

No. 740,522.

PATENTED OCT. 6, 1903.

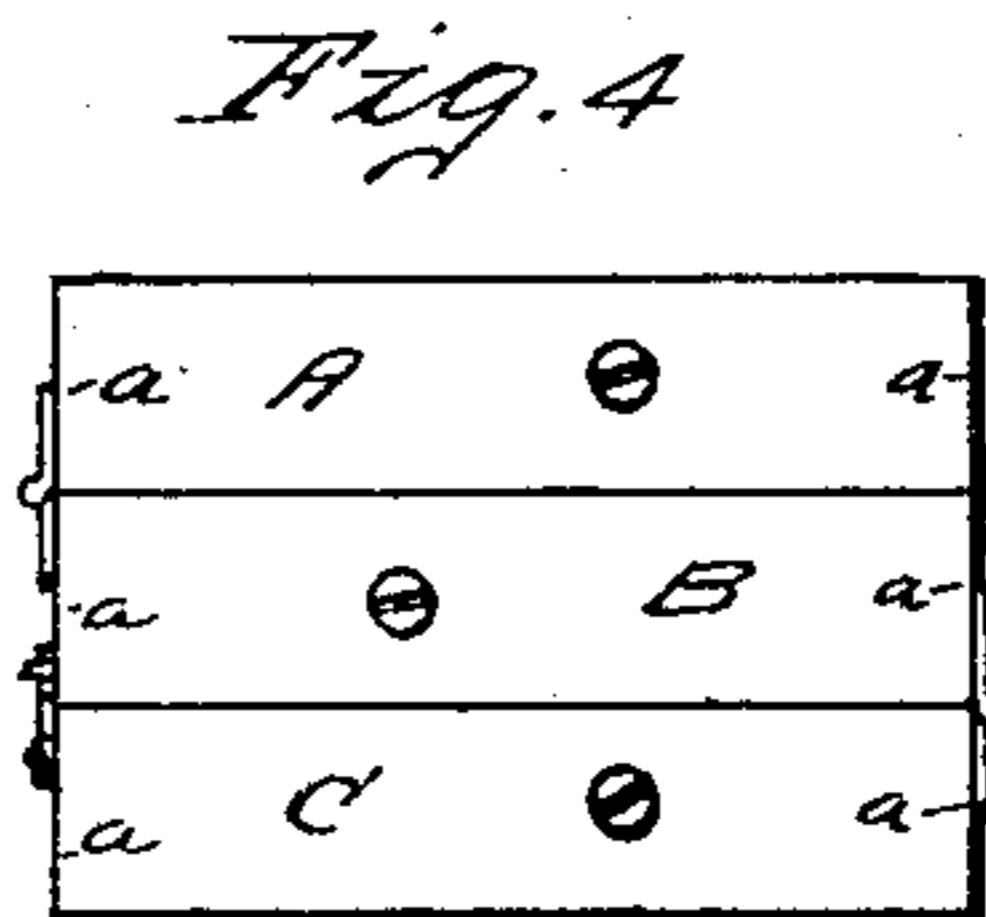
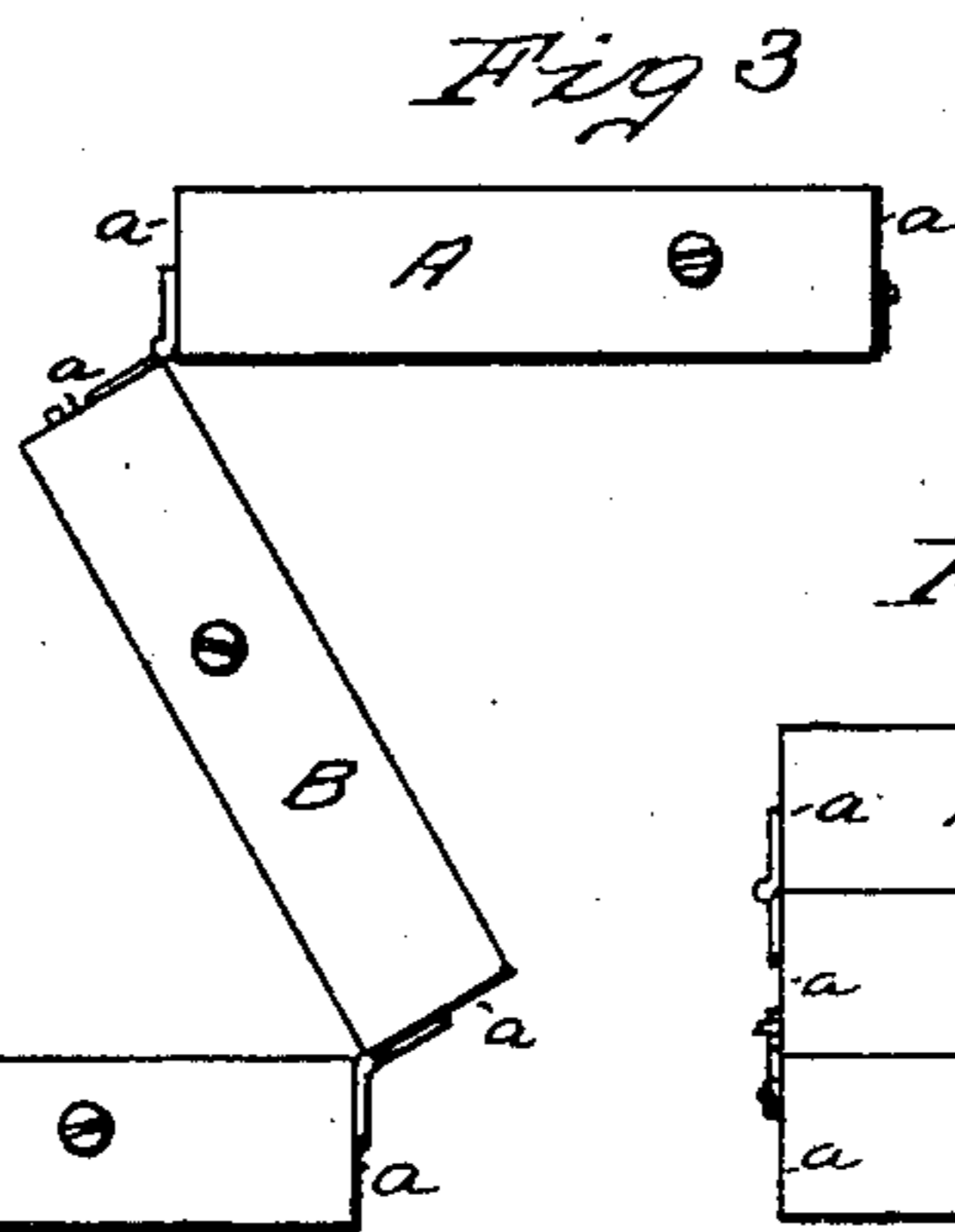
