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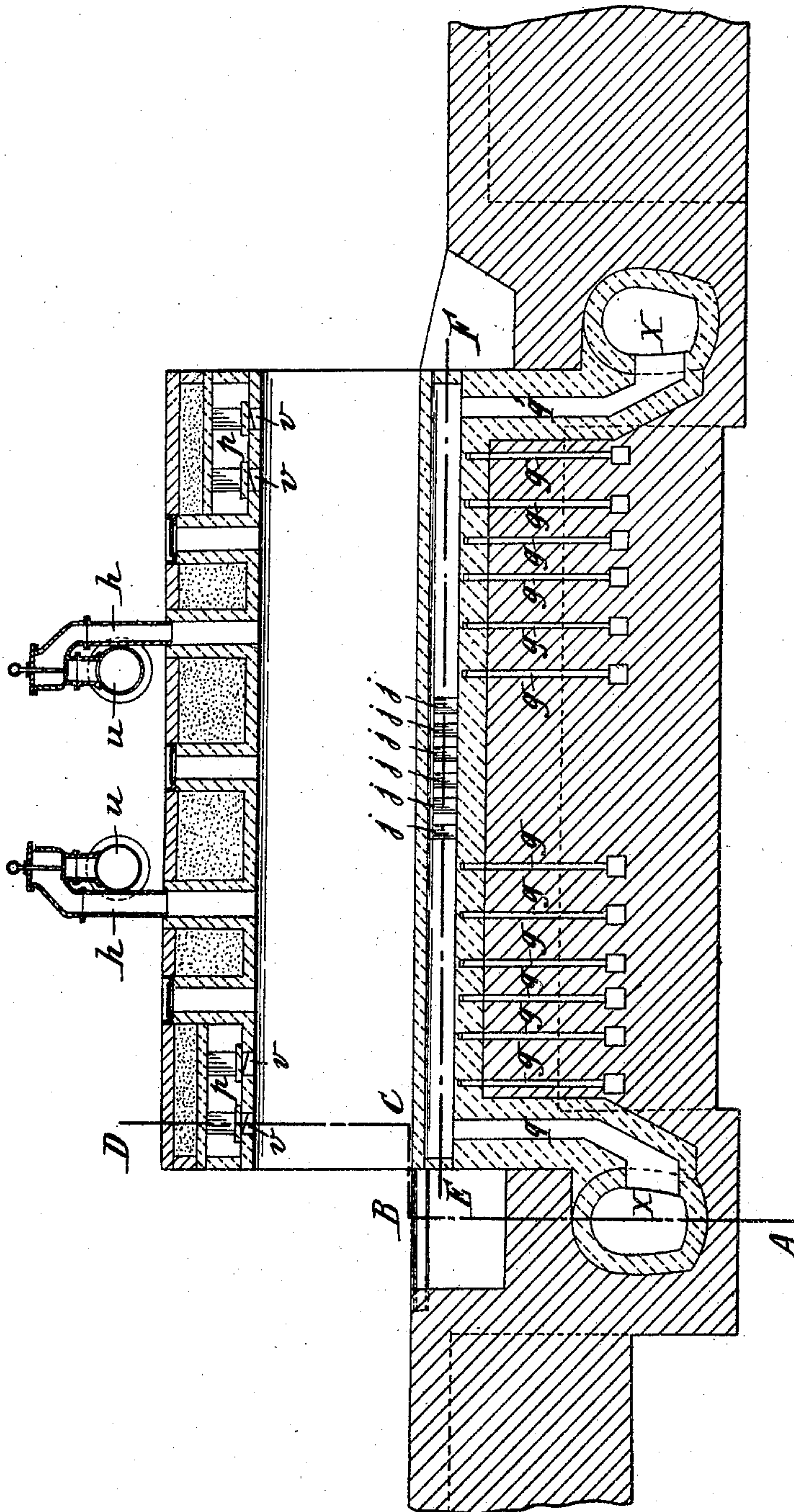
PATENTED JULY 11, 1905.

