

No. 689,554.

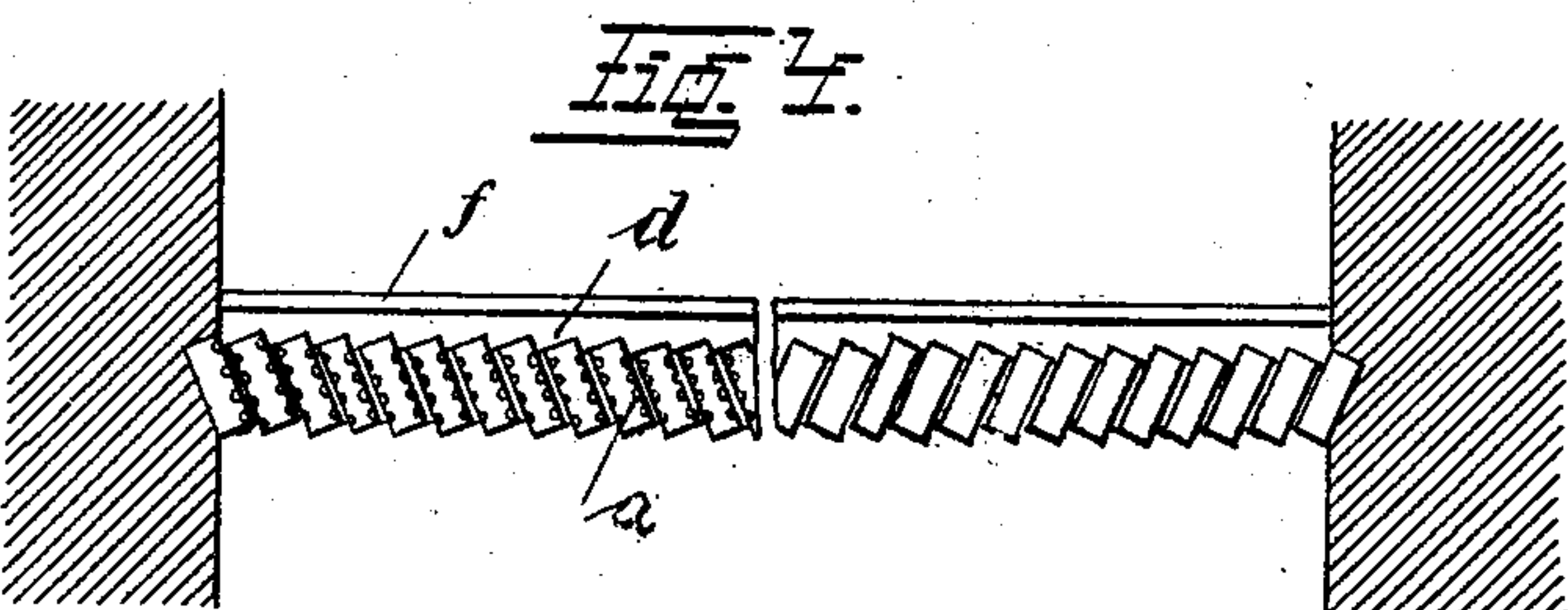
