

No. 682,517.

Patented Sept. 10, 1901.

O. E. BAHNEMANN.  
ADJUSTABLE SHELVING.

(Application filed Feb. 27, 1901.)

(No Model.)

2 Sheets—Sheet 1.

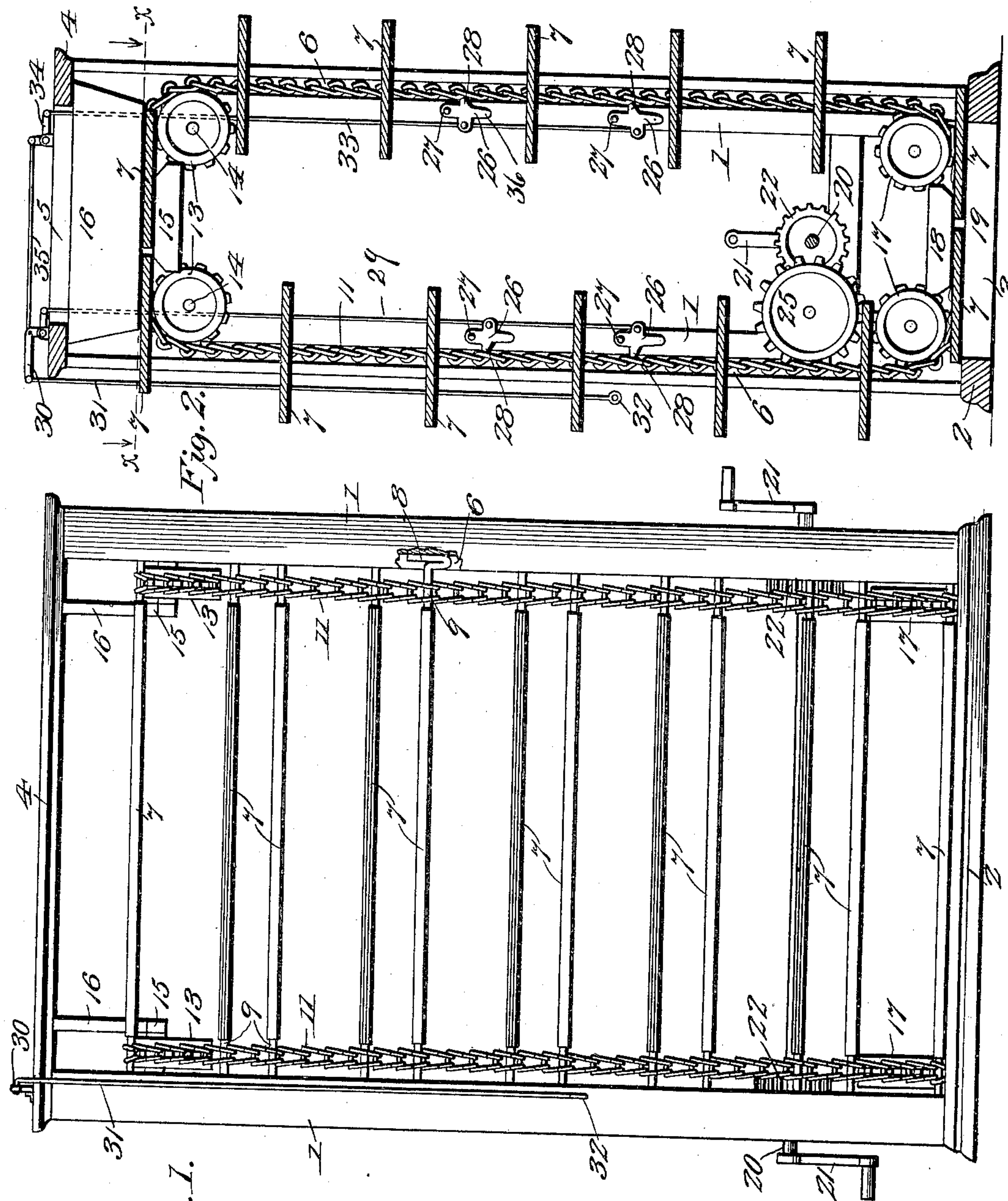


Fig. 1.

