

No. 606,813.

Patented July 5, 1898.

W. S. REED.

DEVICE FOR STRINGED MUSICAL INSTRUMENTS.

(Application filed Sept. 22, 1897.)

(No Model.)

3 Sheets—Sheet I.

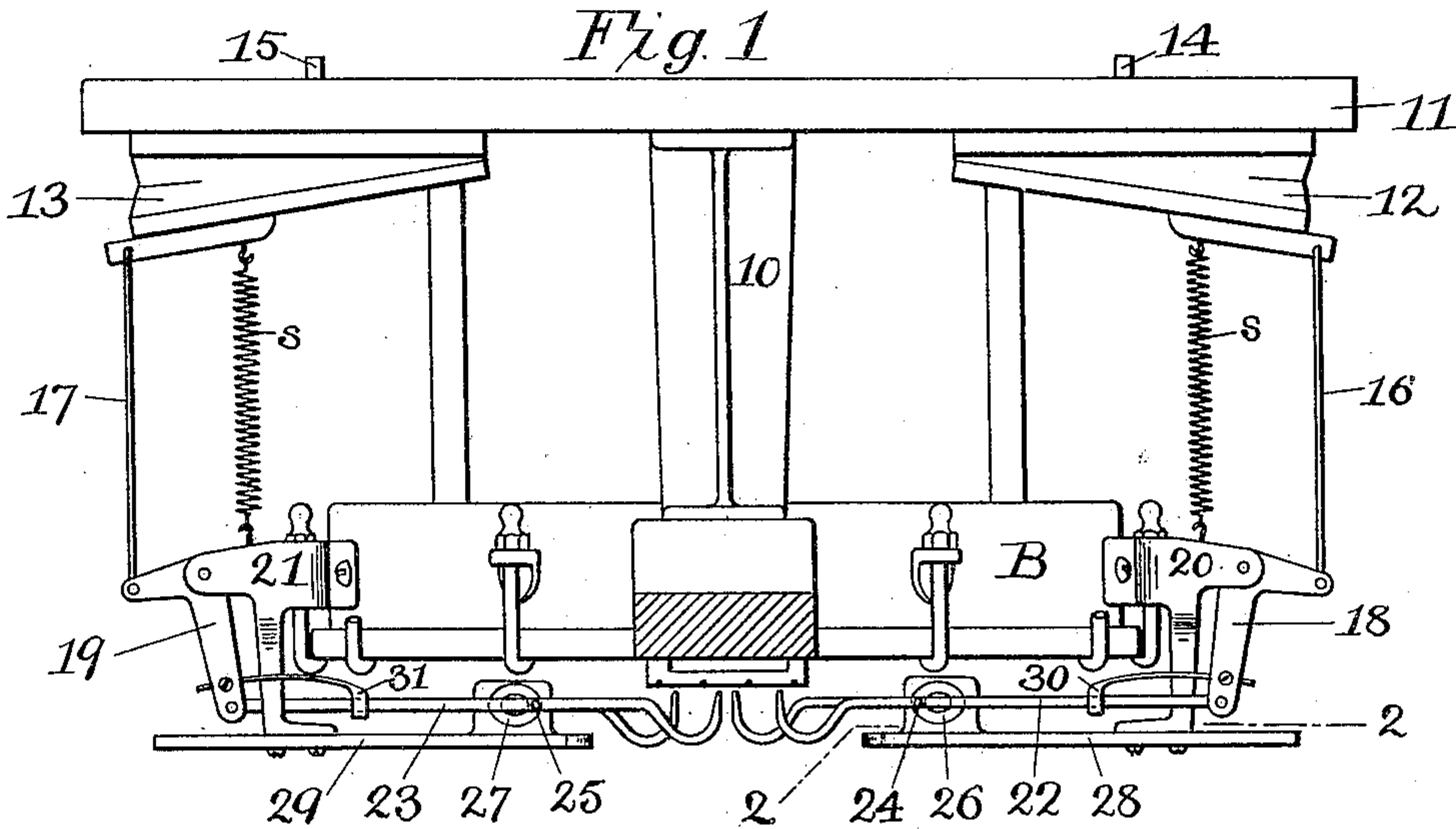
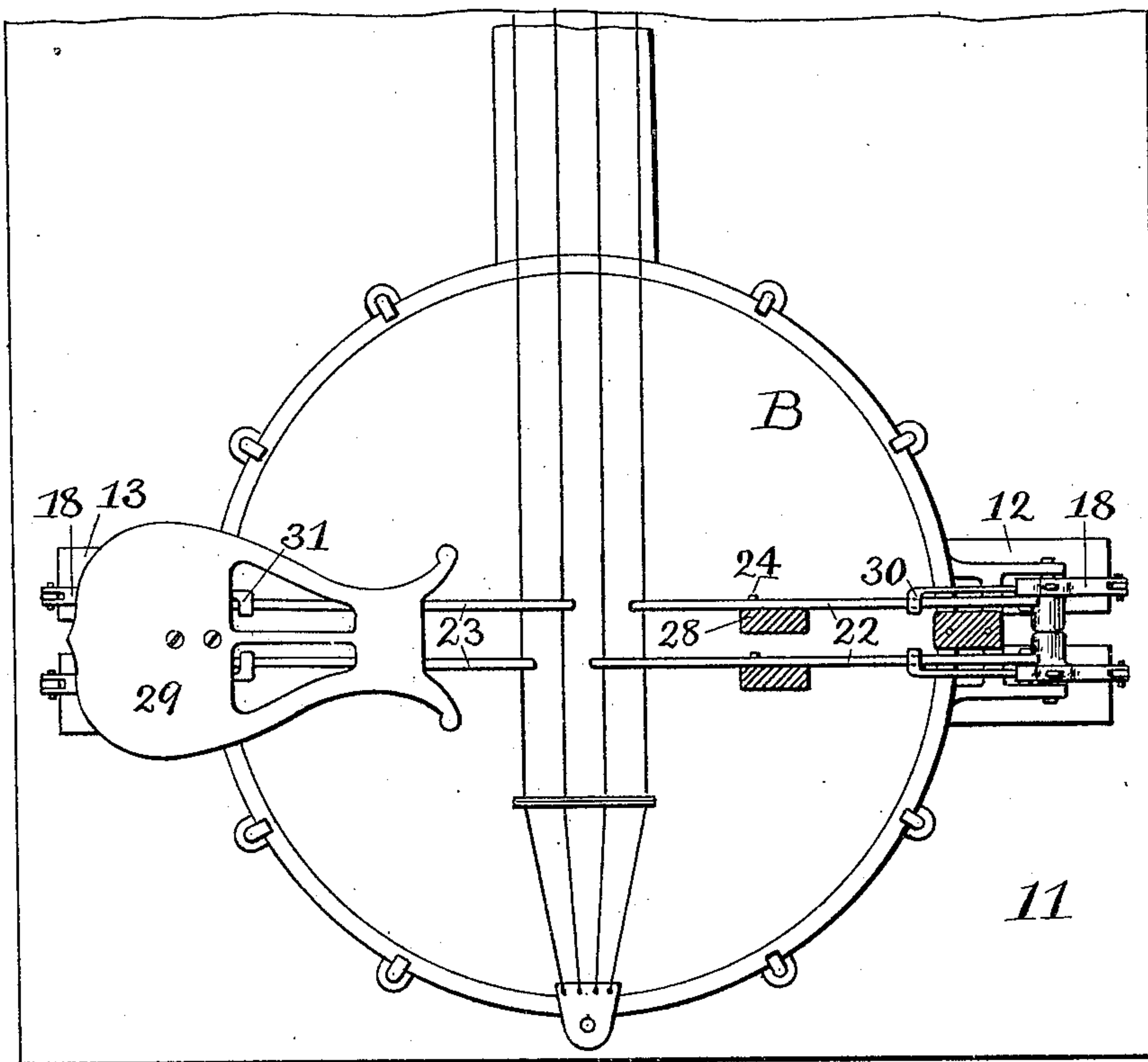