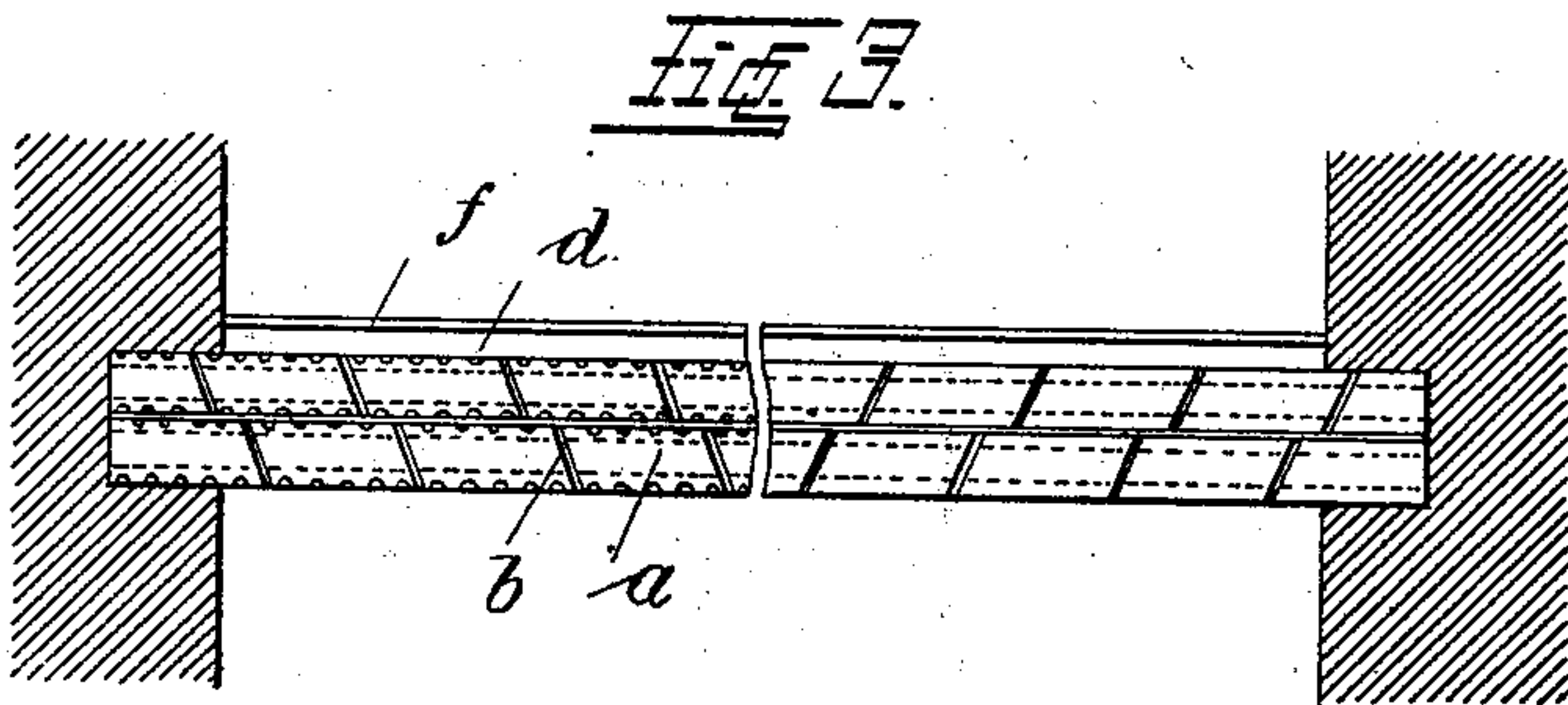
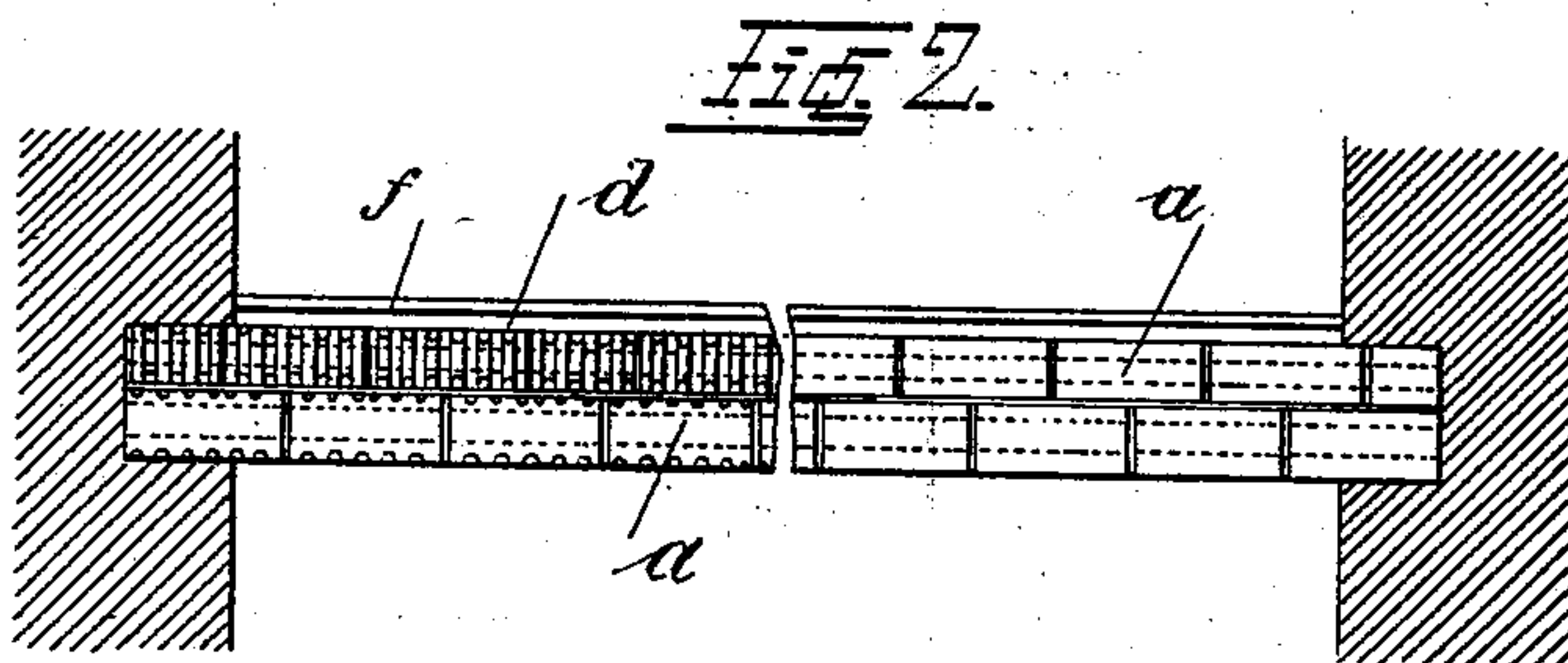