E. COPPEE.
COKE OVEN.

APPLICATION FILED JAN 20, 1903.

10 SHEETS—SHEET 1.

Fig. 1.



WITNESSES
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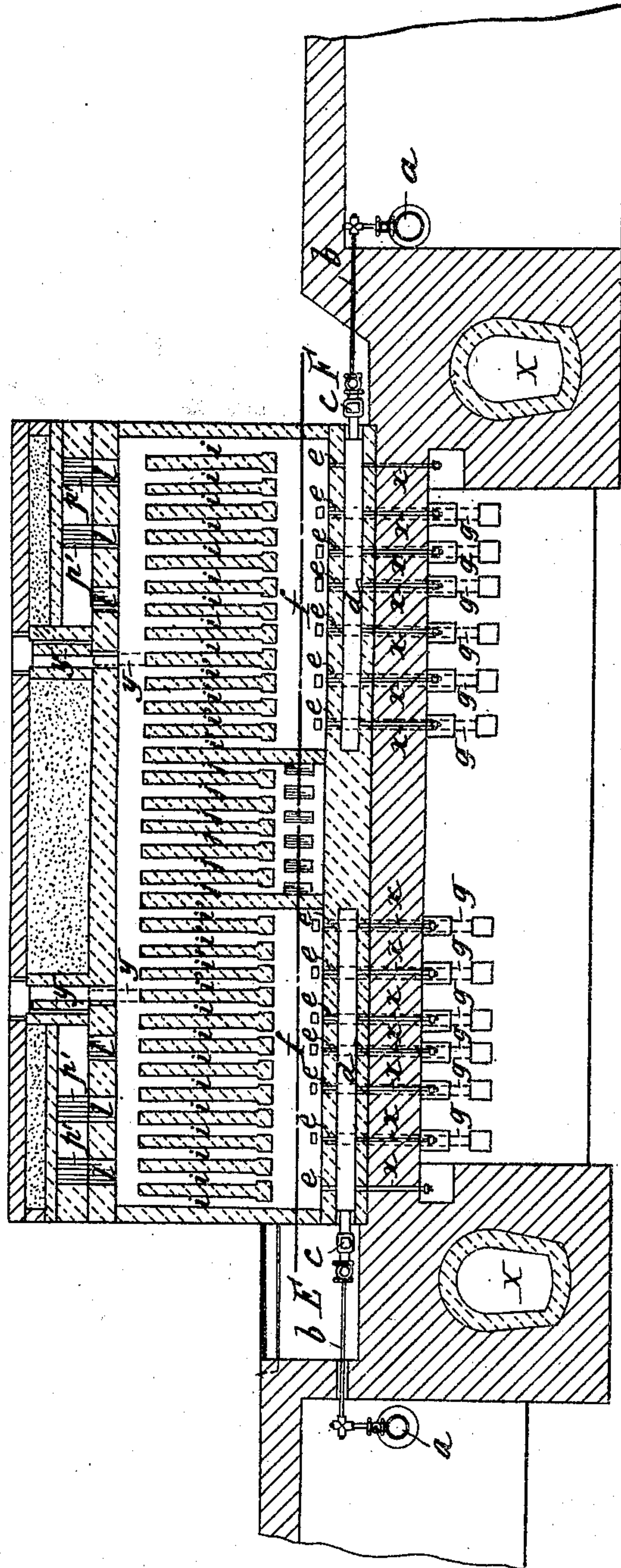
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10 SHEETS—SHEET 2.

Fig. 2.



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10 SHEETS—SHEET 3.

Fig. 4.

