

No. 770,061.

PATENTED SEPT. 13, 1904.

C. M. FURMAN, JR.  
CALCULATING MACHINE.

APPLICATION FILED NOV. 28, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

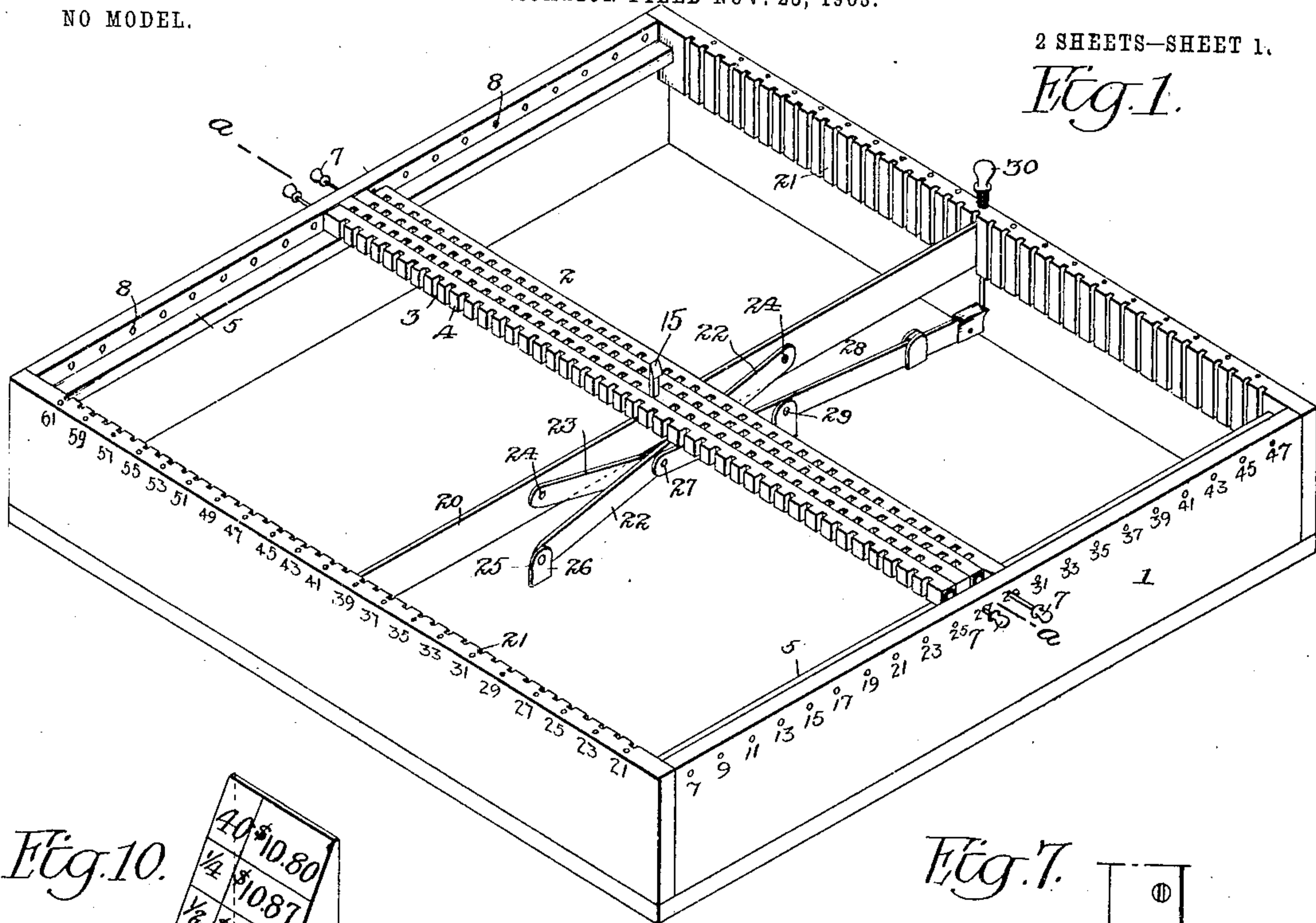


Fig. 10.