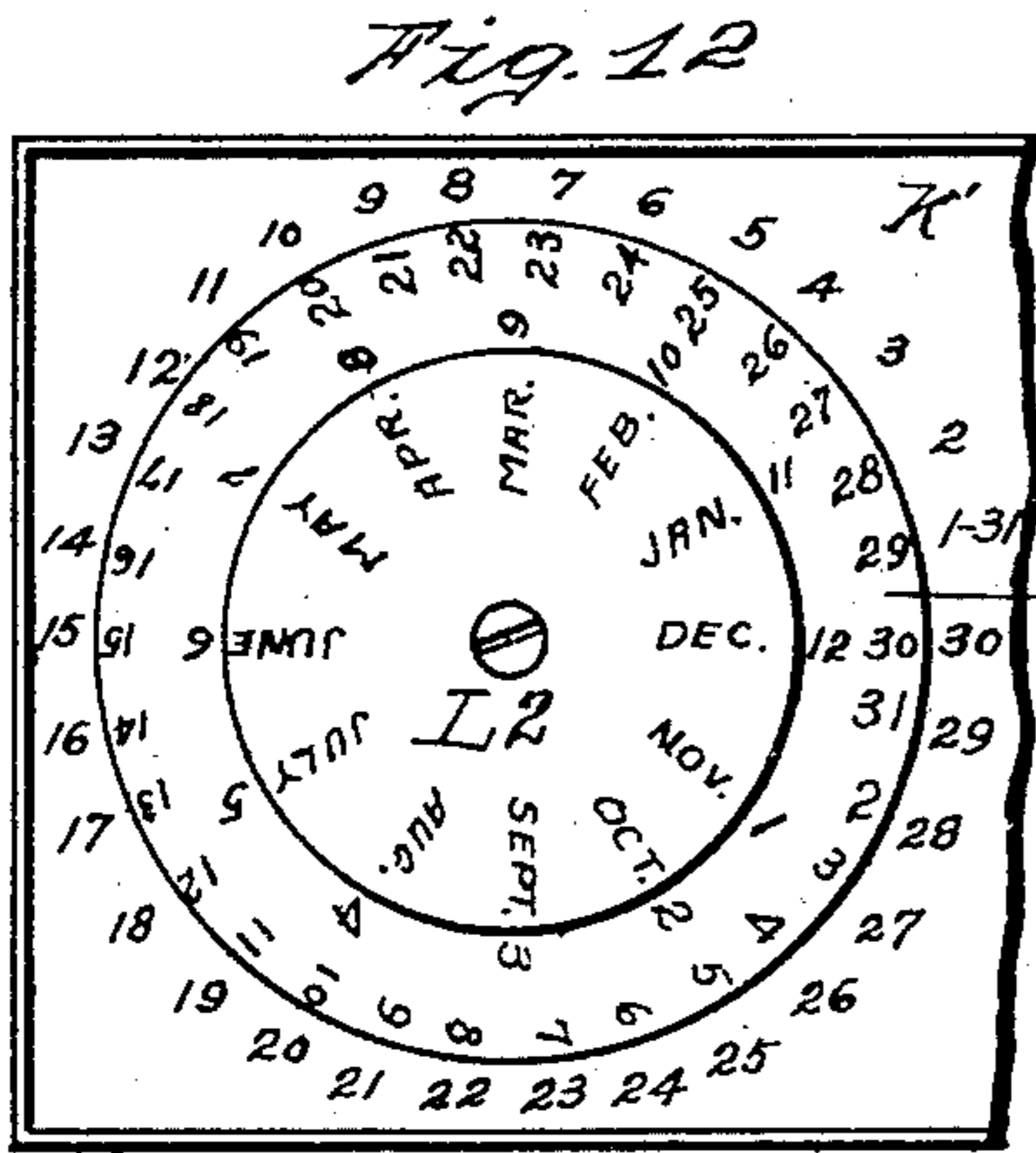
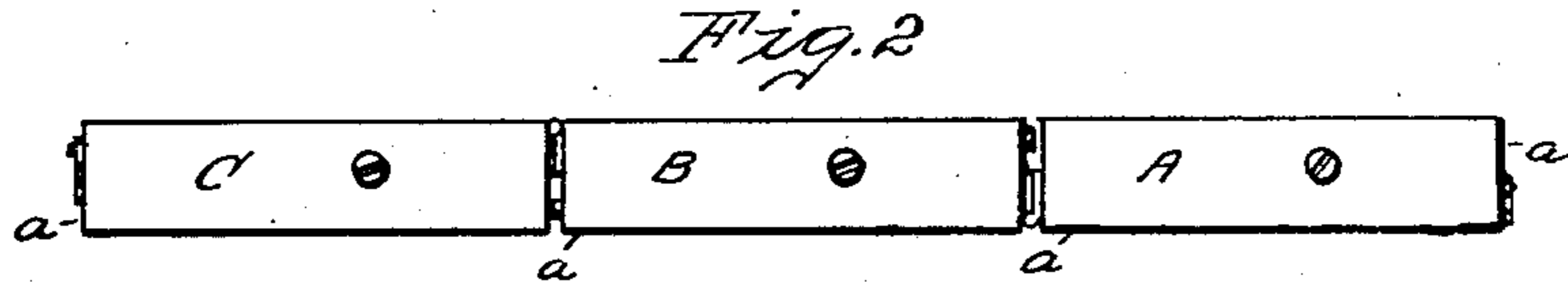
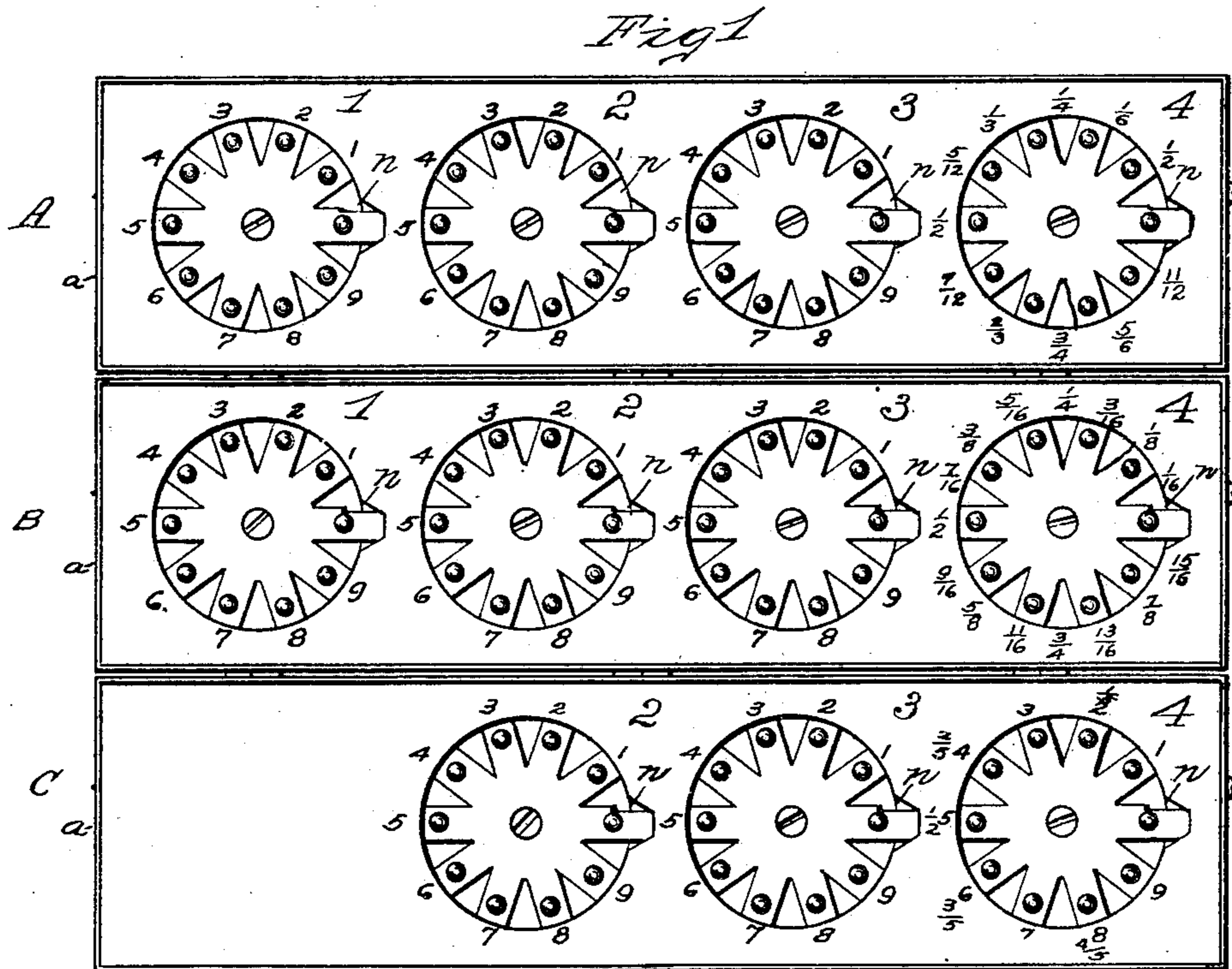
B. BUNDY.

