found that a very good material for the sheath is thin buckskin and for the filling small shot about three or four hundredths of an inch in diameter. Many other forms of finely-divided material can be used, such as sand, glass beads, or balls, pulverized lime, chalk, small seeds, &c. Seeds are not desirable, as they will disintegrate after being struck a greater or less number of blows. Pulverized materials are liable to cake, and sand is objectionable, as in the event of leaking through the sheath it might get into the working parts of the machine and wear them out. If the construction of the cushion, as shown in Fig. 3, is considered, it will be seen that when the type-bar 3 strikes it the balls that form the filling will be displaced, and thus the energy of the blow will be absorbed in imparting motion to these balls. When all the energy of the blow has been absorbed by the movement of the balls that constitute the filling, the type-bar will come to a state of rest, and it will not rebound because there will be no stored-up energy to send it forward. To make the cushion 1 as perfect in action as possible, the sheath must be of soft material and as inelastic as can be obtained, for if it is stiff and decidedly elastic it will store some of the energy of the blow, and thus cause the type-bar to rebound to a slight extent. It is also necessary that the filling of the cushion be of such a structure that its particles can move out of place with little or no resistance, because if they do not a portion of the energy of the blow will be stored by flexing the type-bar and its connecting-links, and this energy will be given back in the form of a slight rebound. In practice it is not possible to make a sheath that is entirely free from elasticity and stiffness, and it is not possible to obtain a filling that will permit the particles to move without resistance; but these conditions can be approximated so nearly by using soft leather or cloth for the sheath and for filling a granulated or otherwise finely-divided material the particles of which have smooth surfaces and are hard that the distance through which the type-bars will rebound is so small as to be only a fraction of the distance from the cushion to line 19. If the type-bars rest in a horizontal position, as in the "Underwood" machine, the filling of the cushion 1 would be likely to gradually work down to the center, thus making the abutment too high for the type-bars at the bottom of the curve and so low for those at the sides as to permit the bars to strike the side flanges of 2 that support the cushion sidewise. To prevent this occurrence, I make the cushion divided into compartments running diagonally across the face, as is shown in Fig. 4. In machines in which the type-bars are held in the vertical position, as in Fig. 3, the filling may settle at the lower side to such an extent as to throw the bars too far forward, and to prevent this occurrence I construct the cushion for such cases with two or more compartments running parallel with the sides, as is shown in Fig. 5. A better idea of the construction shown in Figs. 4 and 5 can be had from Fig. 6, which is a cross-section of the first figure on line B B and of the second on line A A.

I do not herein specifically claim the compartments running longitudinally of the pad or parallel with the sides thereof, but have elected to claim herein, broadly, the idea of having these compartments running at an angle to the type-bars and specifically the idea of having them at an angle to the length of the pad. The latter form may be used in all forms of type-writers, whereas the former is useful principally in circular type-baskets. The effect of both of these forms is to produce a pad with a fluted surface, which is especially advantageous in a type-pad having the inherent qualities of yielding and non-resiliency, in that it makes the yielding of the pad more responsive to the type-bar, and while maintaining the breadth of support for the type-bar brings less of the material in contact therewith, and therefore facilitates eliminating the resilient effect of the pad.

The type-bars as ordinarily made have sharp edges, as shown in Fig. 7 at 3. With the pads commonly used there is no objec-

tion to the sharp corners, but with the cushion here described there is, as the edges are liable to cut through the sheath, and thus allow the filling to escape. On this account I prefer to make the type-bar along the portion that strikes the cushion with rounded corners, as indicated on bar 4 of this figure, or else I make them curved, as in Fig. 8, or semicircular, as in Fig. 9. In these drawings the abutment and cushion are shown in position to be struck by the upper end of the type-bar; but it can be readily seen that this position is not the only one that will met the requirements. In fact, the abutment might be placed so as to be struck by a projection from the type-bar provided just for that purpose, or it might even be placed so as to be struck by the key-lever 7 instead of the bar 3. As my invention is applicable to any form of type-writer using type-bars, I do not limit myself to its use when located in the position here shown, but claim it in any position in which the design of the machine on which it is used may require it to be placed. My invention consists in providing an inelastic and yielding cushion to receive the impact of the blow struck by the type-bars on the return stroke, and therefore is not limited either in the position of the cushion, its shape, or the way in which it is supported, providing its position is such that it can absorb the energy of the blow struck by the type-bar, its shape such as to not interfere with its properties of being yielding and inelastic, and the way in which it is supported such as not to impair its efficiency of action.

Having thus described the invention, the following is what is claimed as new therein:

1. In a type-writer a yielding inelastic cushion, against which the type-bars strike on the return stroke, consisting of a sheath of soft flexible material, and a filling of finely-divided material, in rounded form.

2. A type-bar pad, having in its structure the inherent qualities of yielding and non-resiliency and constructed in fluted form.

3. The combination of a cushion located to receive the impact of the type-bars on their return stroke, formed of a sheath and a filling yielding by lateral displacement, and an abutment shaped to receive said cushion and support it along the sides.

4. The combination of a yielding inelastic cushion to support the type-bars in their normal position, consisting of a sheath of flexible material, and a filling of finely-divided material, and an abutment shaped to receive and hold said cushion.

5. The combination of a yielding inelastic cushion consisting of a sheath arranged to divide said cushion into compartments, these compartments being filled with a finely-divided material, yielding by lateral displacement; and an abutment fastened to the frame of the machine, and provided with a groove or depression to hold the cushion in its proper position.

6. A yielding inelastic cushion to receive the impact of the type-bars, comprising compartments made of flexible material, filled with a finely-divided substance.

7. A yielding inelastic cushion to receive the impact of the type-bars, consisting of an inclosing sheath divided into compartments filled with a finely-divided material; the line of division between the compartments running at an angle to the direction in which the filling tends to gravitate.

8. In a type-writer, a yielding inelastic cushion for arresting the type-bars in normal position, constructed of an inclosing sheath and a filling of finely-divided material; the sheath being formed in a plurality of compartments, the lines of division between which compartments extend at an angle to the length of the cushion.

9. In a type-writer, a yielding inelastic cushion for arresting the type-bars in normal position, constructed of an inclosing sheath and a filling of finely-divided material; the sheath being formed in a plurality of compartments the lines of division between which compartments extend at an angle to the length and to the transverse dimension of the cushion.

10. In a type-writer, a yielding inelastic cushion to receive the impact of the type-bars on their return stroke, consisting of a sheath of flexible material constructed to form compartments running diagonally across the face of the cushion, and a filling of finely-divided material in these compartments.

11. The combination of a type-writer-key cushion constructed with a filling to absorb the energy of the blow yielding by lateral displacement when struck by the type-bars, properly located to receive the impact of said bars; an abutment shaped to receive and hold the cushion, and the type-bars constructed with rounded surfaces or corners along the portion that strikes the cushion.

12. The combination of a yielding non-resilient cushion to support type-bars in their normal position, consisting of a sheath of suitable flexible material, and a filling of finely-divided material; an abutment secured to the frame of the machine and adapted to receive and hold the cushion; type-bars arranged to strike and rest against the cushion; and the operating key-levers acting under a suitable return influence, to return the type-bars to their normal position against the cushion.

The foregoing specification signed this 10th day of May, 1902.

WILLIAM BAXTER, Jr.

In presence of—
STEPHEN H. OLIN,
A. L. WILSON.