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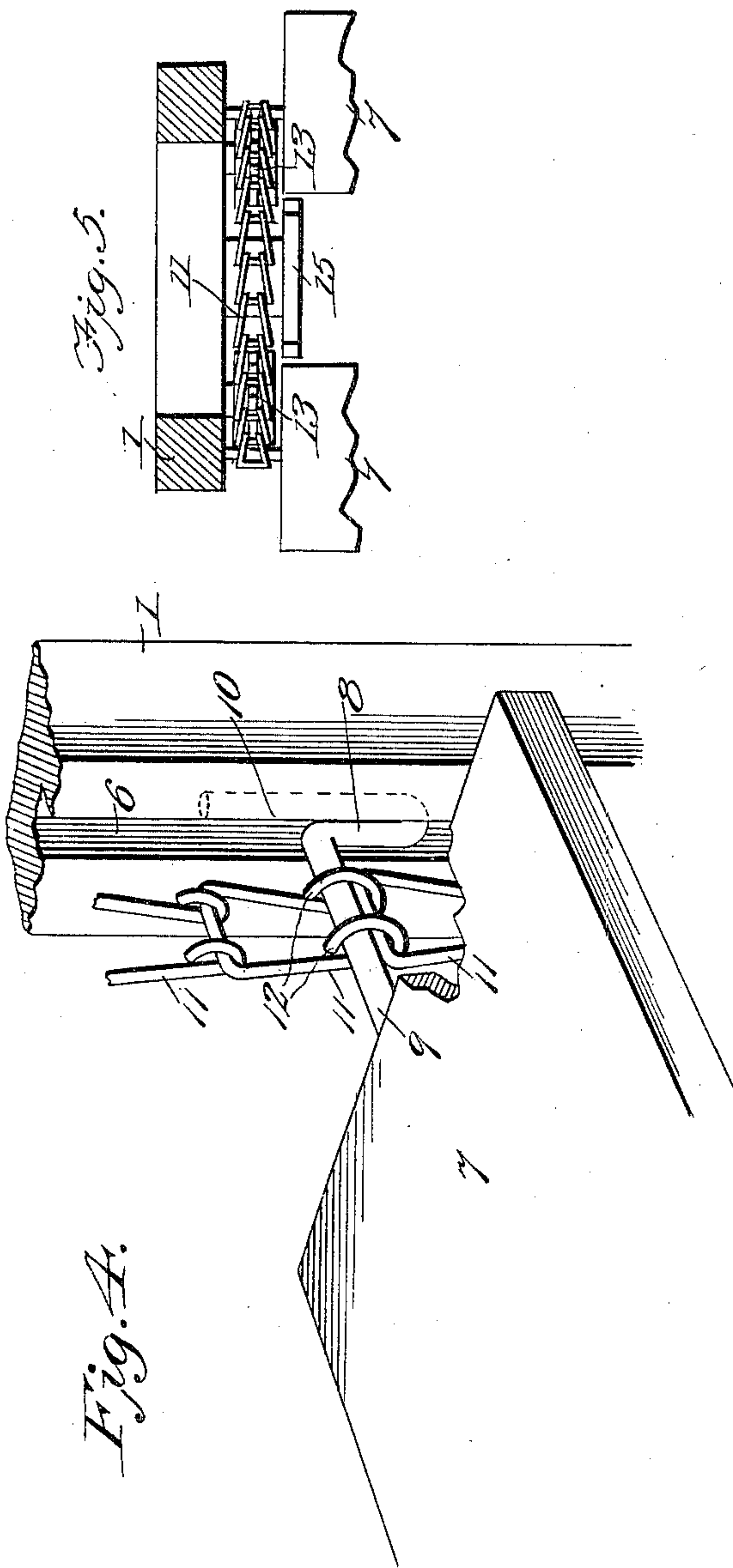
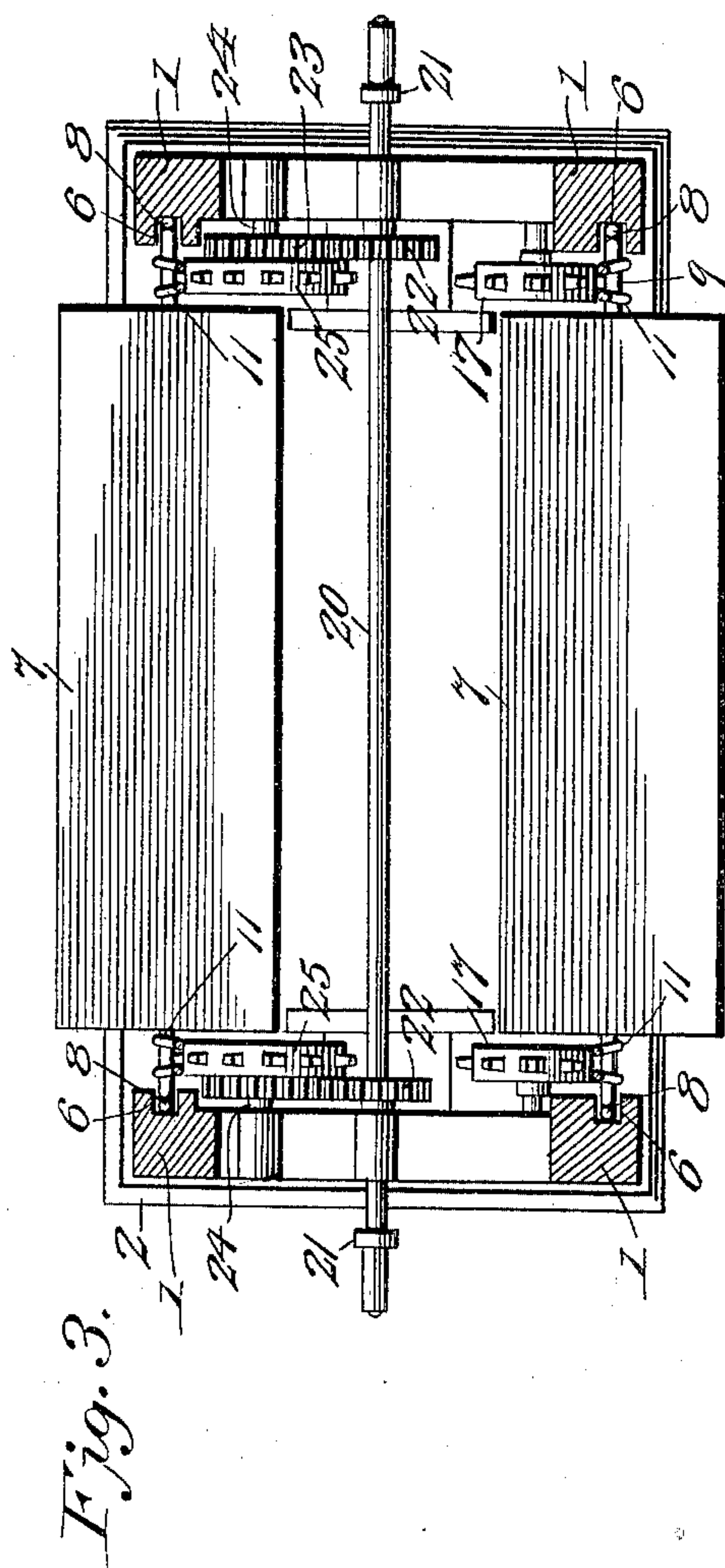