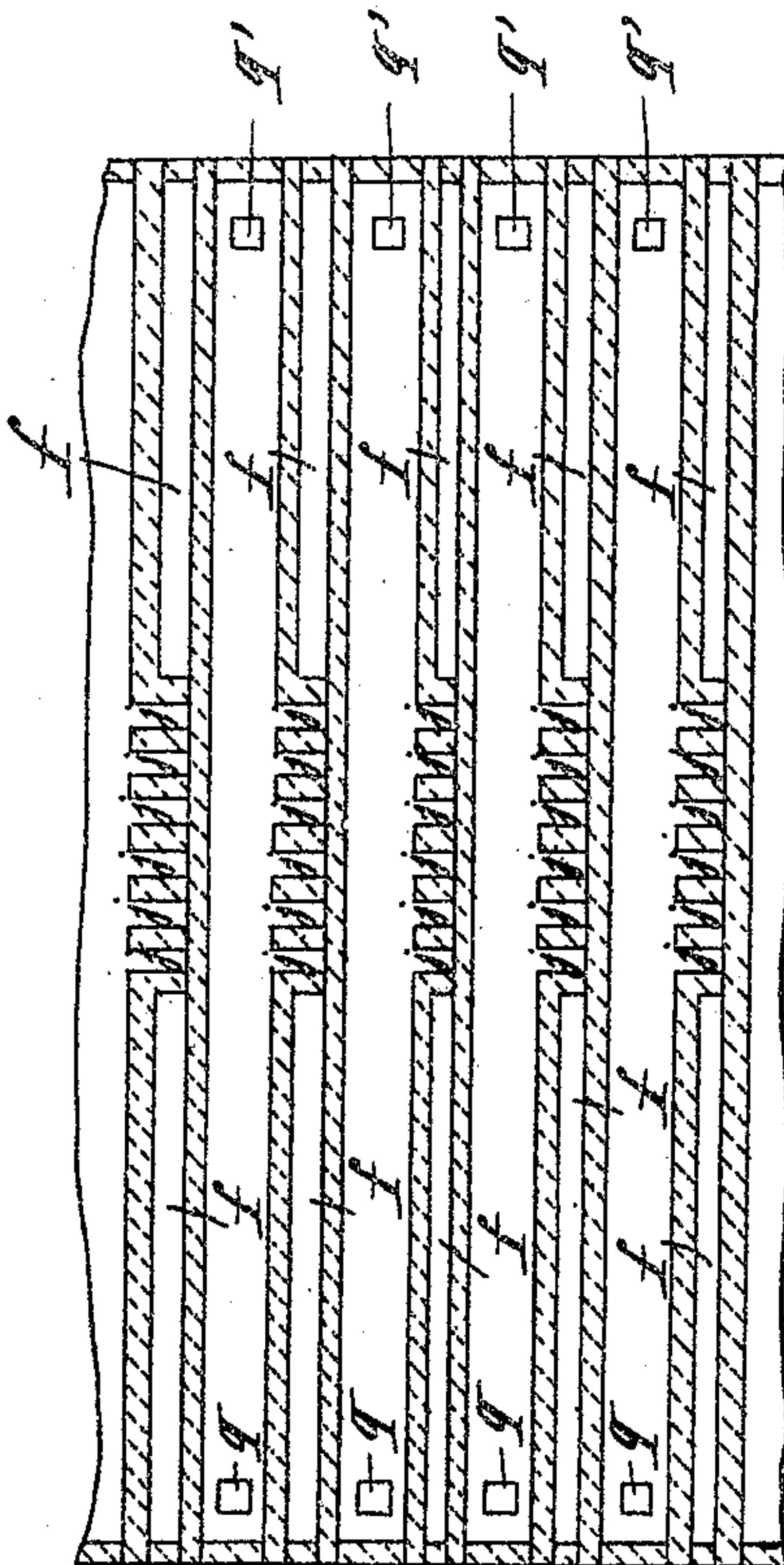