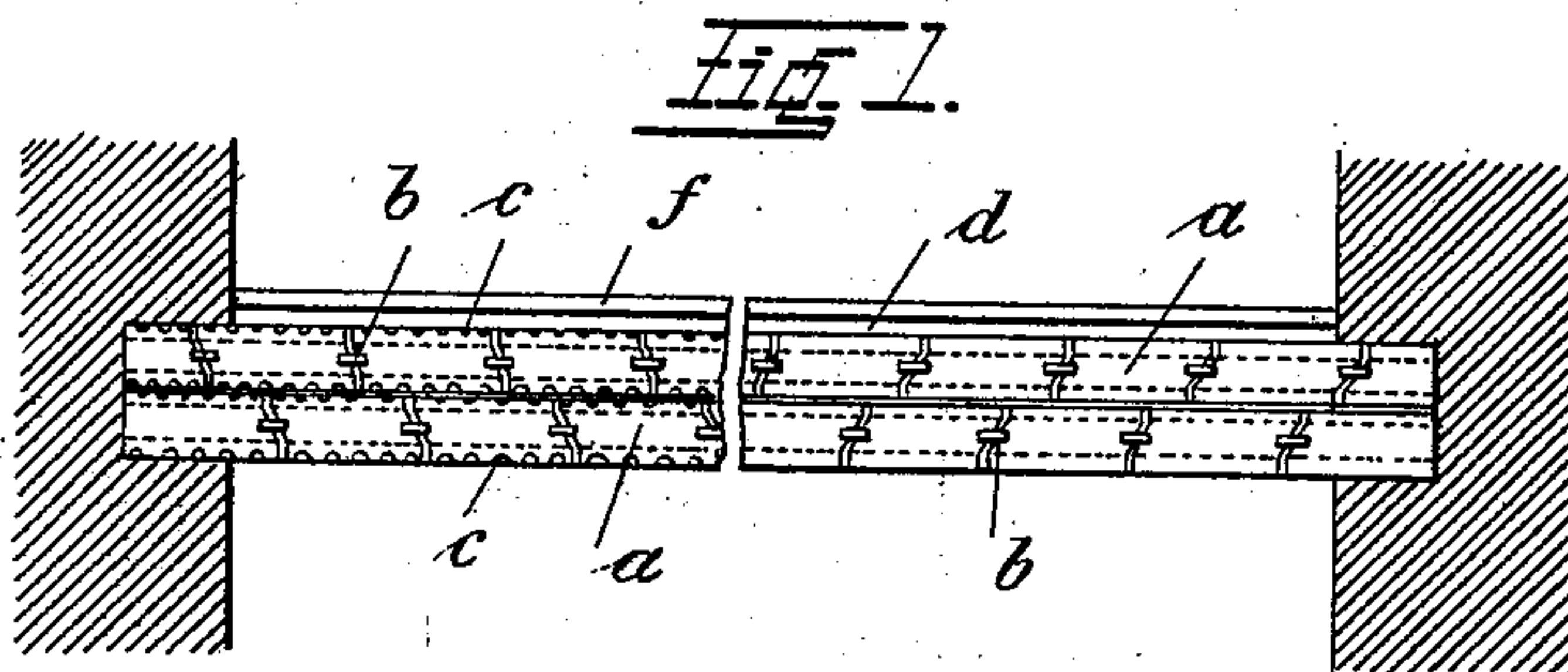
Patented Dec. 24, 1901.