Fig. 2



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Fig. 3

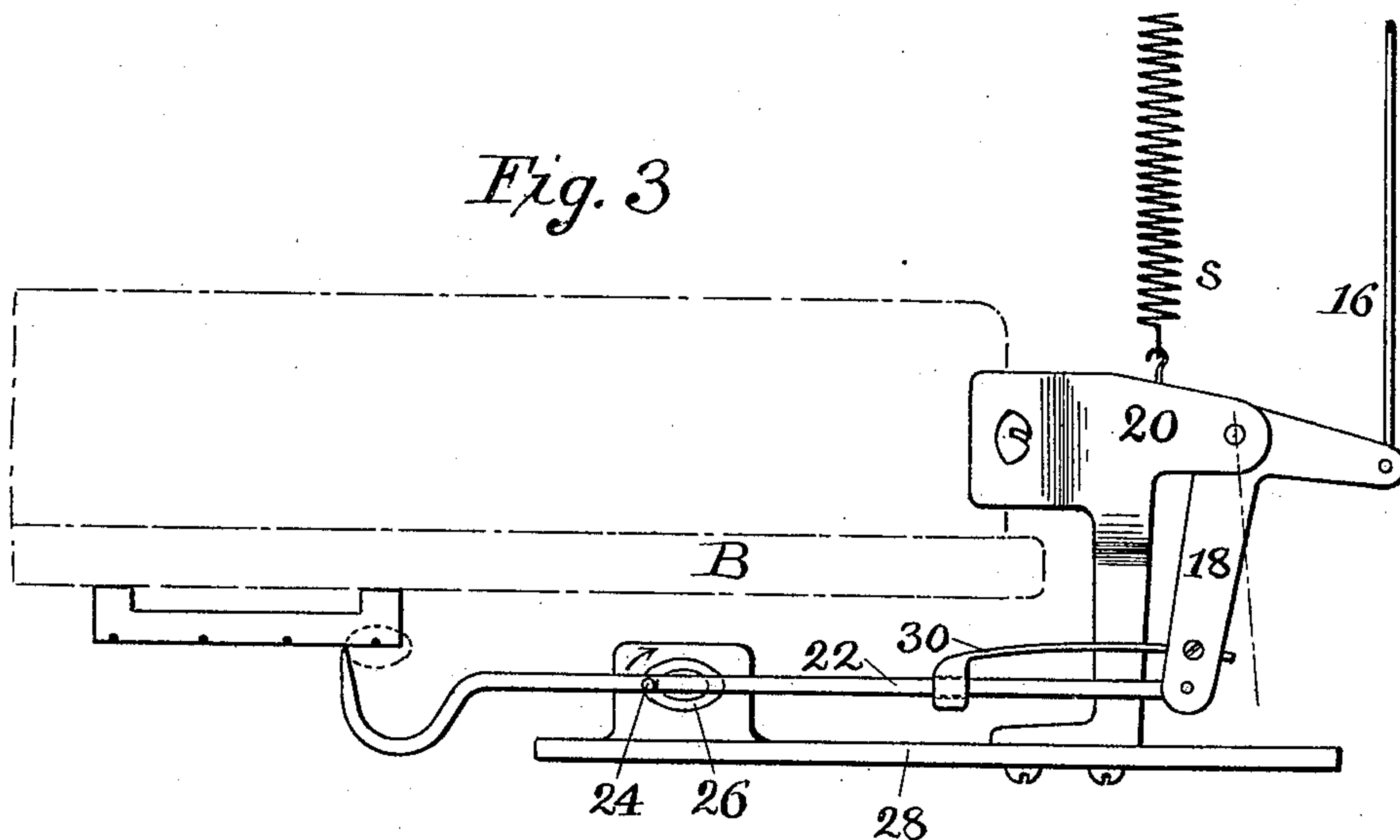