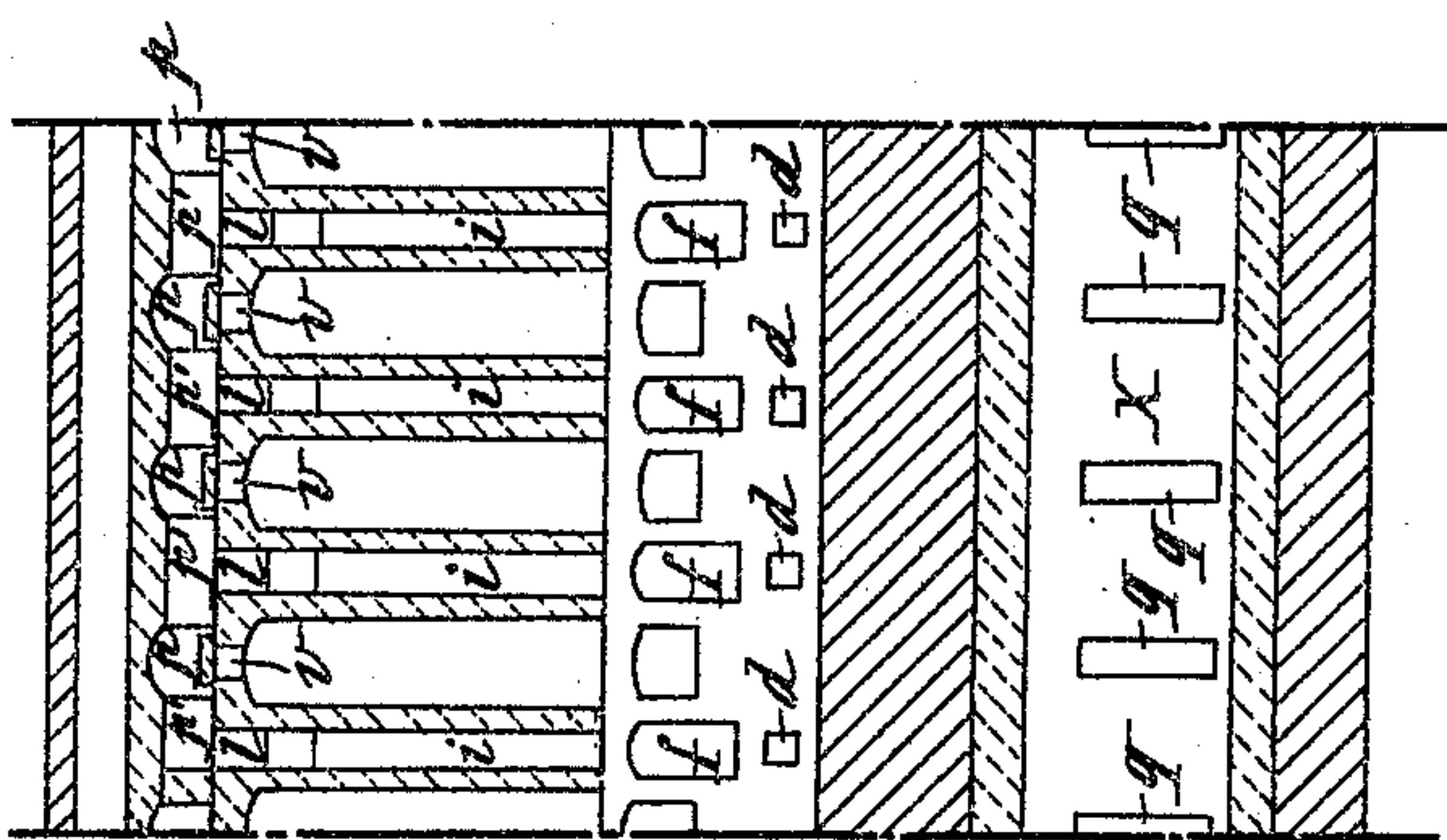