C. LORENC.
STRAIGHT CEILING CONSTRUCTION.

(Application filed Apr. 13, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witness:
C. A. Luffy
C. Sedgwick

Inventor:
C. Lorenc
By *Agood & Co*
Atty's.

No. 689,554.

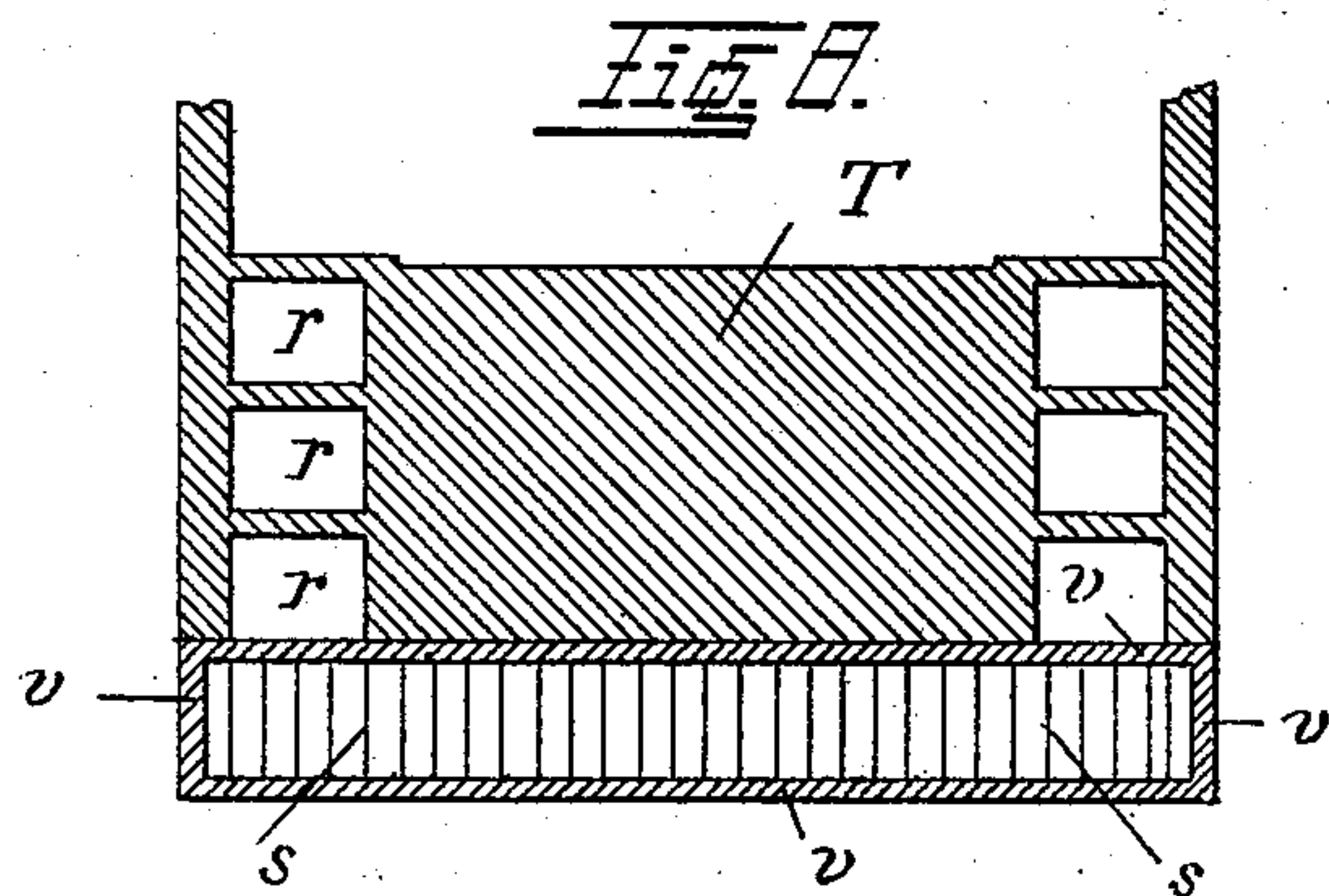