MACHINE FOR ADDING AND SUBTRACTING INTEGERS AND FRACTIONS.

APPLICATION FILED OCT. 21, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses
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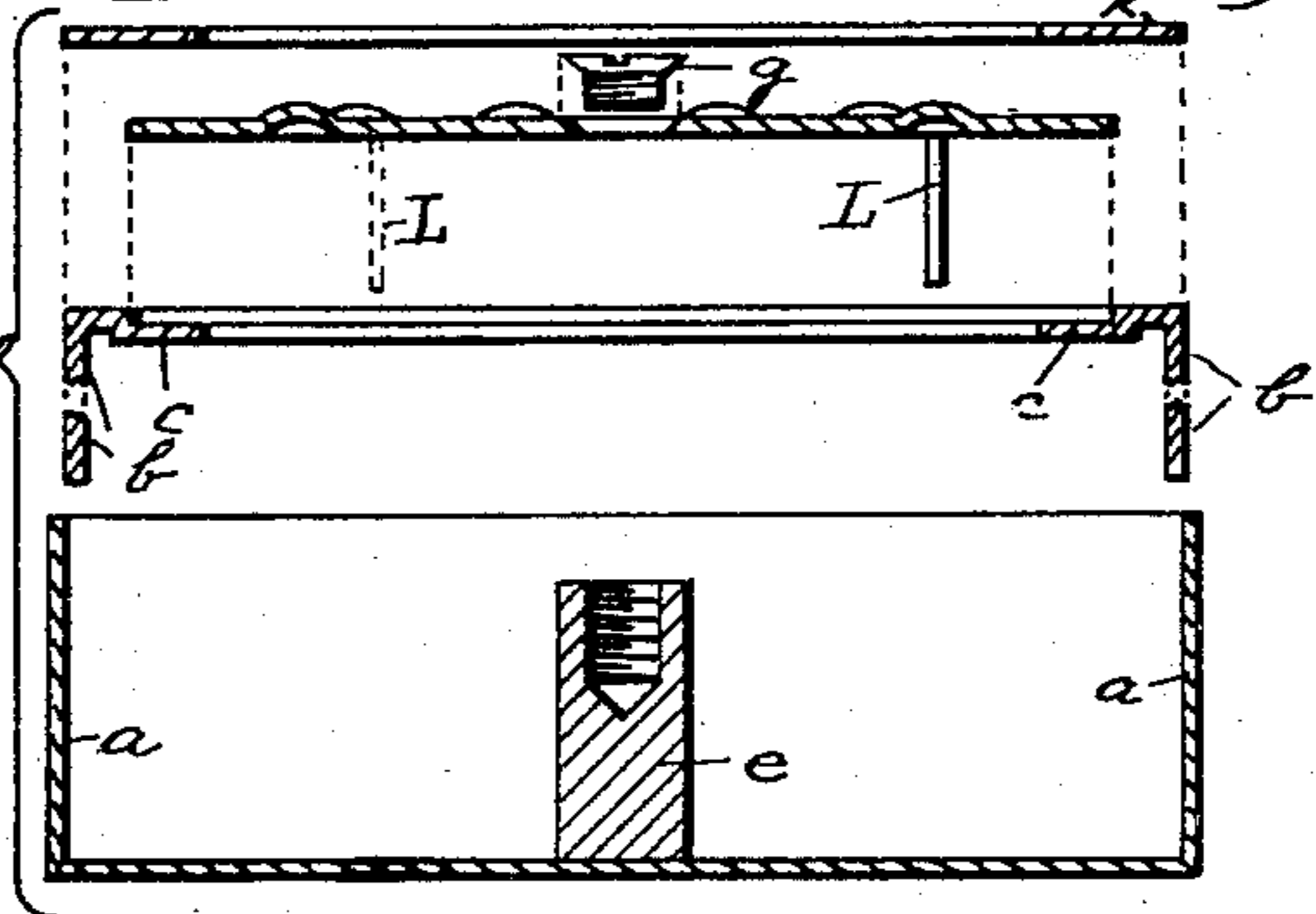
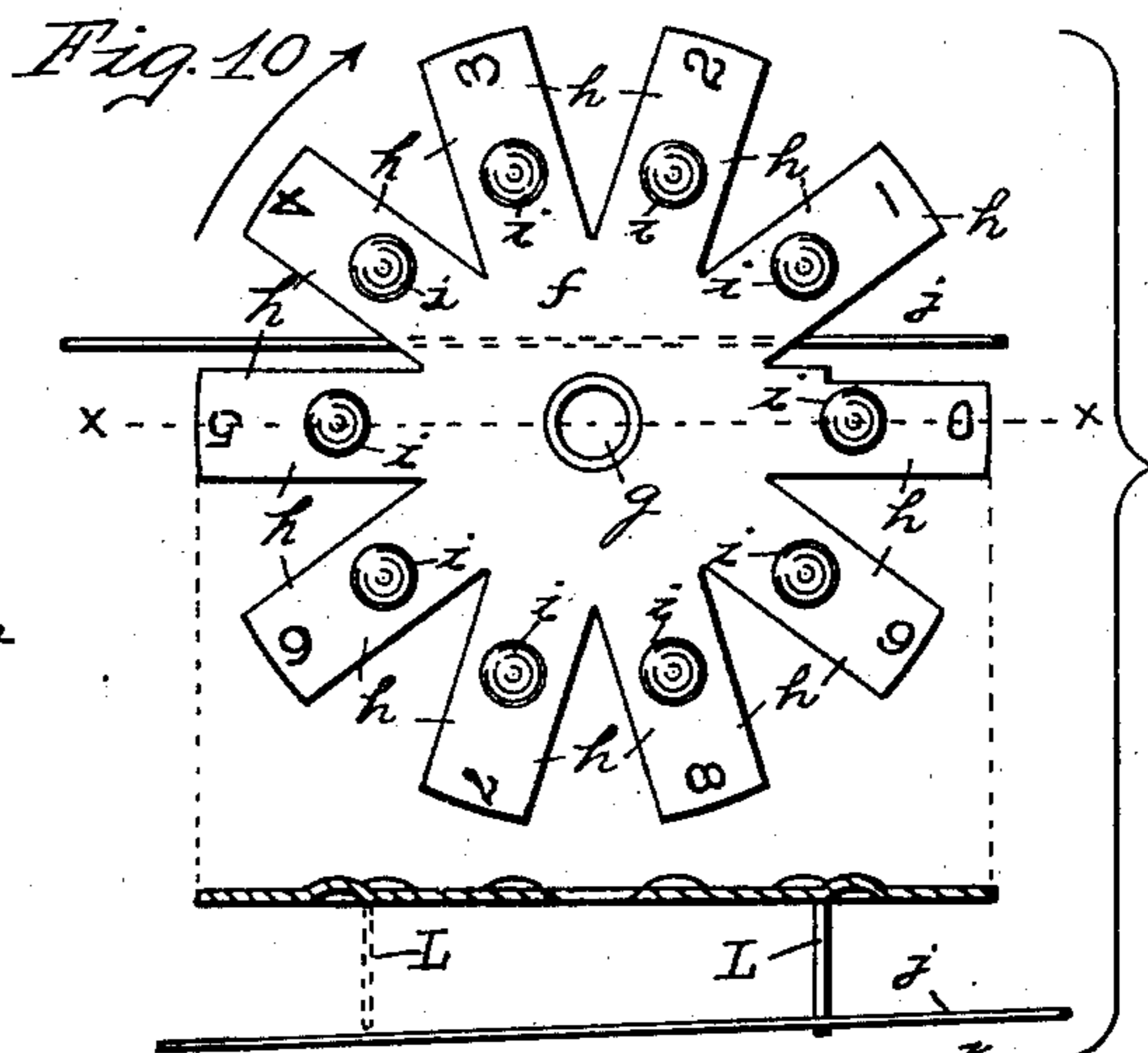
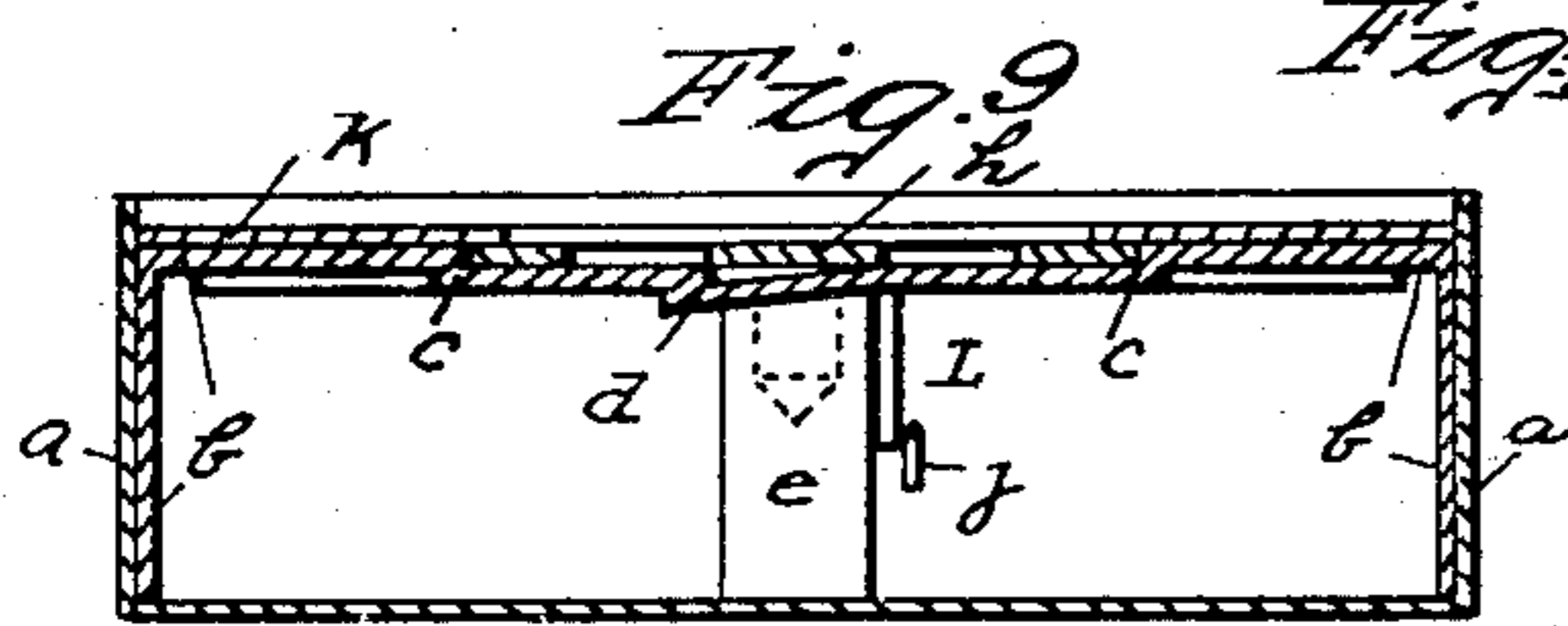