Fig. 3.



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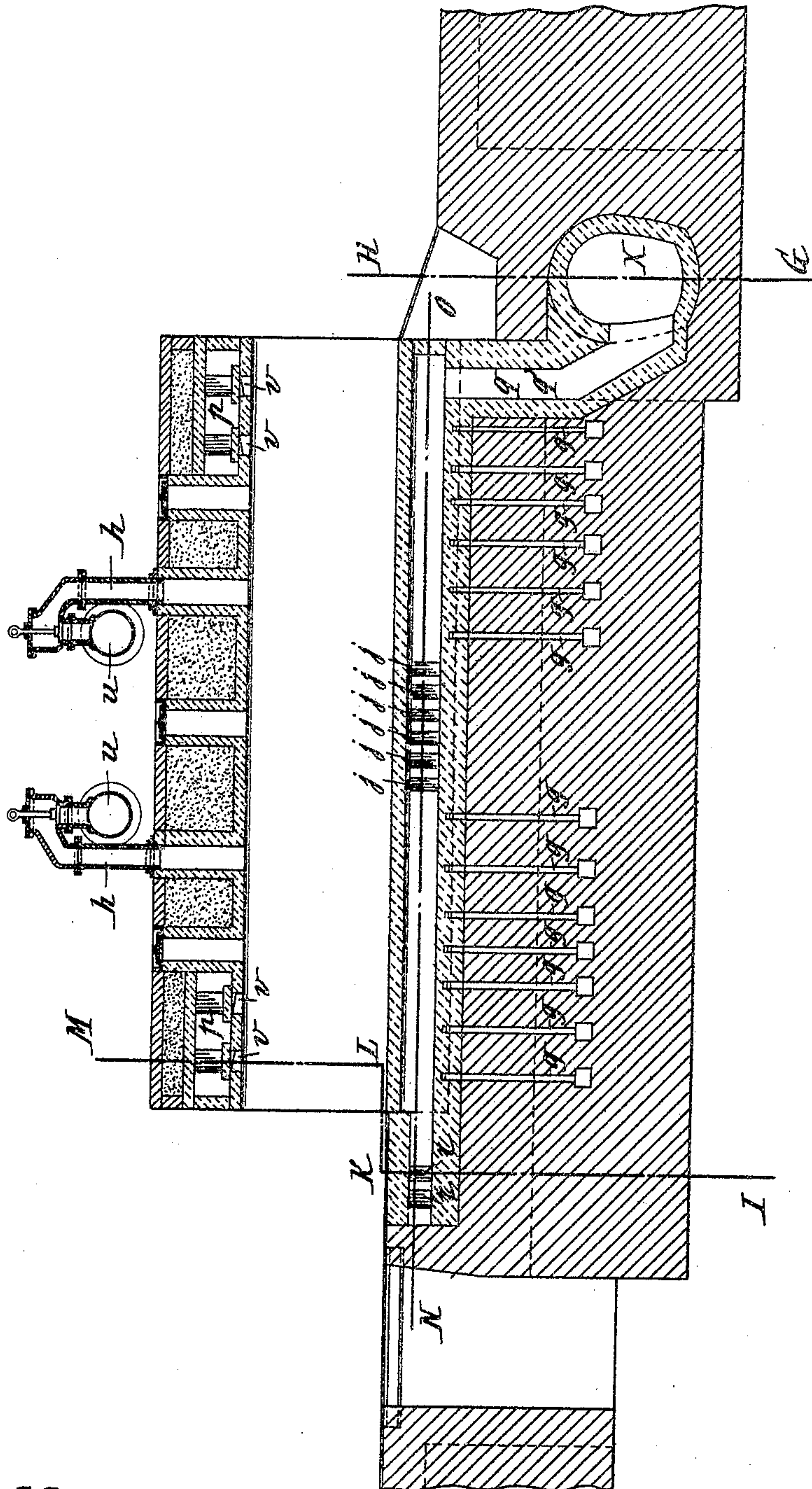
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10 SHEETS—SHEET 4.

Fig. 5.