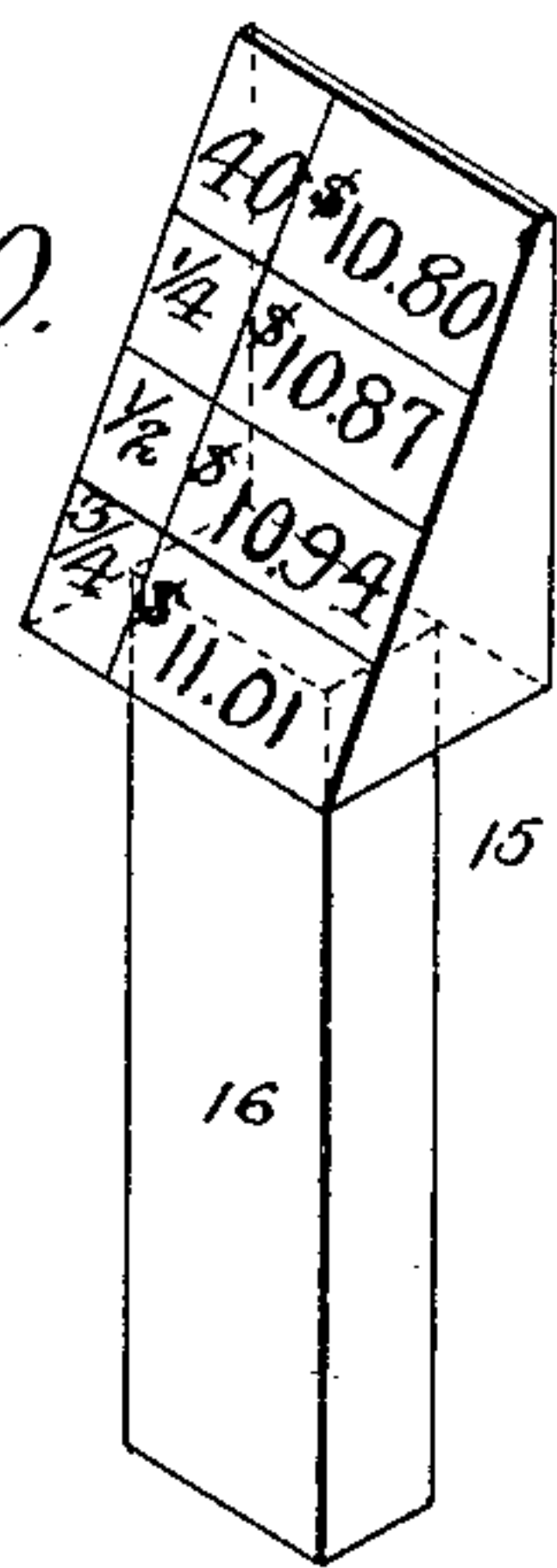


Fig. 7.