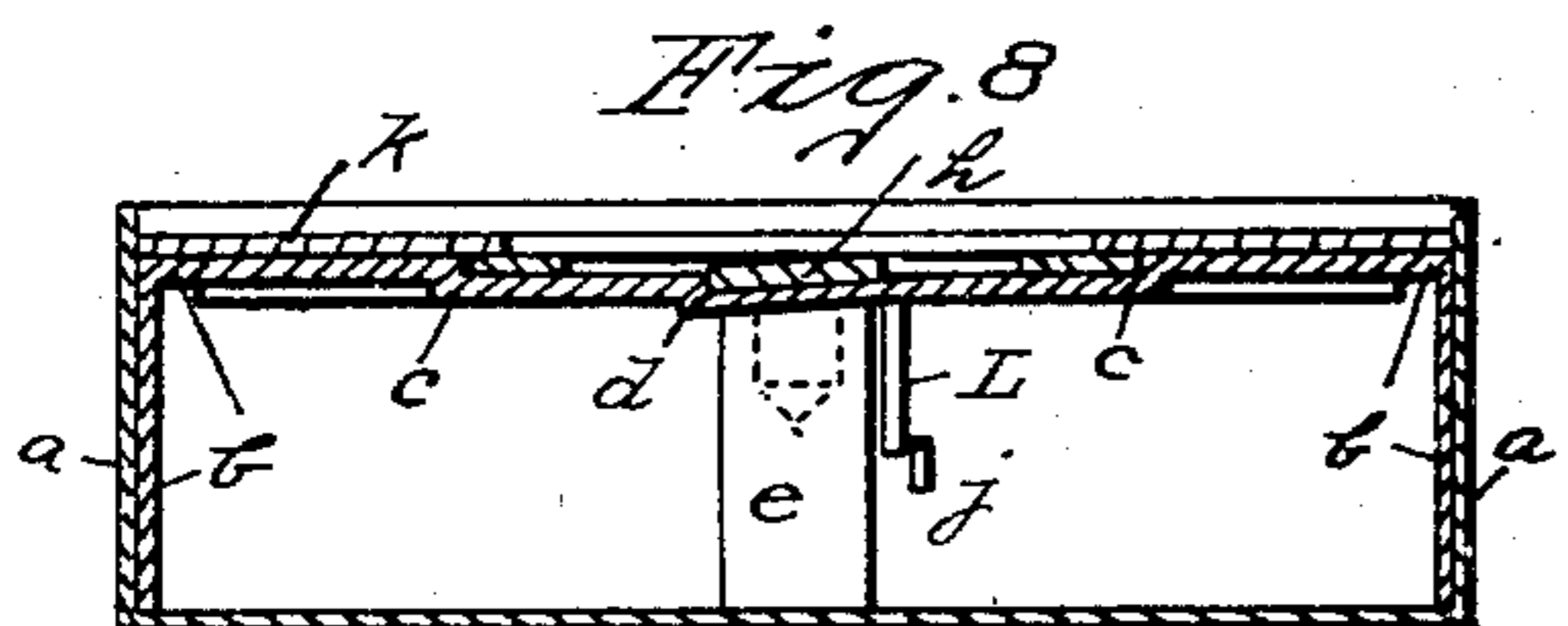
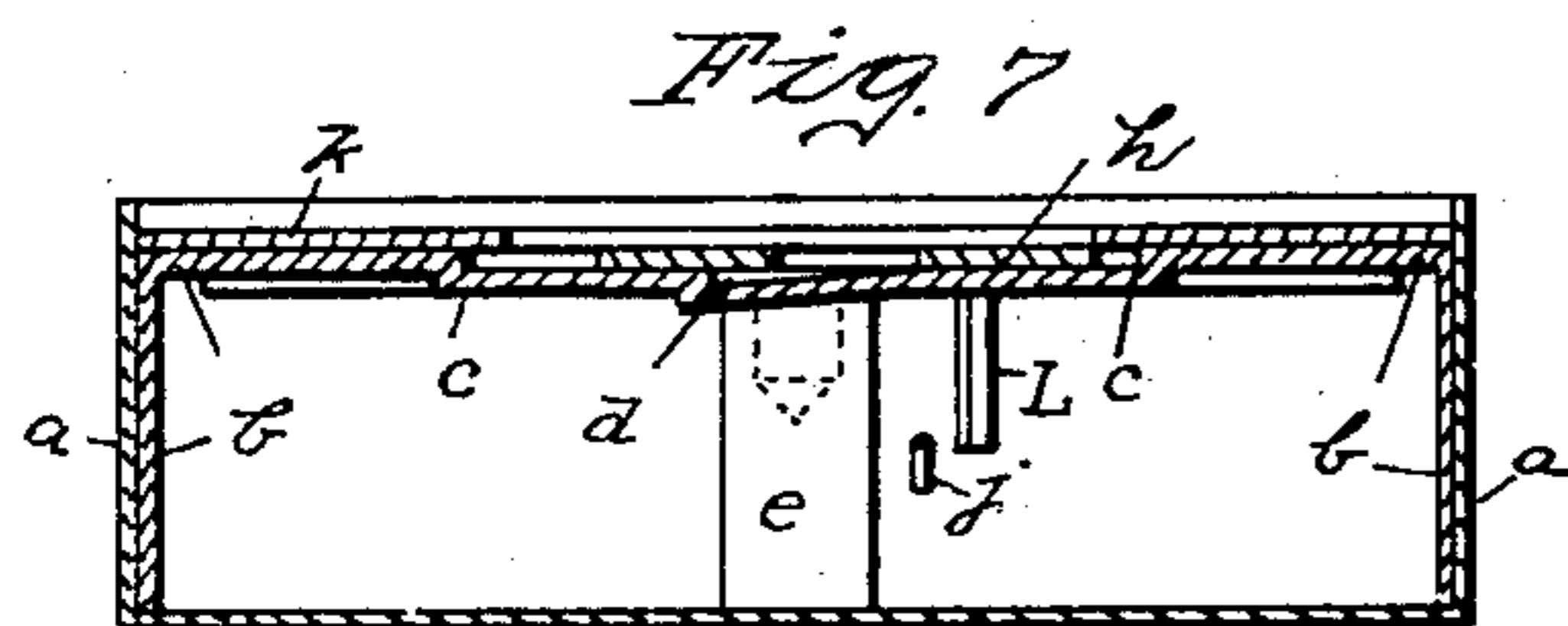
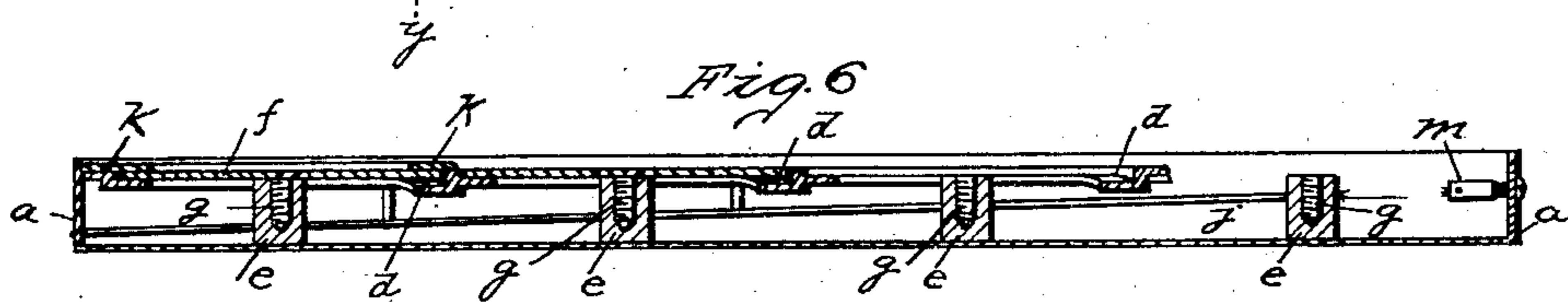
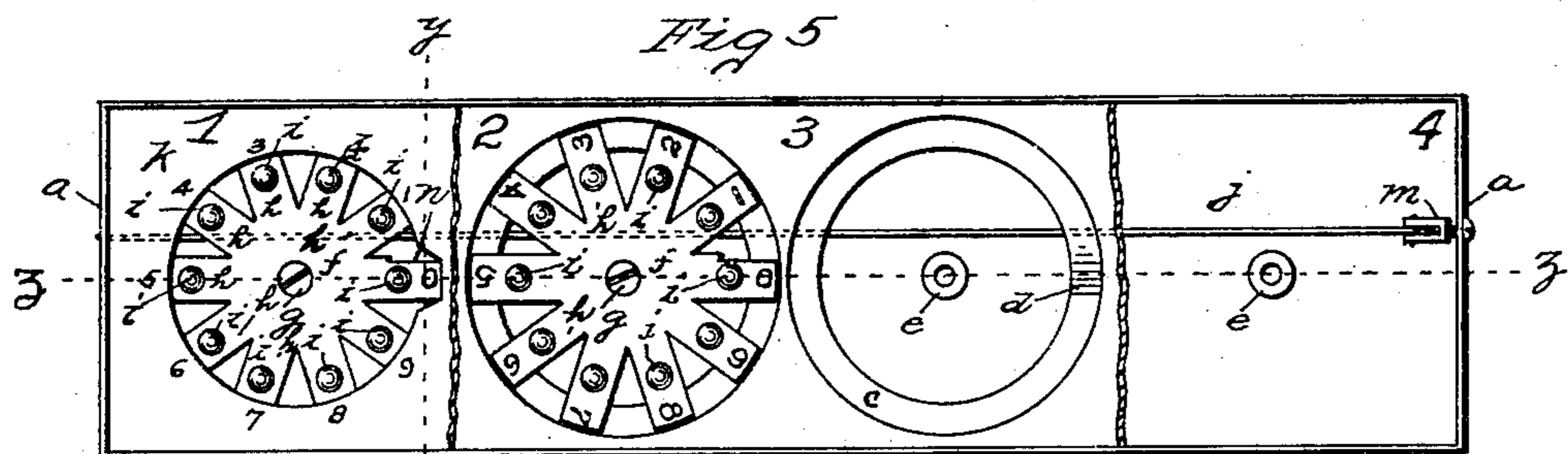
B. BUNDY.