Fig. 5.

Fig. 4.

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# UNITED STATES PATENT OFFICE.

OTTO E. BAHNEMANN, OF GERA, MICHIGAN.

## ADJUSTABLE SHELVING.

SPECIFICATION forming part of Letters Patent No. 682,517, dated September 10, 1901.

Application filed February 27, 1901. Serial No. 49,105. (No model.)

*To all whom it may concern:*

Be it known that I, OTTO E. BAHNEMANN, a citizen of the United States, residing at Gera, in the county of Saginaw and State of Michigan, have invented new and useful Improvements in Adjustable Shelving, of which the following is a specification.

This invention relates to adjustable shelving; and the object of the present invention is to provide in connection with a series of shelves means for moving the shelves up and down in order that the articles supported thereon may be displayed to advantage. The structure hereinafter described is particularly designed for use in stores where it is necessary to economize space and at the same time render the goods easily accessible from all the shelves. Under the present invention all of the shelves are arranged in a continuous or endless series and so mounted with respect to the supporting stand or casing that by means of suitable operating mechanism shelves may be raised or lowered and any shelf of the series brought to any desired elevation for the purpose of displaying the articles thereon and rendering them accessible.

It is also an object of the present invention to provide means for supporting the shelves independently of the operating mechanism in connection with means for tripping the supporting devices when it is necessary to move the entire series of shelves.

The invention also contemplates novel means for maintaining the horizontality of the shelves during their movements.

Other objects and advantages of the invention will appear more fully in the course of the ensuing description.

In the accompanying drawings, Figure 1 is a view in elevation of a stand or casing equipped with adjustable shelves and operating mechanism therefor constructed in accordance with the present invention. Fig. 2 is a central vertical cross-section through the same. Fig. 3 is a horizontal section through the structure. Fig. 4 is a detail perspective view showing the relation of the shelves to the endless belts or chains and the posts or uprights of the frame of the stand or casing, and Fig. 5 is a section on the line  $xx$  of Fig. 2.

Similar numerals of reference designate cor-

responding parts in all figures of the drawings.

Referring to the drawings, it will be seen that the shelves are mounted within a stand or casing comprising, essentially, a series of corner-posts or uprights 1, the lower ends of which connect with the base-frame comprising the front and rear members or side bars 2 and the cross-bars 3, which also form the lower guides or strips upon which the shelves rest and by means of which they are guided in moving horizontally from front to rear, or vice versa. The corner-posts are also rigidly connected at their tops by means of the longitudinal bars 4 and the cross-bars 5. The stand or casing may be otherwise braced in any desired manner, if necessary.

In carrying out the present invention the corner-posts are provided with vertical grooves or ways 6, adapted to receive the slides connected with the shelves. Each of the shelves (indicated at 7) is provided with centrally-arranged and terminally-projecting shelf-balancing slides 8, each of which comprises a shank 9, which extends from one end of the shelf into the groove or way 6, and also a vertically-disposed steadying slide or foot-piece 10, which works up and down in the groove 6 in order to prevent the shelf from tipping and spilling the articles carried thereby. A simple form of shelf-balancing slide is shown in Fig. 4 as composed of a rod, one end of which is inserted in or otherwise rigidly connected to the shelf 7, while its opposite or outer end is bent at a right angle thereto to extend in one direction and then recurved or bent upon itself to extend in the opposite direction, as clearly shown in Fig. 4, by means of which the slide 10 projects at both sides of the shank 9 and equidistantly therefrom. The shelves 7 are arranged at any suitable distance apart, and they are all connected in an endless series by means of a pair of endless belts or chains 11, the links of which are provided with loops or sleeves 12, through which the shanks 9 of the slides 8 pass and in which said shanks are journaled and free to turn. The belts or chains 11 pass over and around a pair of pulleys or sprocket-wheels 13, arranged near the top of the stand and mounted upon shafts 14, arranged in the same horizontal plane and respectively adja-



cent to the front and rear of the stand. Arranged in a plane between the shafts 14 is a transverse guide-strip 15, extending across the frame near the top, and above the strip 15 is placed a second transverse guide-strip 16, which is placed a suitable distance from the strip 15 to enable the shelves 7 to pass slidingly between the two guides. The strips 15 are secured to any suitable bracket or support attached to the posts 1, as shown in Fig. 5. A corresponding pair of wheels 17 is arranged at the bottom of the stand, and also a corresponding pair of lower guides or guide-strips 18 and 19, between which the shelves 7 are adapted to pass and slide. The belts or chains pass around all of the wheels 13 and 17, and the guide-strips 15, 16, 18, and 19 engage the shelves and prevent them from tipping as they move in a horizontal direction from the front toward the rear of the frame, and vice versa. As the shelves travel up or down the slides 8 cooperate with the walls of the grooves or ways 6 and prevent the shelves from tipping. In this way the shelves are steadied and balanced at all times.