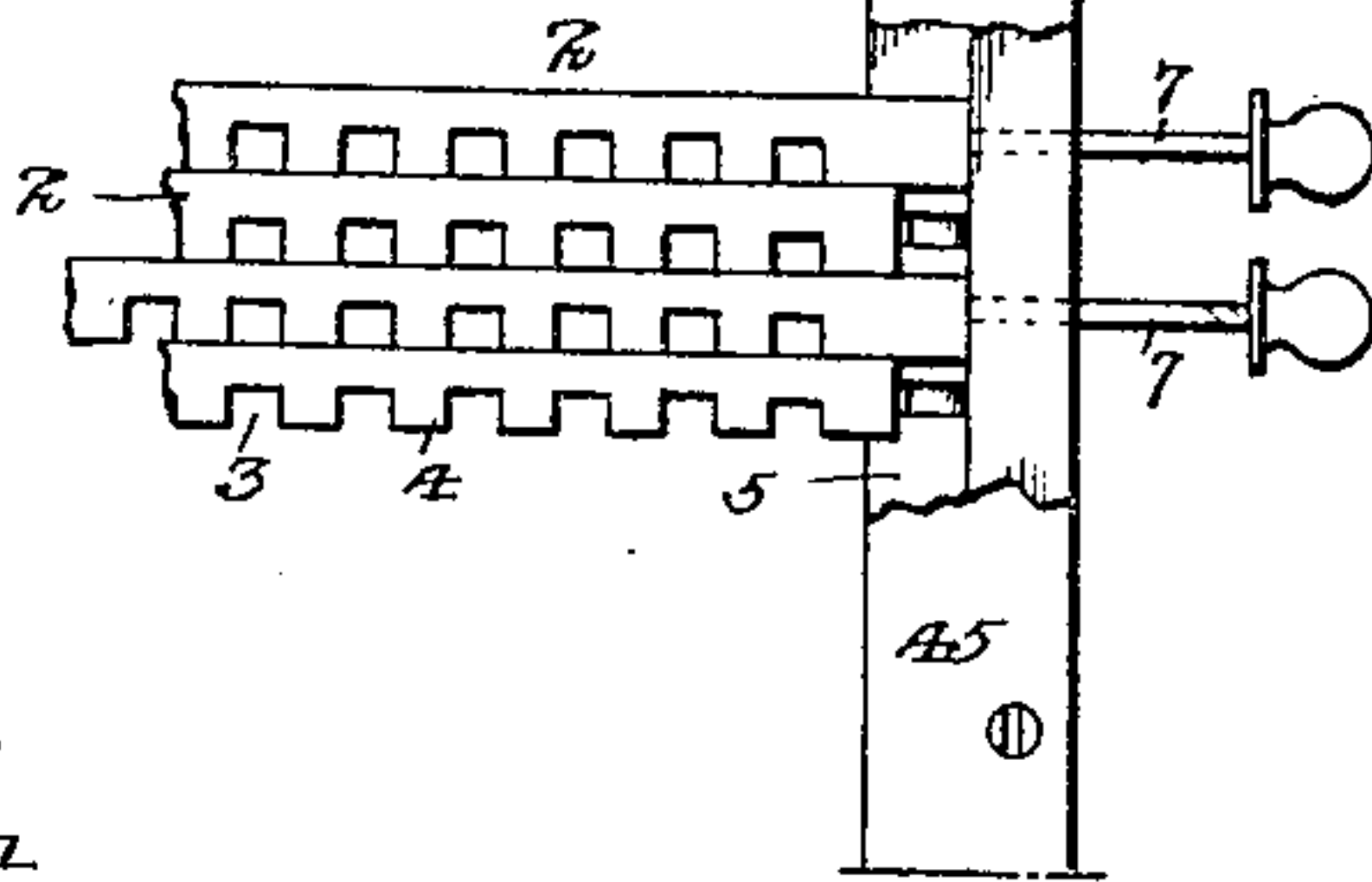


Fig. 8.

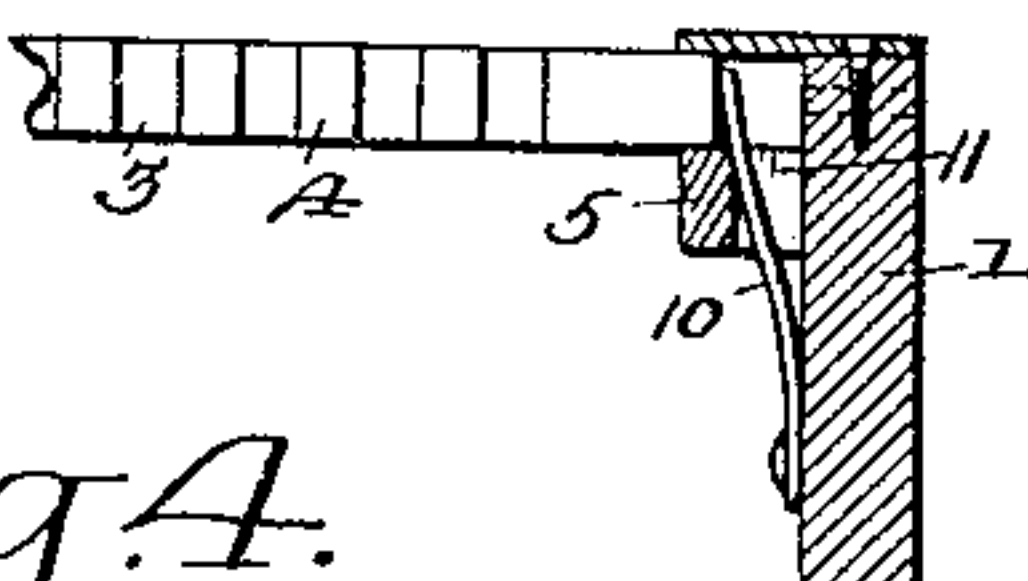


Fig. 4.

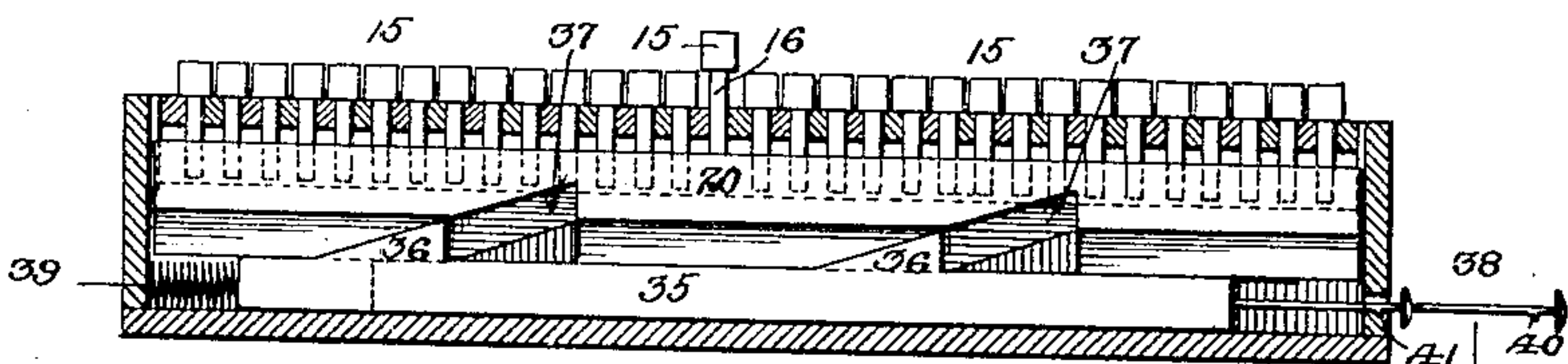


Fig. 6.