MACHINE FOR ADDING AND SUBTRACTING INTEGERS AND FRACTIONS.

APPLICATION FILED OCT. 21, 1902.

NO MODEL.

2 SHEETS—SHEET 2



Witnesses
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UNITED STATES PATENT OFFICE.

BENJAMIN BUNDY, OF PASADENA, CALIFORNIA.

MACHINE FOR ADDING AND SUBTRACTING INTEGERS AND FRACTIONS.

SPECIFICATION forming part of Letters Patent No. 740,522, dated October 6, 1903.

Application filed October 21, 1902. Serial No. 128,199. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN BUNDY, a citizen of the United States, residing at Pasadena, in the county of Los Angeles, State of California, have invented and discovered a new and useful Improvement in Machines for Adding and Subtracting Integers and Fractions; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvement in machines for adding and subtracting integers and fractions; and the objects of my improvement are, first, to connect together the parts of the machine, so that it may be conveniently carried from place to place and occupy little space when not in use; second, to produce and assemble in a machine devices that will with facility add and subtract whole numbers and fractions; third, to provide means for signaling, whereby the operation of computation is readily performed and the results thereof accurately obtained, and, fourth, to afford means for manually operating the machine, thereby obviating expensive and cumbersome mechanism. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of the machine opened and ready for use, the divisions thereof connected together. Fig. 2 is a view in elevation of one end of the machine shown in Fig. 1. Fig. 3 is a view in elevation of the divisions of the machine illustrated in Figs. 1 and 2 hinged together and partly open. Fig. 4 is an end view in elevation of the machine shown in Figs. 1, 2, and 3, the divisions thereof closed. Fig. 5 is a top plan view of one of the divisions of the machine, in one section thereof illustrating the pivotal post and signaling-wire, in another section thereof of the pivotal post, signaling-wire, and base-plate, in another section thereof the signaling-wire, the base-plate, the revolving wheel, and pivotal pin, and in the last section thereof of the signaling-wire, the base-plate, revolving wheel, top plate, and pivot-pin. Fig. 6 is a longitudinal section on line *z z* of Fig. 5. Fig. 7 is a cross-sectional view on the line *y y* of Fig. 5. Fig. 8 is a cross-sectional view

on the line *y y* of Fig. 5. Fig. 9 is a cross-sectional view on the line *y y* of Fig. 5. Fig. 10 represents views in elevation of the wheel and signaling-wire and also sectional view of the revolving wheel. Fig. 11 represents sectional views of the top plate of the revolving wheel on line *x x* of Fig. 10, of the base-plate with parts of the lateral flanges thereof broken away, of the case or box, and of the pivotal post; and Fig. 12 is a plan view of a portion of the case or box, showing a calendar.

Similar reference letters, numerals, characters, and signs refer to similar parts throughout the several views.

The reference-letter *a* refers to the case or box, and the letter *b* to the base-plate, having two lateral flanges extending downward into the rectangular box *a* and resting upon the bottom thereof against the sides of said box *a*. The top of the base-plate *b* is countersunk, as shown at *c* in Figs. 7, 8, and 9. The edge near the cut-out portion of the base-plate *b* is provided with a countersunk stop *d*. (Illustrated in Figs. 7, 8, and 9.)

In each section of the box or case *a*, about the longitudinal and cross centers thereof, I fasten to the bottom a vertical post *e* and to the top of which the revolving wheel *f* is centrally pivoted by means of the pin *g*. The revolving wheel *f* carries upon its periphery, and preferably made integral with said wheel, ten radially-projecting resilient arms *h*. Each of said radial arms is provided with raised struck-up portions *i*, by means of which the said wheel *f*, carrying the resilient radial arms *h*, is revolved by the finger of the operator, so as to bring any one of the said radial arms to the zero-point, which is a cut-out portion *n* in the top plate *k*. (Shown upon Figs. 1 and 5 of the drawings.)

The box or case *a* has extending longitudinally from one end thereof to the other the signaling-wire *j*, (shown in Figs. 5, 6, and 10 in full and dotted lines, and it is also illustrated in section in Figs. 7, 8, and 9.) This wire *j* at one end is attached to the case or box *a*, and at the other end is a tightening device *m*, by means of which the wire when it becomes slackened by use can be tightened by turning the adjusting-screw in the clamp *m*, as shown in Figs. 5 and 6 of the drawings. The opposite end of the signaling-wire is

preferably fixed in the other end of the case or box *a* opposite to that to which the tightening device *m* is secured.

One of the resilient radial arms *h*, on the end of which the zero character is placed, as shown in Figs. 1, 5, and 10, has cut therefrom the downward-projecting finger *L*, as illustrated in Figs. 1, 5, 7, 8, 9, 10, and 11 of the drawings. Said downward-projecting finger *L*, cut from or made a part of the said radial and resilient arm *h*, is designed by me to strike the inclined signaling-wire *j* as the revolving wheel *f* is carried around by the finger of the operator, and the said downward-projecting finger *L* is made of such a length as to strike the signaling-wire *j* when the said finger *L* reaches the most elevated portion of the wire within the circle wherein the said downward-projecting finger *L* revolves, one signal or alarm indicating to the operator that one unit must be carried to the next higher column.

The invention as herein presented consists of three divisions A, B, and C. The divisions A and B each contain sections 1, 2, 3, and 4, while division C contains three sections 2, 3, and 4. Each of the divisions A, B, and C are hinged together, as illustrated in Figs. 1, 2, 3, and 4 of the drawings, so that the three divisions of the machine when being operated upon are exposed to view in the same plane and when not in use are compactly folded one upon the other, as in Fig. 4, and occupy but little space upon the desk of the party using the machine.