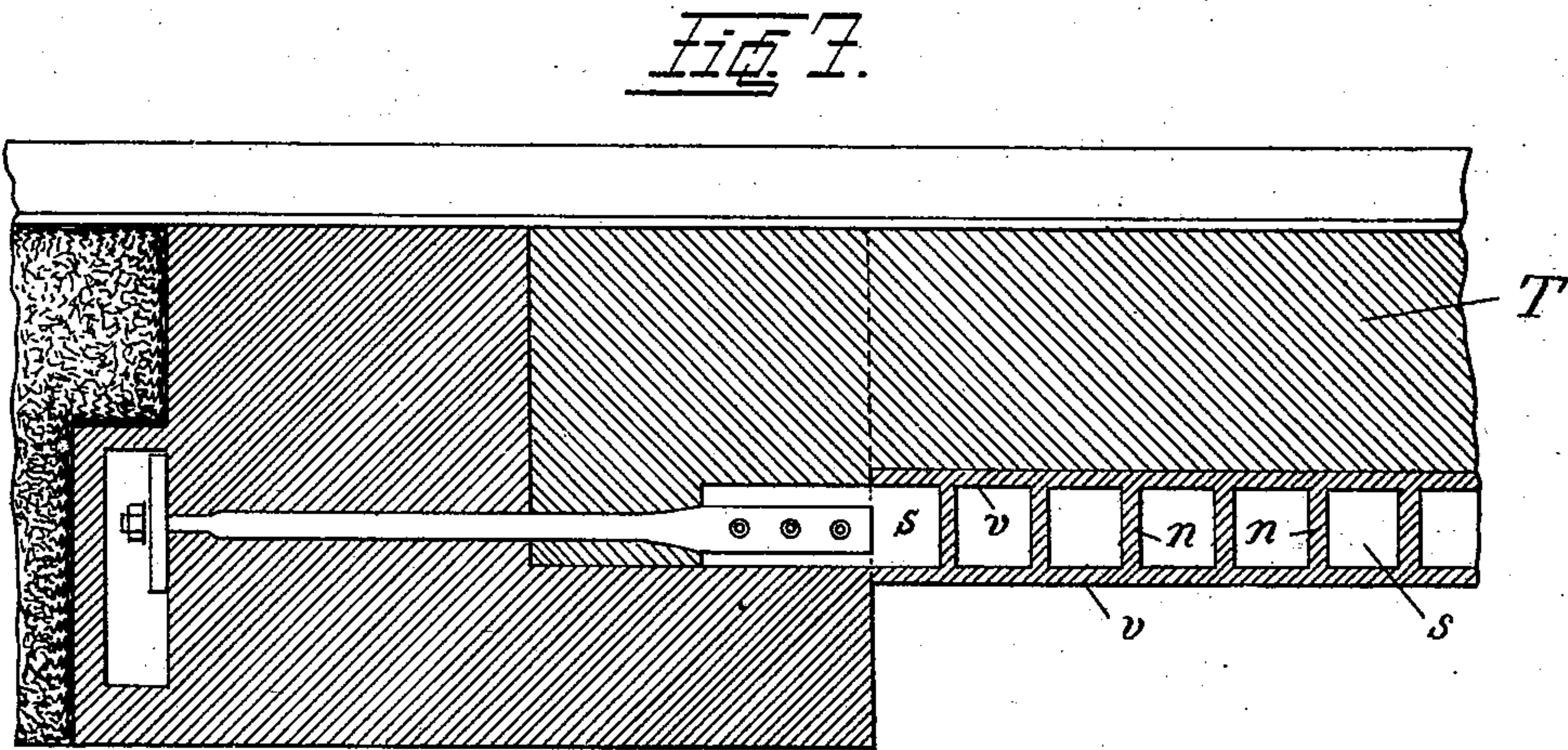
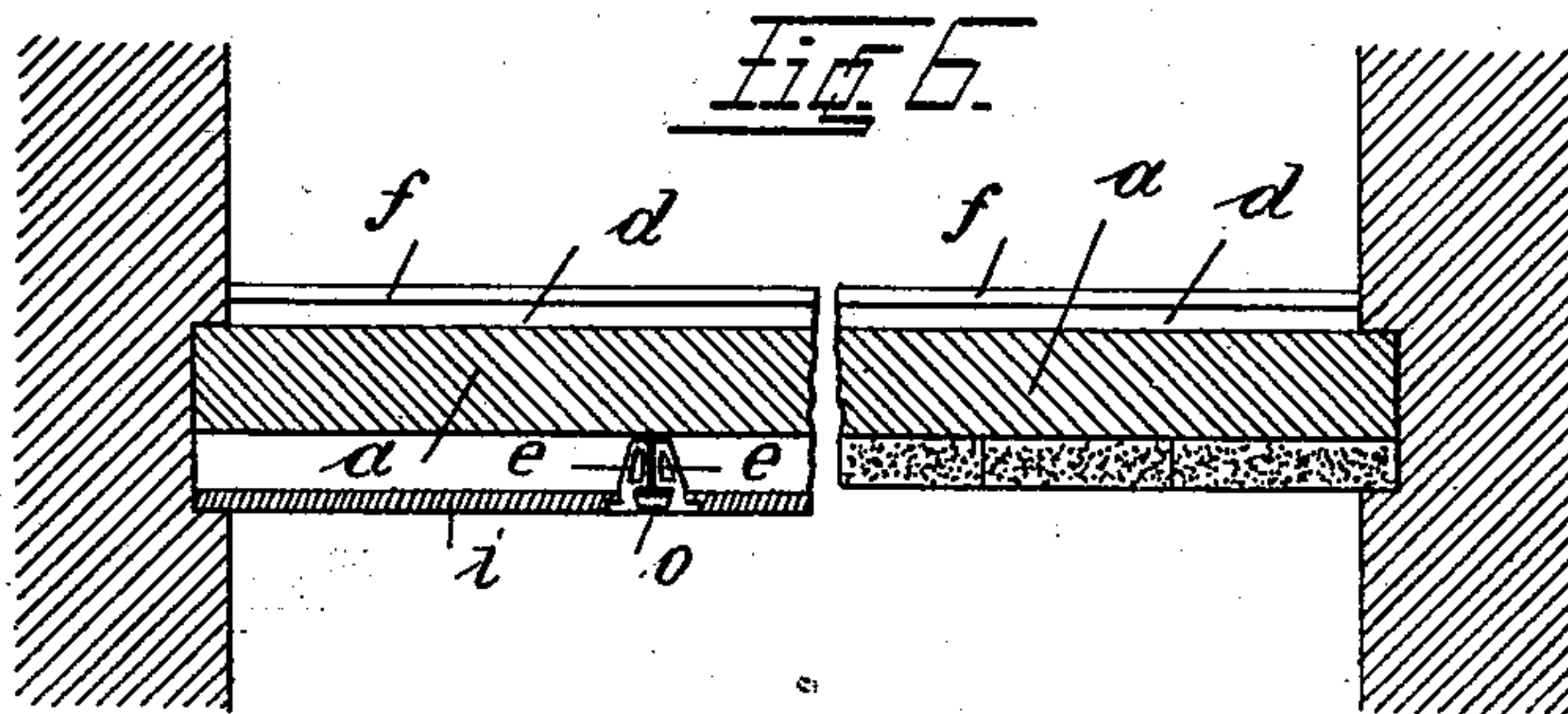
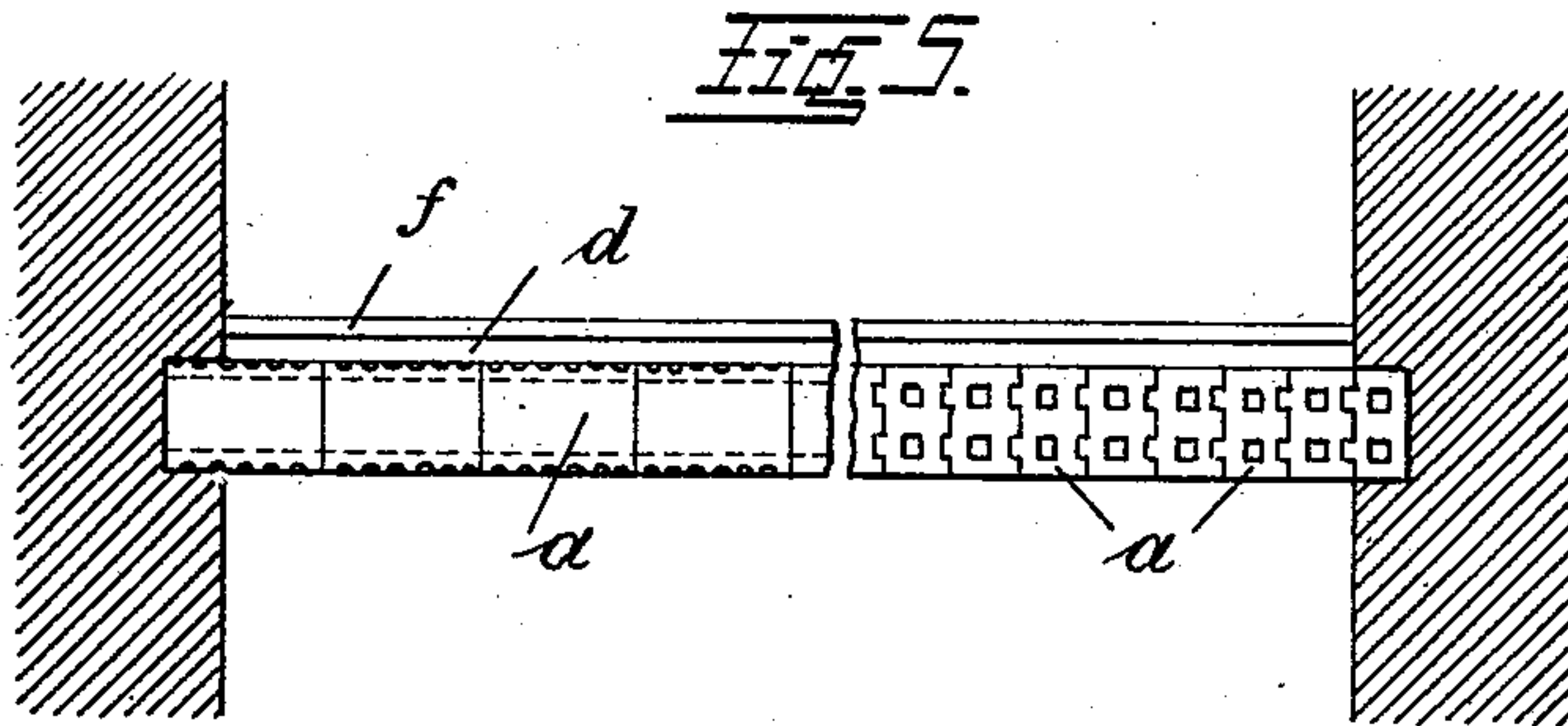
Patented Dec. 24, 1901.