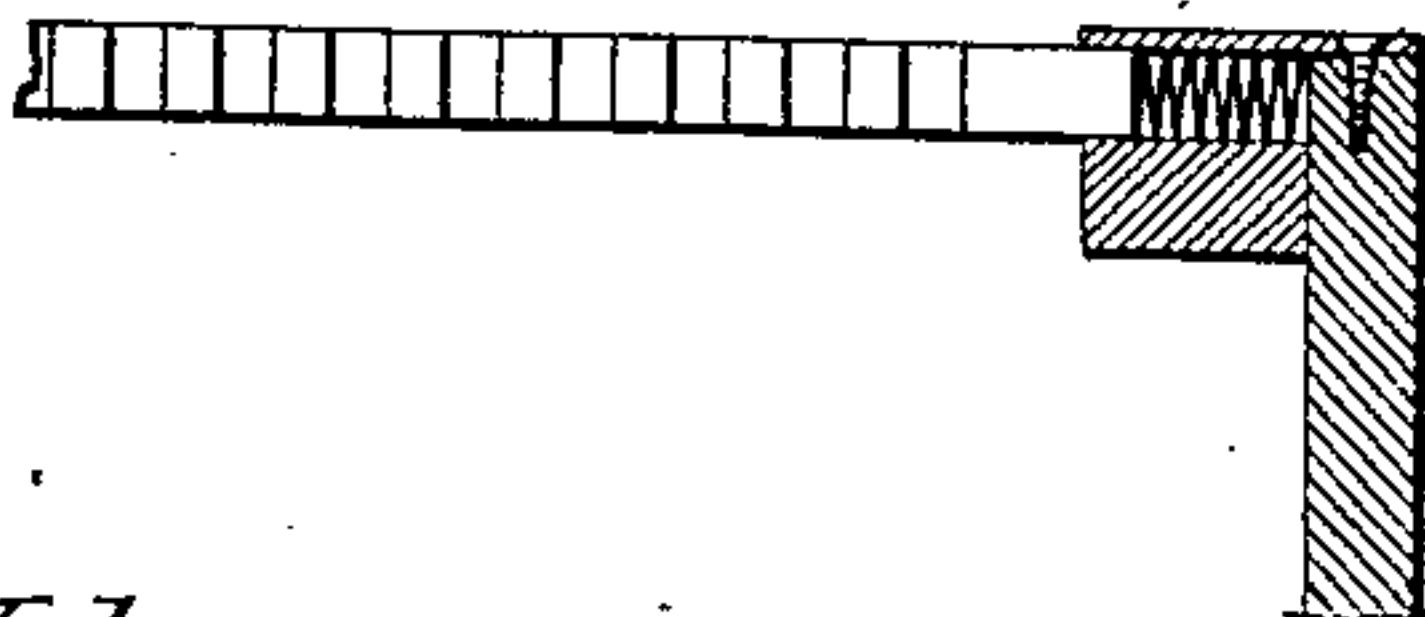
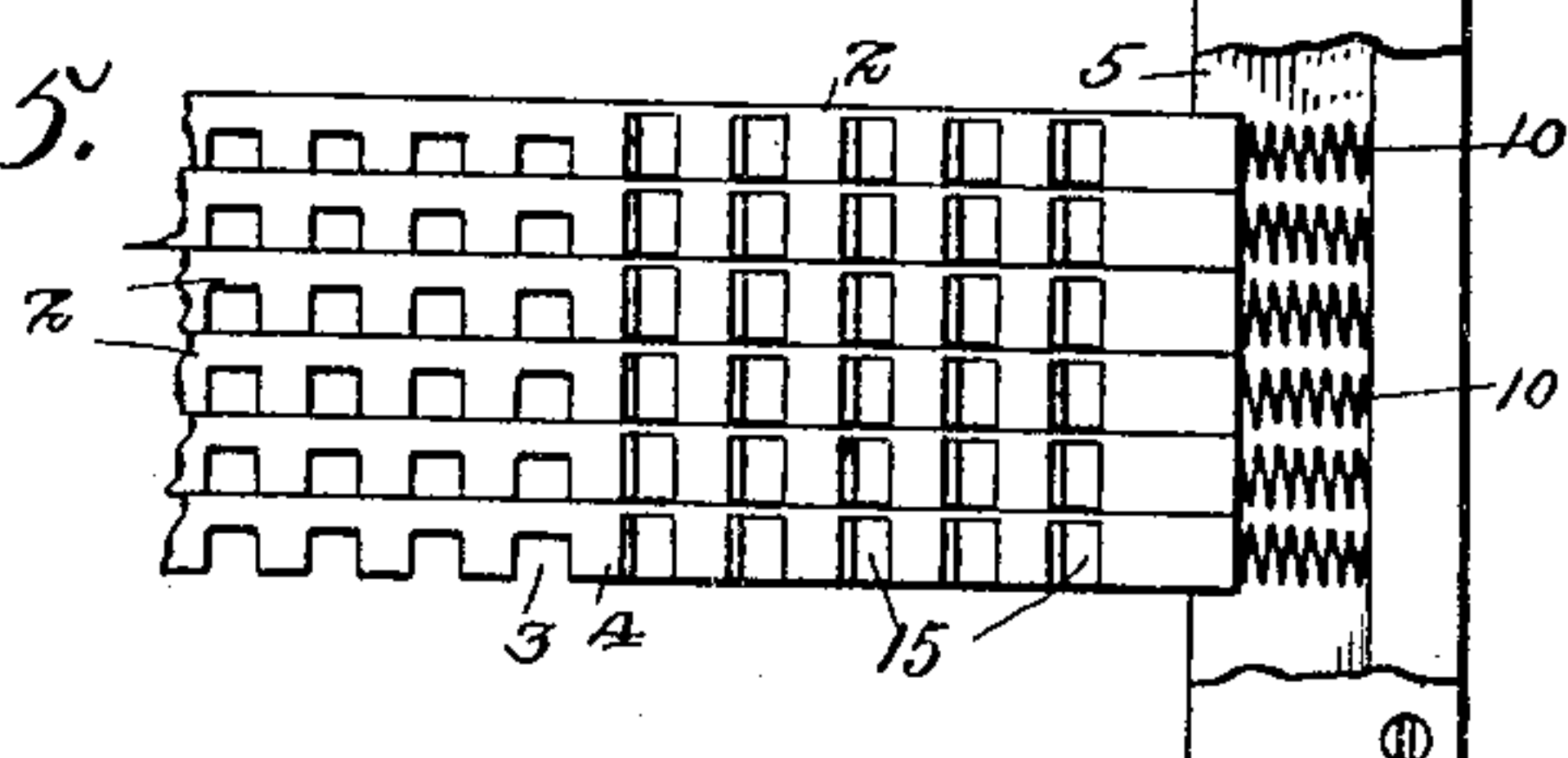