Fig. 4

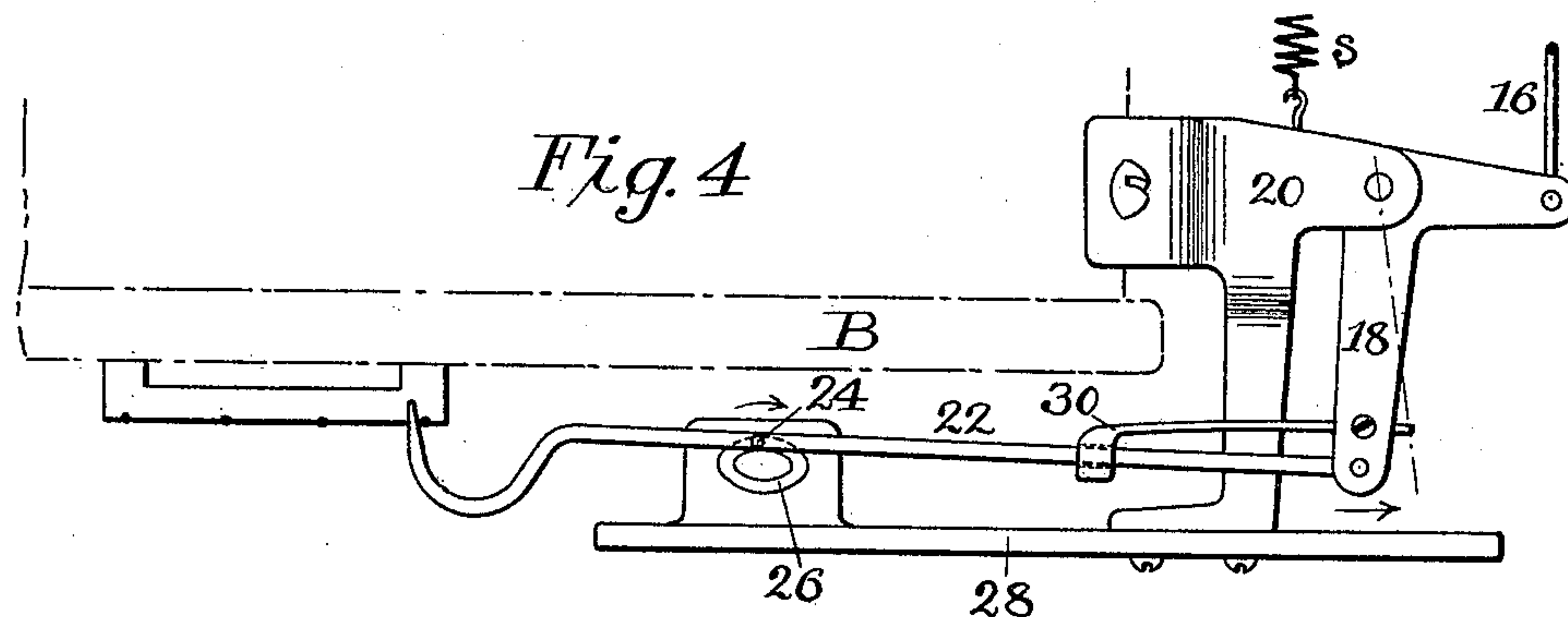
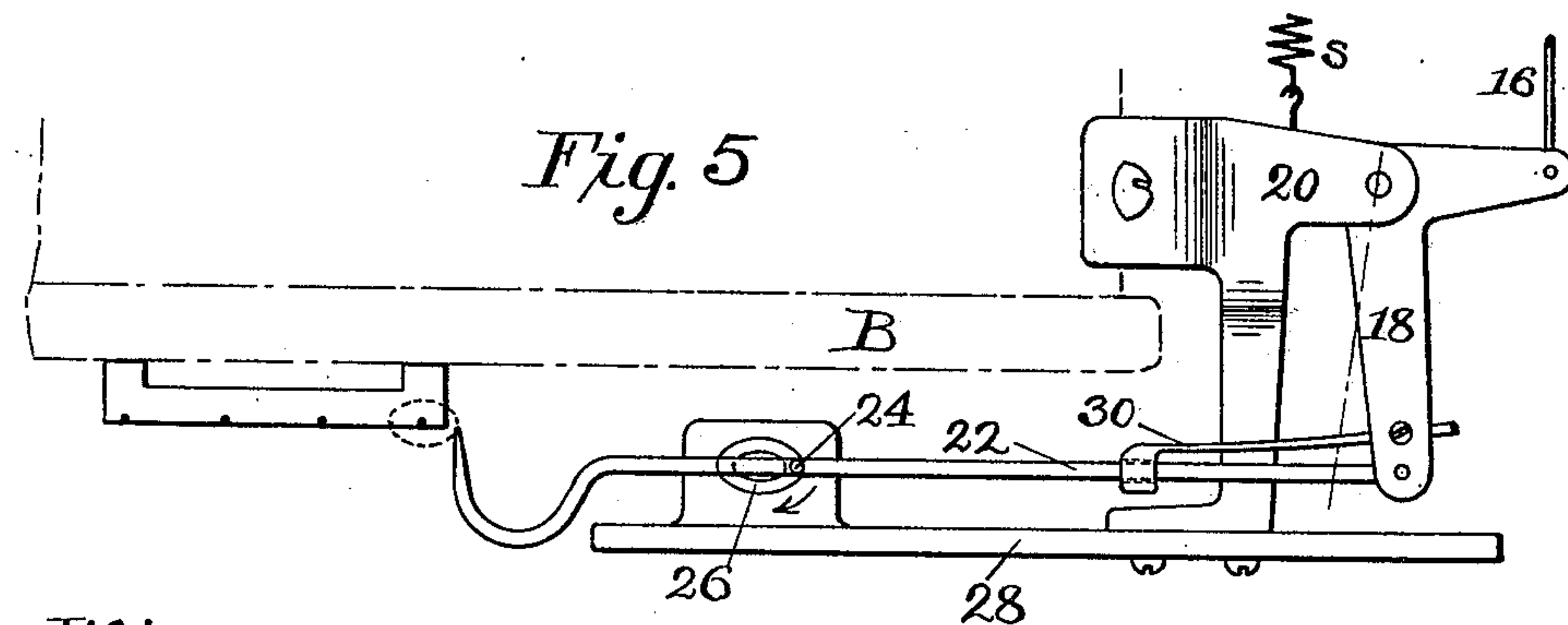