C. LORENC.
STRAIGHT CEILING CONSTRUCTION.

(Application filed Apr. 13, 1901.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:
C. A. Duffy
C. Sedgwick

Inventor:
C. Lorenc,
By Osgood & Co.
attys.

UNITED STATES PATENT OFFICE.

ČENÉK LORENC, OF WEINBERGE, NEAR PRAGUE, AUSTRIA-HUNGARY.

STRAIGHT-CEILING CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 689,554, dated December 24, 1901.

Application filed April 13, 1901. Serial No. 55,634. (No model.)

To all whom it may concern:

Be it known that I, ČENÉK LORENC, of Königl Weinberge, near Prague, Bohemia, Empire of Austria-Hungary, have invented
5 certain new and useful Improvements in Straight-Ceiling Constructions, of which the following is a specification.

The present invention relates to a new construction of straight ceilings for any desired
10 span width, which construction is distinguished thus: (a) in a ceiling of slight height—that is, in simple ceiling formation—by the peculiar transverse joining-surfaces of the stones composing the ceiling; (b) in a ceiling
15 of considerable height by the fact that the ceiling is comprised of several layers lying one above another and in step-like arrangement, whereby the layer-surfaces of the building stones or concrete are obliquely under-
20 cut, ribbed, or notched; (c) that for considerable span widths is used a support for the ceiling of slight iron girders or supporting sheet-iron plates serving as a frame in the construction of the ceiling, and (d) that in
25 each of the methods of construction specified above the building-stones or ceiling layers are bound together in one single supporting bulk by means of an especial mortar.

In carrying out this invention building-
30 stones or concrete is used, which because of the hollow or porous structure possesses as slight a weight as possible, wherewith, to attain a still greater increase in the supporting capacity, there are used in connection with the
35 building-stones broken or undulatory joining-surfaces combined with fastening by pegs or other wood-joining methods.

The employment of hollow and porous stones is indeed already known, but in this
40 manner not yet applied. Such stones have been used up to now only for the reason that they are light. They possess, however, only a slight compressive strength and almost no tensile strength. If already in many in-
45 stances, and for slight span widths, hollow porous bricks suffice or should suffice, the under surfaces of the same must be rendered hard and air-tight by means of impregnation with potash or soda, soluble glass-powder so-
50 lution, clay solution, or silicic fluorhydric acid or fluates and the like. If now in walls or arches an especial below-described mortar is used, then the joining-surfaces will be closed air-tight, and if after the construction

in layers of the masonry the said mortar is
55 thoroughly run in on the upper surfaces and immediately after the hardening of the same impregnated, as before shown, then a considerably greater tensile and compressive strength is attained than heretofore. 60

The use of obliquely undercut, ribbed, or notched overlying surfaces, also of broken, undulatory, and ribbed joining-surfaces, is very important because to such surfaces, the mortar adheres considerably better than to
65 smooth surfaces.

By means of the joining-pegs the masonry acquires a considerably greater arching and supporting capacity.

If the ceiling has a considerable height, the
70 same is carried out in such a manner that several layers of building-stones are arranged in step-like tiers, one above another, and between the different layers is poured in the mortar before mentioned, so that all the lay-
75 ers are united in one whole strong supporting-body. In the same manner one proceeds if the different layers are composed of concrete, wherein one begins the new upper
80 layer as soon as the mortar used underneath, which will be touched by the upper layer, has in some measure dried. Also here by the use of the several-times-mentioned mortar between the different layers is attained a
85 joining of the same into one single support- ing mass.

To increase the tensile strength of the ceiling and a substitute for a support, I sometimes put as a strengthening undergirding for the weight supporting the ceiling itself before
90 the construction of the last under it, at regular intervals, slight girders or iron plates of any cross-section or form. For very great span-widths and for bridges I use riveted plates, the sheet-iron or plates being con-
95 nected in distances from 0.5 to two meters, under and above or at pleasure, by means of cog-like laid on cross-plates or cross-iron sheets, &c., or by concrete ribs, so that a lateral yielding is precluded; or hoop-iron or sheet-
100 iron of any diameter, filled in with beton or some other very light concrete, are fitted into the masonry. A few of the hoop-irons or sheet-irons, according to necessity, are drilled
105 at both ends and supplied with iron fasten- ings, the whole of which serves to form a very firm arching over the space between the walls or abutments. The undergirders or sheet-