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 2.

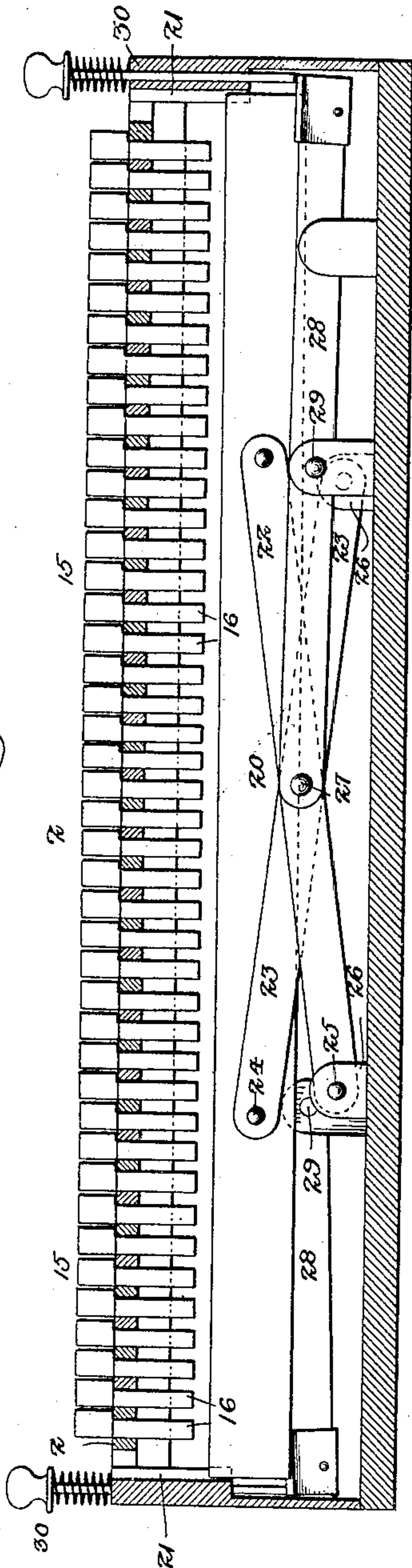


Fig. 3.