Fig. 5



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Fig. 6

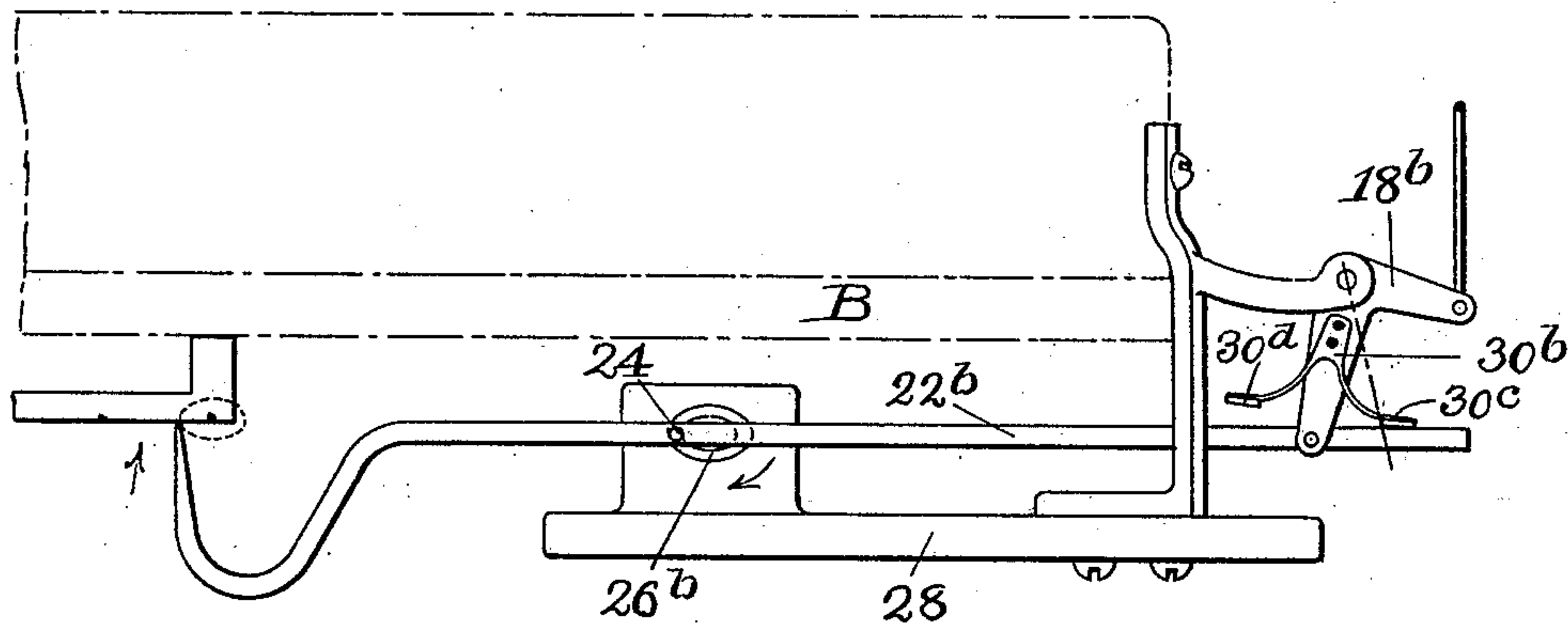
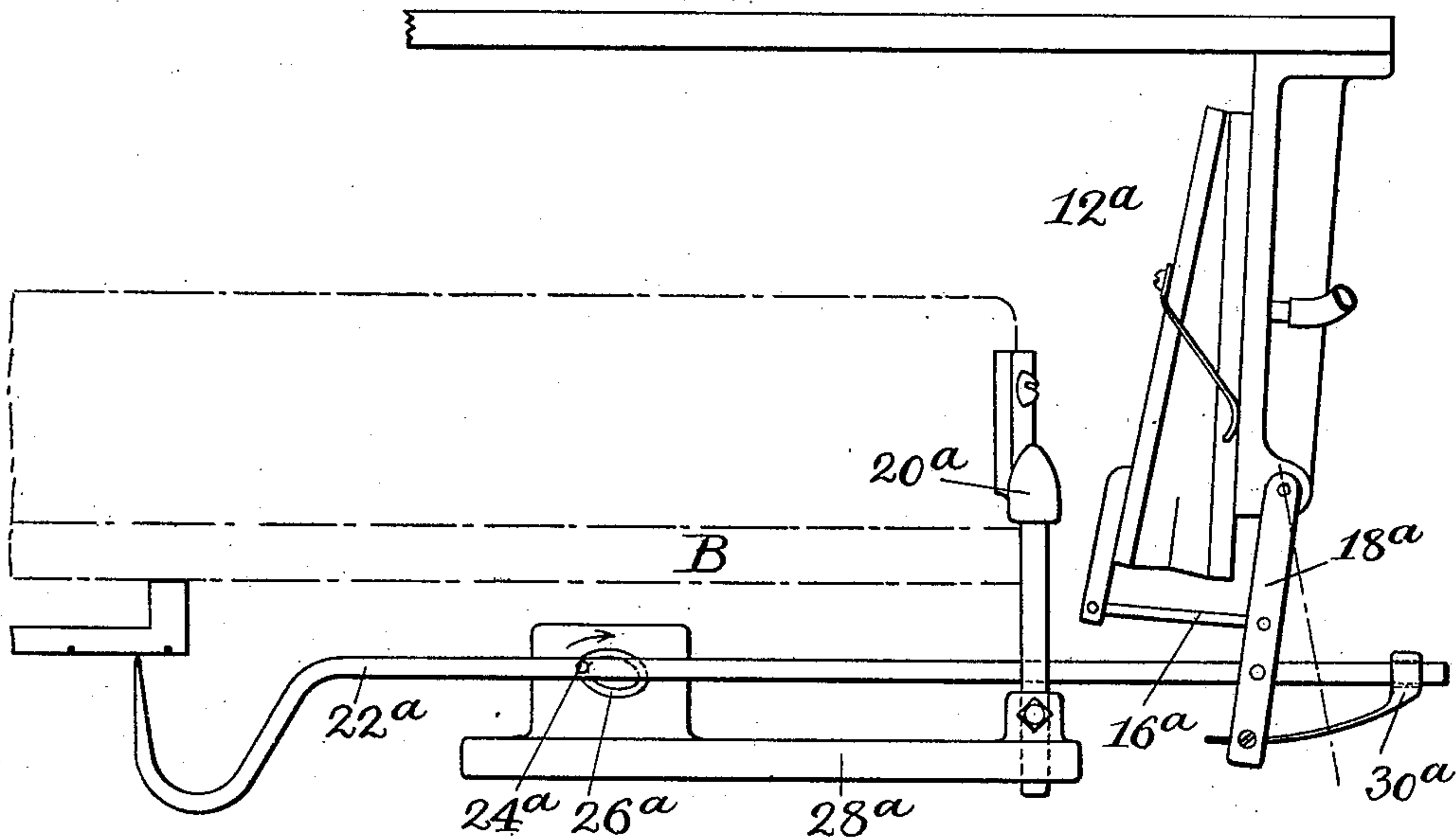