In division C, as hereinbefore referred to and illustrated in Fig. 1 of the drawings, the first section is omitted. In this space the inventor's name or a calendar may be inserted.

Each of the corresponding sections of the three divisions are constructed alike, as will readily appear from the above description and upon inspection of Figs. 1, 5, and 6 of the drawings. Each of said sections in each of said divisions is provided with a pivoted post *e*. Each of the said corresponding sections of the three divisions is provided with a revolving wheel *f*, which turns upon the pivotal post *e* and upon the pin *g*, the latter of which passes through the wheel *f* into the top of the post *e*. Each of the said sections of any one of the said divisions has a rectangular case *a* in common and the same base-plate *b* with its countersunk portion, (shown at *c*), in which the ends of the said radial arms *h* of the wheel revolve. In the edge of each of the said countersunk portions of the base-plate *b* is provided a corresponding stop *d*, in which one of the ten resilient radial arms *h* has upon each end thereof one of the ten numerical characters from zero ("0") to nine, ("9"). Each of said arms *h* of the wheel *f* is adapted to be depressed by the finger of the operator placed upon the upward projection *i* on each of the said resilient arms as imperatively selected in the process of computation according to the numerical char-

acters represented in the number to be added or subtracted.

Section 4 of each of the divisions A, B, and C is intended for the addition and subtraction of fractions, section 4 of the division A for adding or subtracting twelfths, ($\frac{1}{12}$.) Section 4 of division B is intended for adding and subtracting sixteenths, ($\frac{1}{16}$.) Section 4 of division C is intended for adding and subtracting tenths, ($\frac{1}{10}$.)

Sections 2 and 3 of division C are designed for the addition and subtraction of units and tens. Sections 1, 2, and 3 of division B are designed for adding and subtracting hundreds, thousands, and ten thousands. Sections 1, 2, and 3 of division A are intended for adding and subtracting millions, ten millions, and hundred millions.

Any number of divisions that may be desired can be added to this machine, each of said added divisions having at least three sections for whole numbers and additional sections for fractions that can be reduced to a common denominator, and these additional sections may be hinged or otherwise connected together.

In addition of fractions the manner of operating section 4, division C, is illustrated in the following manner: For example, add five-tenths plus two-tenths plus four-tenths, equals one and one-tenth. The finger of the operator is placed upon the projection *i* opposite the figure on the top plate *k* indicating one-half. The wheel *f* then is moved around until it reaches the cut-out portion *n* in the top plate *k*. The next step in the operation is to add two-tenths, when the finger of the operator is placed upon the projection *i* opposite the figure on the top plate indicating two-tenths, and it is carried around until it rests in the cut-out portion *n* of the top plate *k*. The third step is to add four-tenths, when the finger of the operator is now placed upon the projection *i* of the arm *h* opposite the figure on the top plate indicating four-tenths, and this arm is carried around in the direction shown by the arrow in Fig. 10 of the drawings until the said arm rests in the cut-out portion *n* in the top plate *k*. During this last movement of the wheel *f* the finger *L* has been brought in contact with the inclined signaling-wire *j* and one alarm or signal given, which indicates that one whole number has been added. The finger of the operator is now placed upon the radial arm opposite the figure on the top plate *k*, indicated by the numeral 1 in section 3, and it is moved to the cut-out portion *n* in said section. The sum of the three fractions added is read from the cut-out portions *n n*, in sections 3 and 4—namely, " $1\frac{1}{10}$."

In subtraction of fractions the manner of operating section 4, division C, is shown in the following manner: For example, subtract one-fifth or two-tenths from seven-tenths, which equals five-tenths. The finger of the operator is placed upon the projection *i* opposite the figure on the top plate *k* indicating

seven-tenths. The wheel *f* is then moved around until it reaches the cut-out portion *n* in the top plate. The next step in the operation is to subtract one-fifth or two-tenths, when the finger of the operator is placed upon the projection *i* opposite the cut-out portion *n* in the top plate *k*, and the wheel is carried around in the opposite direction from the arrow shown in Fig. 10 until the said arm *i* is opposite one-fifth or two-tenths. The result will appear in the cut-out portion in the top plate *k*.

To avoid making the specification prolix, further description of the operation intended to be performed upon section 4 of division B for adding sixteenths ($\frac{1}{16}$) is not deemed necessary; neither is it considered necessary to describe the operation intended to be performed by section 4 of division A for adding twelfths ($\frac{1}{12}$). The operation is identical with that above exemplified in adding and subtracting tenths. With like results sixteenths ($\frac{1}{16}$) and twelfths ($\frac{1}{12}$) can be added by means of sections 4 and 3 of divisions B and A, respectively.

For adding whole numbers with sections 2 and 3 of division C the finger of the operator is placed upon the projecting arm *i* with the zero thereon in sections 2 and 3 and each of said arms of the wheel *f* on which zero is fixed in said sections placed in the cut-out portions *n n* on the top plate. The next step the operator places his finger upon the arm of the wheel *f* now opposite the figure "7" on the top plate *k*, which is carried around until the said arm rests in the cut-out portion *n* on the top plate. The second step the finger of the operator is placed upon the arm in section 3 opposite the figure "9" of the top plate *k*, which is carried around until it rests in the cut-out portion *n* in the top plate. The third step is to place the finger of the operator upon the projection *i* of the arm of the wheel *f* opposite to the figure "1" on the top plate *k* of section 2. The said arm is moved around until it rests in the cut-out portion *n* of the top plate *k*. The fourth step is again to place the finger of the operator upon the projecting arm of the wheel *f* opposite the figure "1" of section 2, and it is carried around until it registers with the cut-out portion *n* in the top plate *k*. The sum of the three numbers "79," "10," and "10" now appears in the cut-out portions *n n* of sections 2 and 3.

For adding whole numbers with sections 1, 2, and 3 of division B is exemplified in the following manner: nine hundred plus fifty-eight plus thirty-six. The projecting arms *i i*, on which zero is fixed in sections 1, 2, and 3, are placed in the cut-out portions *n n n* of the top plate *k*. The first step the finger of the operator is placed upon the projecting arm of the wheel *f* on section 1 opposite the number "9" on the top plate *k*, and this arm is moved around in the direction of the arrow shown in Fig. 10 of the drawings until it rests in the cut-out portion *n* of the top plate

k. The second step the finger of the operator is placed upon the projecting arm *i* of the wheel *f* on section 2 opposite the figure "5" on the top plate *k*, and this arm is moved around in the same direction as before until it rests in the cut-out portion *n* of the top plate *k*. The third step the finger of the operator is placed upon the projecting arm *i* in section 3 opposite the number "8" on the top plate *k*, and this arm is moved around until it rests in the cut-out portion *n* of the top plate *k*. The fourth step the finger of the operator is placed upon the arm *i* of the wheel *f* in section 2 opposite the number "3" on the top plate *k*, and this arm moves around in the same direction as before until it rests within the cut-out portion *n* of the top plate *k*. The fifth step the operator places his finger upon the projecting arm *i* of the wheel *f* opposite the number "6" on section 3, and this arm is moved around in like manner as before until it rests upon the cut-out portion *n* of the top plate *k*. During the last movement which the operator made one alarm or signal was given, caused by the projecting finger *L* being brought in contact with the inclined wire *j*, which signal indicates that "1" should be carried to the next higher number, and this, the sixth step, is accomplished by the operator placing his finger upon the projecting arm of the wheel *f* in section 2 opposite the number "1" on the top plate *k*, and this arm is moved around in the same direction as before until it reaches the cut-out portion *n* in the top plate *k*. The sum of the three numbers is now read in the three cut-out portions *n n n* of sections 1, 2, and 3 of the top plate *k*, commencing first with section 1, said sum being "994."