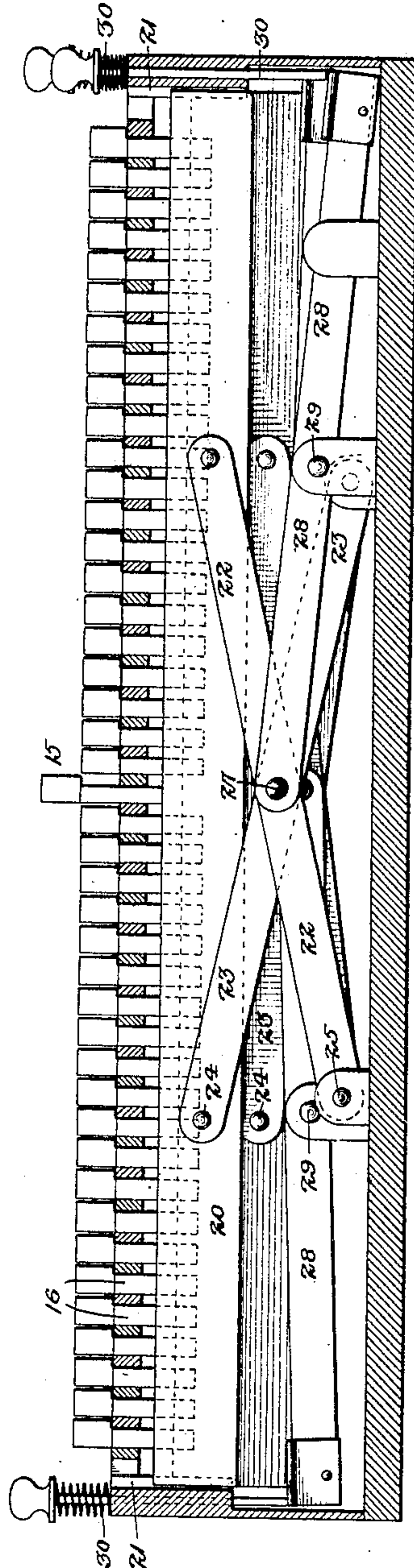
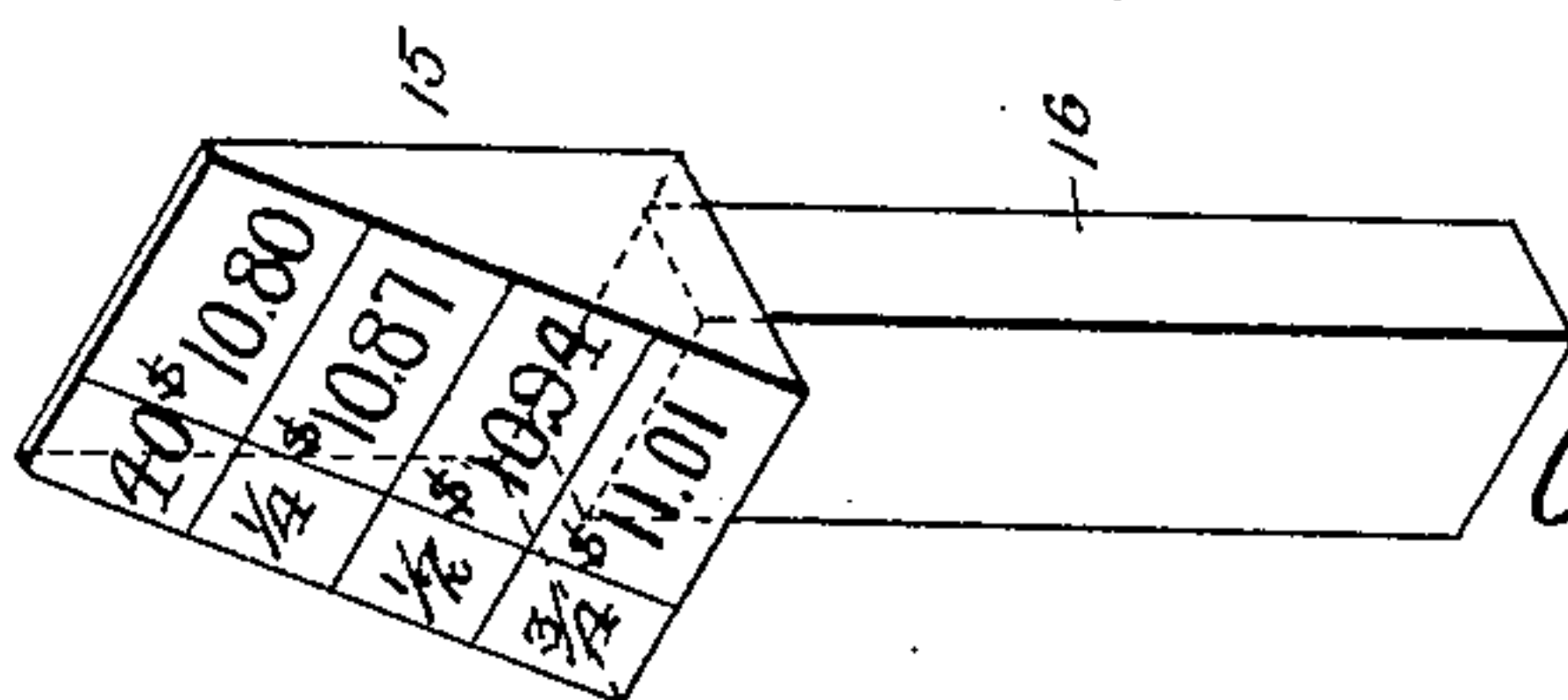


Fig. 4.



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# UNITED STATES PATENT OFFICE.

CHARLES M. FURMAN, JR., OF PHILADELPHIA, PENNSYLVANIA.

## CALCULATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 770,061, dated September 13, 1904.

Application filed November 28, 1903. Serial No. 182,993. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES M. FURMAN, Jr., a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented an Improved Calculating-Machine, of which the following is a specification.

My invention relates to calculating-machines designed for calculating the amount of wages due when the wage per hour, day, or week, and number of hours of service is given.

My invention is designed to facilitate the finding of any desired number or amount by mechanical means, thus avoiding all mental effort in effecting calculation and insuring absolutely a correct result.

My invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view showing one form of my improved calculating-machine, showing sufficient of the parts to illustrate the structure and operation of such machines. Fig. 2 is a sectional view, on an enlarged scale, taken on the line *a a*, Fig. 1, showing parts of the apparatus in normal or non-working position. Fig. 3 is a similar sectional view showing the position of the parts when the machine is being operated. Fig. 4 is a similar view, on a smaller scale, illustrating a modified form of structure; and Figs. 5, 6, 7, 8, 9, and 10 are views illustrating details of my invention.