Fig. 7



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UNITED STATES PATENT OFFICE.

WILLIAM S. REED, OF LEOMINSTER, MASSACHUSETTS, ASSIGNOR TO THE
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DEVICE FOR STRINGED MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 606,813, dated July 5, 1898.

Application filed September 22, 1897. Serial No. 652,512. (No model.) Patented in England August 8, 1896, No. 17,616, and
in France August 3, 1896, No. 258,580.

To all whom it may concern:

Be it known that I, WILLIAM S. REED, a
citizen of the United States, residing at Leominster, in the county of Worcester and State
5 of Massachusetts, have invented certain new
and useful Improvements in Picker-Controlling
Devices for Stringed Musical Instruments, of which the following is a full, clear,
and exact specification, and for which I have
10 received Letters Patent of Great Britain, No.
17,616, dated August 8, 1896, and of France,
No. 258,580, dated August 3, 1896.

This invention relates to improved devices
for mechanically picking the strings of self-
15 playing stringed musical instruments, and
comprises improved means for directing and
controlling the movement of the point of each
picker-finger with precision, so as to compel
it to engage with and release its string in the
20 most effective way, returning to its first position
by a different path, which carries it
clear of the still-vibrating string.

One object of this invention is to provide
improved and simplified means for controlling
25 the movement of the picker-finger so as to
cause it to move in the predetermined path.