The means for operating the shelves consists of an operating-shaft 20, mounted in suitable bearings in the frame and provided at one or both ends with a detachable operating-crank 21, which crank may be removed in order to prevent persons from tampering with the device. The shaft 20 is provided adjacent to its opposite ends with spur gear-wheels 22, which intermesh with and drive other spur gear-wheels 23, fast on stud-shafts 24, connected with the frame, and also provided with driving sprocket-wheels 25, which engage with and drive the chains or belts 11. By this means the operator may move the entire series of shelves, causing the front tier to move up or down, as may be desired, the rear tier of shelves moving in the opposite direction. By continuing the rotation of the driving-shaft the rear shelves may be brought to the front side of the stand, and in this way any of the entire series of shelves may be brought into any desired position.

In order to hold the shelves stationary after they have been moved by the operating mechanism hereinabove described, I provide a series of shelf supports or catches 26, each of which is pivotally mounted at 27 on the frame and provided with a catch lip or shoulder 28, adapted to engage any one of the shanks 9 of the shelf-balancing slides. The supports or catches 26 are arranged one above the other, and the series of catches mounted at one side of the frame are coupled together by a connecting-cord 29, which is attached to an elbow-lever 30, preferably mounted at the top of the frame and adapted to be operated by means of a pull-cord 31, having a handle 32, arranged within reach of the operator. The series of catches at the other side of the frame are coupled together by a similar connecting-cord 33, which connects with an elbow-lever 34, that is in turn con-

nected with the first-named elbow-lever 30 by means of a suitable connection 35. In this way it will be seen that all of the shelf supports or catches 26 may be simultaneously tripped or thrown out of engagement with the shanks 9 of the slides 8 for permitting the shelves to be moved up or down by the operating mechanism described. Each of the catches 26 is also provided with a depending lever portion 36, so that it may be grasped and operated by hand and independently of the common operating device—namely, the pull-cord 31.

From the foregoing description it will be seen that the shelves are connected together in an endless series and that they may be simultaneously moved by a common operating device, by means of which any desired shelf may be brought to the front of the stand and carried to any desired elevation. It will further be seen that the load carried by the shelves at one side of the stand serves to counterbalance the load carried by the opposite side; further, that the horizontality of all the shelves is preserved at all times, thus avoiding the liability of the shelves to tip and spill the contents thereof. It will also be noted that the shelf supports or catches 26 form, in effect, auxiliary supports or safety devices for preventing the shelves from falling in case one or both of the operating belts or chains should break.

I do not desire to be limited to the exact details of construction and arrangement hereinabove set forth, and accordingly reserve the right to change, modify, and vary the construction within the scope of this invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a series of grooved uprights; of an endless series of shelves each provided with shelf-balancing slides projecting from the ends of the shelves and movable in the grooves, upper and lower sets of guide-strips horizontally disposed, and arranged in spaced parallel relation and adapted to engage the upper and lower sides of the ends of the shelves as they move in a horizontal direction, and means for raising and lowering the shelves.

2. The combination with grooved standards, and upper and lower sets of horizontal guide-strips, arranged in spaced parallel relation and adapted to engage the upper and lower sides of the shelves adjacent to their edges, of an endless series of shelves provided with shelf-balancing slides projecting from the ends of the shelves and each comprising a shank and a vertically-disposed portion working in said grooves, endless belts connecting the shelves, and operating means for said belts or chains embodying an operating-shaft and a detachable crank fitted thereto.

3. The combination with an endless series



of movable shelves arranged to move up and  
down in parallel planes; of a stand or casing  
in which the shelves are mounted, means for  
preventing the shelves from tipping in their  
5 upward and downward movements, means for  
operating the shelves, and horizontally-dis-  
posed guide-strips at the top and bottom of  
the stand or casing, said strips being arranged  
in spaced parallel relation and adapted to re-  
10 spectively engage the upper and lower sides  
of the shelves adjacent to their edges.

4. The combination with a stand or casing,

an endless series of shelves movable up and  
down therein, and operating means for the  
shelves; of a series of pivotally-mounted 15  
shelf supports or catches, and a common op-  
erating device connected with said catches  
for simultaneously tripping them.

In testimony whereof I affix my signature  
in presence of two witnesses.

OTTO E. BAHNEMANN.

Witnesses:

JOHN RUMMEL,  
ERNST J. MOLL.