In the accompanying drawings, 1 represents a frame, box, or drawer, rectangular in shape, having a series of notched bars 2 extending across and filling the entire upper portion of the case, such bars containing notches arranged in line with each other and indicated at 3, with solid portions of the bar of the same width lying between said notches and indicated at 4. The bars 2 may rest upon ledges 5 upon opposite sides of the drawer 1 and have at one end headed stems 7, which extend through apertures 8 in the side walls of the frame or case and serve to position said bars with respect to the casing. These pins serve also as a means to move the bar 2 in a longitudinal direction for a purpose to be hereinafter described. In some instances the bars may be arranged with the operating-stems alternating on opposite sides of the

box or drawer 2, as shown in Figs. 1, 2, and 3, or these bars may have their stems upon one side only of the box or drawer, as shown in Figs. 4, 5, and 6.

At the opposite end of each bar a spring is provided, which serves to maintain the bars in a certain position with relation to the casing, such springs being disposed in any suitable manner, and if they are flat springs, as shown in Figs. 7 and 8, they will pass through suitable openings 11, formed in the side supports 5. It will be noted that the bars shown in Fig. 1 are arranged so that every other one has its stem extending on one side and the alternate members have their pins extending on the opposite side of the casing. This arrangement will facilitate the manipulation of said bars by the aid of the stems, but is not necessary, and the stems may be arranged on one side only, as shown in Fig. 4.

Disposed in each of the notches 3 of the bars 2 are number-carrying members 15, having posts or studs 16, loosely fitting said notches and capable of vertical movement when operated by proper mechanism. These studs or members contain amounts representing the wages due for certain specified hours and the even fractions of the same.

Arranged within the box or casing and at right angles to the notched bars 2, carrying the studs or members 15 containing the amounts, are a series of vertically-moving bars 20, which normally lie directly beneath the solid portions 4 of the bars 2. These bars 20 are arranged to lie in grooves 21, disposed in the opposite sides of the box or casing and are vertically movable in said grooves.

In one form of my apparatus (illustrated in Figs. 1, 2, and 3) the bars 20 are carried by a pair of toggle-links 22 and 23, pivoted at 24 to said bar at 25 to supports 26 in the casing proper and at 27 to an operating bar or member 28. This bar or member 28 is fulcrumed at 29 and is depressed by means of a vertically-moving stem 30, carried by the side wall of the box or casing and in line with the grooves for the reception of the bars 20. Under normal conditions the bars 20 may be raised and lowered by depressing of any of the stems 30, and such action does not affect



any other portion of the apparatus. In lieu of this toggle-lever mechanism I may provide the means illustrated in Fig. 4 to effect the vertical movement of one of bars 20. In this form of structure this movement is accomplished by horizontally-sliding bars 35, lying directly beneath each of the bars 20 and having cam projections 36, which normally rest in similar-shaped recesses 37, formed in the bars 20. These sliding members 35 are controlled by stems 38 and are held in the normal retracted position by means of springs 39. When after one of the bars 2 carrying the number member 15 has been moved into position with relation to the bars 20, the latter is to be operated. This is accomplished by pushing the bar 35, through the aid of one of the stems 38, against the tension of the spring 39, and the number member desired will be raised, as indicated in Fig. 4. The stems 38 are provided with projections 40, adapted to set in depressions 41, formed in the box or casing 1, and when one of the bars 35 has been pushed in it may be held in the forward position by engaging the projection with this notch. In like manner all of the stems controlling the different parts of the mechanism may be provided with similar or substantially similar means for holding said moving parts in the operative position when they have been once moved to such position.

The bars 2 are preferably held in place with respect to the box or casing by means of guard-pieces 45, secured to the edge of the former, as shown in Figs. 5, 6, 7, and 8.

The number members 15 may have their stems or studs disposed with relation to the part carrying the numbers indicating the pay in the manner shown in Fig. 9 or in the manner shown in Fig. 10. These keys or stems 30 are numbered in regular order from end to end to indicate the number of hours for which the pay is to be calculated or the rate of pay, and the cross-bars 2, carrying the vertical moving studs or members, are numbered in the same manner—that is to say, they may contain the rate of wage in regular order or the number of hours for which the wage is to be paid.

The operation of the machine then is as follows: It is desired, for instance, to know the amount due a man for forty and one-half hours' work at the rate of twenty-seven cents per hour. To effect this calculation, the operator will first of all engage the bar 2, which represents the rate of wage or pay which the individual receives for a full hour's work, and pushes this bar longitudinally. His next action is to examine the keys or stems containing the number of hours, and after finding the one indicating forty hours this key is depressed, which has the effect of raising one of the bars 20, controlled by the same, and this bar being now in the changed position of the bar 2 directly under one of said number-car-

rying members 15, carried by said bar 2, such member will be raised and upon examination will be found to contain the amount due for forty and one-half hours' service at the rate of twenty-seven cents per hour—viz., ten dollars and ninety-four cents—and in addition to the amount due for this specified time the several amounts due for forty, forty and one-quarter, and forty and three-quarters hours' work. In like manner any other amount of service at any other amount of wage may be determined by the proper manipulation and operation of the parts of the structure indicating rates of wage and the number of hours' service.