iron surfaces are rendered air-tight either by means of the Robitz system or by specially-formed isolating-plates, which are shoved in and poured over until air-tight. The girders, sheet-iron, and plates can in addition, through casing on both sides, be still better stiffened and closed air-tight. The tensile strong mortar, which here plays an important roll, called "soluble-glass trass cement" or "soluble-glass trass plaster," consists, in substance, of cement, lime or plaster, trass, infusorial earth, and potash or soda soluble glass in powdered form as chief materials, and of secondary materials, as sand, ashes, volcanic stones, marble, and raw-limestone sand or powder, burned clay or mud in sand or powder form, glass sand, alum slate, clinkers, and similar materials.

In the accompanying drawings are, for example, exhibited a few straight-ceiling constructions according to the before-described method (shown in Figures 1 to 5) without employment of girders, and in Fig. 6 with application of slight girders under the ceiling constructions, which serve to increase the tensile power and are a substitute for trestles.

Fig. 1 shows in section a ceiling construction suitable for from five to seven meters span, composed of hollow building-stones, in which all the joining-surfaces *b* are grooved to form peg-holes and fastened with pegs. Fig. 2 shows a straight-ceiling construction of hollow building-stones *a*, in which all the bottom and lateral joining-surfaces are ribbed, while Fig. 3 represents a similar construction, with the difference that the building-stones *a* are formed with oblique cross joining-surfaces. Fig. 4 shows a straight arch of hollow building-stones *a*, whose lateral joining-surfaces are ribbed and which building-stones are put in place obliquely. Fig. 5 shows a straight arch of hollow building-stones *a*, whose lateral joining-surfaces display a wood-joining method and whose bottom surfaces are ribbed. The grooves and pegs of Fig. 1 and the grooves and ribs therein in Fig. 5 form interlocking devices between the building stones or blocks, thus increasing the strength of the ceiling. Fig. 6 shows a straight arch *a* in Figs. 1 to 5, under which are placed light girders, which serve to increase the tensile strength of the arch and of which a few, according to necessity, are bored through at both ends and fitted with girder-fastenings, and they then serve to the very firm arching of the walls. These girders *o* are incased on both sides with especially-formed hollow stones *e*, between which isolating plates *i* are inserted. Figs. 7 and 8 show in longitudinal and cross-section, respectively, a bridge of about seventy meters span, eight meters breadth, and three to four meters high, carrying surface *t*, to which, for the increase and the entire taking up of the tensile strains, riveted plates *s* are attached underneath. These plates are by means of concrete fillings *n*, or otherwise, stiff-

ened, and serve at the same time instead of a trestle. The necessary number of the same, are bored through at both ends, fitted with iron fastenings, and serve to the very firm bridging over of the walls or abutments. The entire plate construction is incased on all sides with a concrete layer *v* under the sidewalks, which have to carry a lesser burden. The supporting-frame is not entirely filled out, but rather with free spaces *r*.

I claim—

1. The combination of hollow building-stones placed together to form a straight horizontal ceiling, and mortar joining the stones into a single supporting mass, said mortar having an admixture of finely-ground cement, with trass material, infusorial earth, soluble glass, and sand.

2. The combination of hollow building-stones with roughened surfaces placed together to form a straight horizontal ceiling, and mortar joining the stones into a single supporting mass, said mortar having an admixture of finely-ground cement, with trass material, infusorial earth, soluble glass, and sand.

3. The combination of hollow building-stones with roughened surfaces and beveled ends placed together to form a straight horizontal ceiling, and mortar joining the stones into a single supporting mass, said mortar having an admixture of finely-ground cement, with trass material, infusorial earth, soluble glass, and sand.

4. The combination of hollow building-stones placed together to form a straight horizontal ceiling, there being registering grooves in meeting ends of said stones, pegs in the grooves, and mortar joining the stones into a single supporting mass, said mortar having an admixture of finely-ground cement, with trass material, infusorial earth, soluble glass, and sand.

5. The combination of hollow building-stones placed together to form a straight horizontal ceiling, the building-stones having interlocking devices, and mortar joining the stones into a single supporting mass, said mortar having an admixture of finely-ground cement, with trass material, infusorial earth, soluble glass, and sand.

6. The combination of hollow building-stones placed together in several layers to form a straight horizontal ceiling, the stones in the layers breaking joints, and mortar joining the stones into a single supporting mass, said mortar having an admixture of finely-ground cement, with trass material, infusorial earth, soluble glass, and sand.

In witness whereof I have hereunto signed my name, this 17th day of January, 1901, in the presence of two subscribing witnesses.

ČENÉK LORENC.

Witnesses:

VICTOR BENESS,
ADOLPH FISCHER.