A further object is to provide improved
means for attaching the string-picking de-
vices to the head of the banjo or other instru-
30 ment with which it is used in such a way as
not to deaden or otherwise interfere with
the vibration of the instrument while being
played, provision being also made for adjust-
ing the devices toward and from the strings,
35 whereby the depth of engagement of the
pickers therewith may easily be regulated.

Figure 1 of the drawings is a plan view,
and Fig. 2 is a front view, of my invention
40 applied to the head of a banjo of ordinary
construction. Figs. 3, 4, and 5 are enlarged
plan views of my improved picker with its
supporting and controlling devices, showing
the moving parts thereof in three different
positions. Fig. 3 represents the picker-finger
45 at the forward end of its stroke in the position
in which it normally rests during the interval
between the sounding of the notes. Fig. 4 shows
the picker about midway of its backward stroke
coming into engagement
50 with the string. Fig. 5 shows the picker in

its extreme backward position passing around
the rearward end of its cam. The arrows adjacent
to the cams shown in these three views indicate
the direction of movement of the picker relative
to its cam. Fig. 6 is a plan 55 view showing a
modified form of my improved means for guiding
the picker-finger around its cam. Fig. 7 is also a
plan view showing a modified arrangement of the
picker-controlling means and showing also my improved
60 means for adjusting the picker toward or from the
strings.

This invention is applicable to several instruments
of the stringed kind, being shown herein as applied
to a banjo of the ordinary 65 construction. The
banjo B is supported by means of brackets 10, attached
to a base 11, to which the motors for operating the
string-picking devices are also attached. These
motors, as herein shown, consist of pneumatic 70
bellows 12 and 13, which are normally held in the
expanded condition shown in Fig. 1 by means of the
springs s, and are operated by exhausting the air
therefrom through the tubes 14 and 15, connected
with pneumatic 75 devices already well known in this art.

The movable sides of the bellows are connected
by means of the rods 16 and 17 to elbow-levers 18
and 19, pivotally mounted upon the brackets 20 21.
To these levers are also piv- 80 otally attached the
pickers 22 and 23, the opposite or string-engaging
ends of which are curved in U form for greater
flexibility. The picker-fingers are also provided
with the projections or cam-pins 24 and 25, which
engage 85 in endless oval or elliptical cam-grooves 26
and 27 in the overhanging arms 28 and 29, respectively.

As a means for causing the pins 24 and 25 to
travel in the right directions at the end 90 portions
of their respective cam-grooves the levers 18 and 19
have fixed upon them the controllers 30 and 31, the
inner ends of which are in sliding engagement with
the pickers 22 23. When the levers are in their
inner positions, 95 (shown in Figs. 1 and 3,) the controllers
serve to carry the picker-pins 24 and 25 around the
inner ends of their respective cam-grooves, so as to
bring the points of the pickers into engagement
with their respective strings. The 100

angular movement of the levers in drawing back through the position shown in Fig. 4 to that shown in Fig. 5 changes the position of the controllers with respect to their pickers, so as to press the latter outwardly or away from the strings, thereby carrying the picker-pins around the outer ends of their cam-grooves, as shown in the latter figure. The releasing of the string takes place between the positions shown in Figs. 4 and 5, the exact point of release being determined by the position of the U-shaped end of the picker and the relative longitudinal position and contour of the cam-groove 26.

A modification of my picker-controlling means is shown in Fig. 6, in which the controller 30^b consists of a bifurcated spring attached to the lever 18^b, the bifurcations extending upon opposite sides of the pivotal connection of the lever with the picker 22^b. When in its forward position, the right-hand bifurcation 30^c of the controller presses against the picker at the outside of its pivot, carrying its point in the direction of the arrow shown adjacent thereto; but when the lever 18^b is moved outwardly to the position indicated by the dot-and-dash center line its altered angular relation to the picker-finger brings the left-hand bifurcation 30^a of the controller into engagement with the picker-finger upon the inner side of its pivot, thereby pushing it in the opposite or outward direction away from the string and around the outer or right-hand end of its cam-groove in the direction of the arrow shown adjacent thereto.