It will be understood that the structure shown in Figs. 4, 5, and 6 may be used in like manner and that either set of moving parts may contain the number of hours or rate of pay, and vice versa.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In a calculating-machine, the combination of a series of sets of movable number-carrying members arranged in parallel rows, means for displacing the individual sets, and means for moving the individual members of the sets after such displacement.

2. In a calculating-machine, the combination of a series of sets of movable number-carrying members arranged in parallel rows, means for displacing the individual sets, and means for imparting vertical movement to the individual members of the sets after such displacement.

3. In a calculating-machine, the combination of a series of sets of movable number-carrying members arranged in parallel rows, means for displacing the individual sets laterally, and means for imparting vertical movement to the individual sets after such displacement.

4. In a calculating-machine, the combination of a series of movable number-carrying members, a series of notched bars arranged in parallel rows in which said members are seated, said bars being movable, and means for raising said number-carrying members after said bars have been moved.

5. In a calculating-machine, the combination of a series of movable number-carrying members, a series of notched bars arranged in parallel rows in which said members are seated means for adjusting or displacing said bars independently of each other, and means for moving said number-carrying members after said bars have been adjusted or displaced.

6. In a calculating-machine, the combination of a series of movable number-carrying members, a series of notched bars arranged in parallel rows in which said members are seated, said bars being laterally adjustable, and means for raising said number-carrying members after said bars have been adjusted.

7. In a calculating-machine, the combina-



tion of a series of number-carrying members, a series of notched members in which said number-carrying members are mounted, said notched members being normally held in one position and movable longitudinally, and a series of members arranged below and at right angles to said notched members and vertically movable with relation to the same, whereby one of the number-carrying members may be raised by such movement when the notched members have been adjusted.

8. In a calculating-machine, the combination of a series of number-carrying members, a series of notched members in which said number-carrying members are mounted, said members being normally held in one position and movable longitudinally, a series of members arranged below and at right angles to said notched members and vertically movable with relation to the same, whereby one of the number-carrying members may be raised by such movement when the notched bars have been adjusted, and means for raising said vertically-moving members.

9. In a calculating-machine, the combination of a series of number-carrying members, notched bars arranged to receive the same, said members having stems extending below the under surface of said notched bars, a series of vertically-moving bars to engage said members, lying below the notched bars and at right angles to the same, means, for moving the notched bars to bring the number-carrying members in line with the lower bars, and means for operating the latter.

10. In a calculating-machine, the combination of a series of number-carrying members, notched bars arranged to receive the same, said members having stems extending below the under surface of said notched bars, a series of vertically-moving bars to engage said members lying below the notched bars and at right angles to the same, means for moving the notched bars to bring the number-carrying members in line with the lower bars, and means for operating the latter, and springs to return the notched bars after the number-carrying member has been raised.

11. In a calculating-machine, the combination of a series of number-carrying members, a series of notched members supporting the same, said number-carrying members having stems disposed in the notches, a series of vertically-movable members lying under the notched members and disposed in line with the spaces between the stems of the number-carrying members, means for moving any one of the notched members to cause the stems of

the number-carrying members to register with the vertically-moving members and means for moving any one of the latter to cause one of the number-carrying members to be raised from its seat in the notched members.

12. In a calculating-machine, the combination of a series of number-carrying members, a series of notched bars supporting the same, said members having stems disposed in the notches, a series of vertically-movable bars lying under the notched bars and normally disposed in line with the spaces between the stems of the number-carrying members, means for moving any one of the notched bars to cause the stems of the number-carrying members to register with the vertically-moving bars, a depressible stem for moving any one of the latter to cause one of the number-carrying members to be raised from its seat in the notched members.

13. In a calculating-machine, the combination of a series of number-carrying members, a series of notched bars supporting the same, said members having stems fitting the notches, a series of vertically-movable bars lying under the notched bars and disposed in line with the spaces between the stems of the number-carrying members, guides for said bars, toggle mechanism for said bars to raise the same evenly, depressible keys of stems for operating said toggle mechanism, and means for adjusting the notched bars so as to bring the stems of the number-carrying members in line with the vertically-movable bars.

14. In a calculating-machine, the combination of a series of number-carrying members, a series of notched bars supporting the same, said members having stems disposed in the notches, a series of vertically-movable bars lying under the notched bars and normally disposed in line with the spaces between the stems of the number-carrying members, guides for said vertically-movable bars, means in engagement with the latter for raising the same, means for adjusting the notched bars so as to bring the stems of the number-carrying members in line with the vertically-moving bars, and push members for operating the means to raise the vertically-movable members.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES M. FURMAN, JR.

Witnesses:

WILLIAM E. BRADLEY,  
JOS. H. KLEIN.