It is deemed unnecessary to exemplify the addition of millions, ten millions, or hundred millions, for which sections 1, 2, and 3 of division A are intended to compute.

In Fig. 12 of the drawings I have shown a calendar having a top plate *K'*, a middle revolving plate *L'*, and a top centrally-pivoted plate *L*².

It will readily appear from the foregoing description, when read in connection with the drawings hereto appended and made a part of the specification and claims, what is the operation of my invention, and further description of the manner of operating my improvement is deemed unnecessary.

It is obvious that many variations and changes in the details of construction and arrangement of my invention may be made that would readily suggest themselves to persons skilled in the art and still be within the spirit and scope of my invention.

I do not desire to confine this invention to the specific construction, combination, and arrangement of parts herein shown and described, and the right is reserved to make all changes in and modifications of the same as come within the spirit of this invention; but I do desire to secure as my invention all fea-

tures of construction and equivalents thereof that come within the scope of my improvement as herein shown and described, and illustrated upon the drawings appended hereto.

5 Having described my invention, what I do claim, and desire to secure by Letters Patent, is—

1. In machines for adding and subtracting integers and fractions, a case, a base-plate
10 having downward-projecting flanges adapted to rest upon the bottom of the case, a vertical, pivotal post secured to the bottom of said case, a revolving wheel having peripheral, projecting arms with numerical characters
15 thereon, a top plate provided with numerical characters, the said numerical characters on said wheel adapted to register with the numerical characters on the said top plate.

2. In machines for adding and subtracting
20 integers and fractions, a base-plate having downward-projecting flanges within the case and resting upon the bottom thereof, a circular cut-out portion and a down-sunk circular portion, a top plate provided with nu-
25 merical characters fixed thereon, a centrally-pivoted wheel having numerical characters adapted to be revolved between said two plates and means for registering any one of the numerical characters on the revolving
30 wheel with any one of the numerical characters upon the top plate.

3. In machines for adding and subtracting integers and fractions, a case, a base-plate
35 fitting within said case and resting upon the bottom thereof provided with a circular cut-out portion and a down-sunk circular portion, a top plate provided with numerical characters circularly arranged thereon, a centrally-
40 pivoted wheel having peripheral projecting arms provided with numerical characters upon the ends thereof, and means for revolving said wheel and for registering the numerical characters thereon with the numerical characters upon the top plate.

4. In machines for adding and subtracting integers and fractions, a case, a base-plate
45 fitting within said case and resting upon the bottom thereof, said base-plate provided with a circular cut-out portion and a down-sunk circular portion, a top plate having a circular
50 cut-out portion corresponding with the cut-out portion of the base-plate, the said top plate having numerical characters arranged around the cut-out portion thereof, a centrally-pivoted wheel provided with radial pro-
55 jecting arms having numerical characters fixed upon the ends thereof, signaling devices and means for revolving said wheel whereby the numerical characters on said wheel regis-
60 ter with the numerical characters upon the said top plate.

5. In machines for adding and subtracting integers and fractions, a case provided with
65 a wire therein extending from end to end thereof, a base-plate having a circular cut-out portion and a down-sunk portion therein, a top plate provided with a circular cut-out

portion with numerical characters arranged therearound, a centrally-revolving circular
70 wheel having numerical characters thereon carrying a downward-projecting finger adapted to be brought in contact with said wire and means by which movement may be im-
parted to said wheel.

6. In a machine for adding and subtracting
75 integers and fractions, a case, an inclined signaling-wire therein, a base-plate having a circular cut-out portion and a down-sunk portion, a top plate provided with a circular cut-
80 out portion corresponding with the circular cut-out portion of the base-plate, a centrally-pivoted wheel carrying a downward-projecting finger adapted to be brought in contact
85 with the inclined signaling-wire at one point only of every revolution of the wheel.

7. A case, a base-plate secured therein, an
inclined signaling-wire secured within the case, said base-plate provided with a circular
90 cut-out portion and a down-sunk circular portion, a top plate having a corresponding circular cut-out portion with numerical characters arranged around said circular cut-out
95 portion of the top plate, a centrally-revolving wheel having a finger made integral therewith, said finger adapted to be brought in contact with the signaling-wire once during an
entire revolution of said wheel, and means by which movement may be imparted to said wheel.

8. A case, an inclined signaling-wire, a
100 base-plate having a circular cut-out portion therein and a down-sunk circular portion thereon, a top plate having a circular cut-out portion therein with numerical characters ar-
105 ranged therearound, a vertical pivotal post fixed to the bottom of said case, a wheel provided with numerical characters thereon, piv-
110 oted to said vertical post and adapted to revolve between the said two plates, said wheel having radial projecting arms carrying a downward-projecting finger adapted to be
brought in contact with the signaling-wire and means by which movement may be im-
parted to said wheel.

9. In machines for adding and subtracting
115 integers and fractions, a case, an inclined signaling-wire fixed in the ends thereof and extending the entire length of said case, a base-plate provided with downwardly-projecting
120 flanges, circular cut-out portions and a down-sunk portion having a stop thereon, a top plate having a circular cut-out portion corresponding centrally with the cut-out portion
125 of the base-plate and provided with numerical characters circularly arranged near the edge of said cut-out portion of the top plate, a centrally-pivoted wheel having peripheral, pro-
130 jecting radial arms with numerical characters thereon adapted to register with the numerical characters upon the top plate, one of said projecting arms carrying a finger adapted to
be brought in contact with said inclined signaling-wire at one point only of one entire
revolution of said wheel, one of said radially-

projecting arms adapted to be brought in contact with the said stop upon the bottom plate, at certain points of revolution of said wheel.

10. A case, a signaling device secured in the
5 ends thereof, a base-plate having a circular cut-out portion and a down-sunk circular portion formed near the edge of said cut-out portion, said circular down-sunk portion provided with a stop made therein, a centrally-
10 pivoted wheel having radial projecting, resilient arms, means for arresting the said radial resilient arms upon the down-sunk circular portion of the base-plate and devices for revolving the wheel.

15 11. In a machine for adding and subtract-

ing integers and fractions, a base-plate having a circular down-sunk portion and a stop made in said circular down-sunk portion, a centrally-pivoted wheel provided with peripheral projecting resilient arms, and means by
20 which movement may be imparted to said wheel whereby any one of said resilient arms may be brought in contact with said stop.

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

BENJAMIN BUNDY.

Witnesses:

AMELIA GUEST,
INEZ MARLIN.