In the modifications of my invention shown in Fig. 7 the motor-bellows 12^a is supported in a position at right angles to that shown in the previous figures, so that the connection of its movable side with the picker 22^a is made without the use of a bell-cranked lever by means of the rod 16^a and the straight lever 18^a, to which the picker is pivoted. In this modification the picker-controller 30^a is shown to be fixed to the outer end of the lever 18^a and is in sliding engagement with the outer end of the picker upon the opposite side of the pivot with which it engages in the previous figures. The effect, however, of this method of arranging and connecting the parts is exactly the same as that already described, the controller, when in the position shown in Fig. 7, tending to carry the point of the picker into the plane of its engagement with the string and in the direction of the arrow around its cam-groove 26^a. By the collapsing of the bellows the lever 18^a is swung to the position indicated by the dot-and-dash line, in which position its angular relation to the picker tends to press the string-engaging end of the latter outwardly and to carry its pin 24^a around the outer end of the cam.

My improved means for adjustably supporting the picker-cam arms is also shown in Fig. 7, wherein the arm 28^a is attached to its bracket 20^a by a sliding joint and set-screw,

which permit of the lateral adjustment of the arm 28^a and its picker-cam, so as to enable the string-engaging end of its picker-finger 22^a to be adjusted to its most advantageous engagement with its string. In this view what may be termed the "major axis" of the ellipse formed by the cam-groove 26^a is shown to be slightly out of parallel with the general direction of the reciprocating movement of the picker, this being considered desirable in some instances in order to correspondingly vary the path of movement of the string-engaging point of the picker.

The motor-bellows which are herein shown for operating my improved picker devices may be connected by means of air-tubes with any of the several well-known devices for exhausting the air therefrom in proper time and sequence to effect the playing of a tune.

An important feature of this invention, especially in connection with its application to a banjo, is that comprising the means for attaching the string-picking devices to the banjo-head. Heretofore in machines of this class the string-picking devices have been attached by means of a bridge or bridges extending across the head of the instrument and secured thereto at its ends, thereby forming rigidly-connecting chord members—as shown, for example, in the United States Patents to Gilman, No. 488,520, of December 20, 1892, and to Reed, No. 558,419, of April 14, 1896. The effect of thus rigidly connecting angularly-remote portions of the rim of the banjo has been to considerably diminish or deaden the freedom of its vibrations in response to those of the strings transmitted to it through the bridge and the skin head, an effect analogous to that which would be produced upon the tone of a bell by casting connecting-bars across its mouth. By the improved means of my present invention the brackets or supports 20 and 21, upon which my improved string-picking devices are carried, are independently attached by a narrow base extending but a short distance around the rim of the banjo-head and at points thereof preferably located diametrically opposite each other at right angles to the center line of the instrument, thus leaving the greatest possible portion of the banjo-rim free to vibrate and interfering in the least possible degree with the characteristically-sonorous qualities of this instrument.

I am aware that pivotally-mounted string-picking fingers have hitherto been employed, directed as to their lateral movements by pins engaging in endless oval cam-grooves, as shown in the patent to Reed, No. 558,419, of April 14, 1896, and to Gilman, No. 565,739, of August 11, 1896; but the cams of those patents are carried upon their respective pickers, thereby appreciably augmenting the size and weight of the rapidly-reciprocating parts. Furthermore, the application of a cam upon an oscillating finger like those shown in the patents referred to involves the

exercise of considerable care and skill in shaping the cam to produce the desired movement, which does not coincide with the form of the cam, because of the angular movements of the latter upon its pivot. By arranging the cam in a fixed relation to the instrument and by having merely a pin or slight projection upon the finger engaged therewith I am enabled to make that finger exceedingly light, so as to be quickly responsive to the action of the motor apparatus and so that the vibrations of the instrument due to the sounding of the notes shall be interfered with in the least possible degree by counter vibrations due to the rapid oscillation of the fingers.

In an instrument of this class it is highly important to reduce the size and weight of all moving parts to a minimum for greater compactness of construction and so as to require the least expenditure of energy, thereby economizing in the capacity and cost of the motor devices employed.

I claim as my invention—

1. In a musical instrument of the class specified, in combination with a picker and a guiding-cam therefor, a pivotally-mounted lever for reciprocating the picker, and a con-

troller carried by the lever and engaging with the picker to press it laterally in opposite directions at the opposite ends of the oscillatory movements of the lever.

2. In a musical instrument of the class specified, in combination with the picker and a guiding-cam therefor, the cam being provided with an approximately oval cam-groove, with which the picker engages, means for reciprocating the picker and for guiding its cam-engaging projection continuously in one direction around the oval path of its groove, consisting of an oscillating lever operatively connected with the finger, and of a resilient controller mounted upon the lever and engaging with the picker-finger; the controller being so disposed upon the lever that the angular movement of the latter serves to press the picker laterally in one direction at one end of the stroke of the lever, and in the opposite direction at the other end of that stroke.

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Witnesses:

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