WITNESSES

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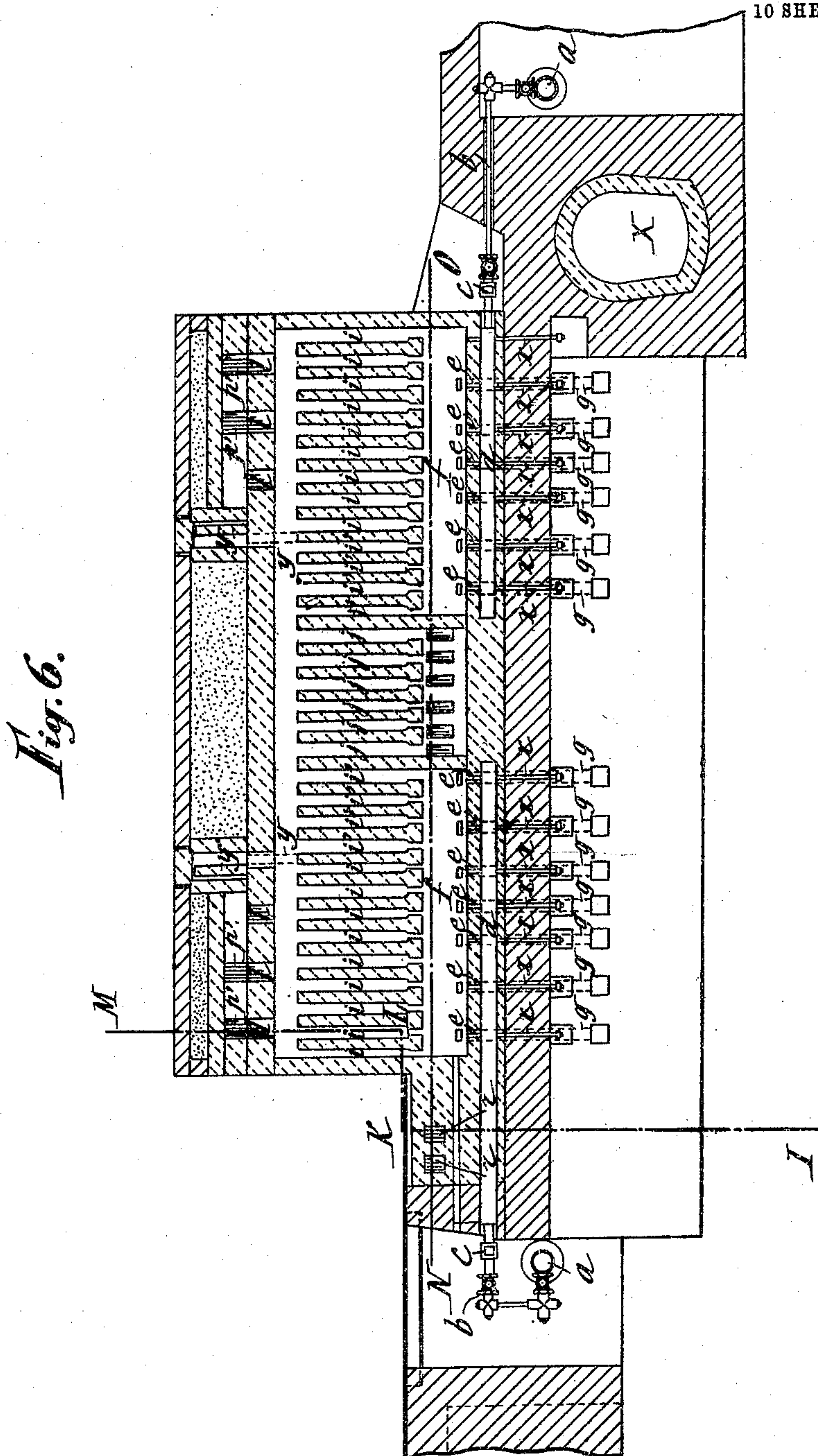
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10 SHEETS--SHEET 5.



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10 SHEETS—SHEET 6.

Fig. 8.

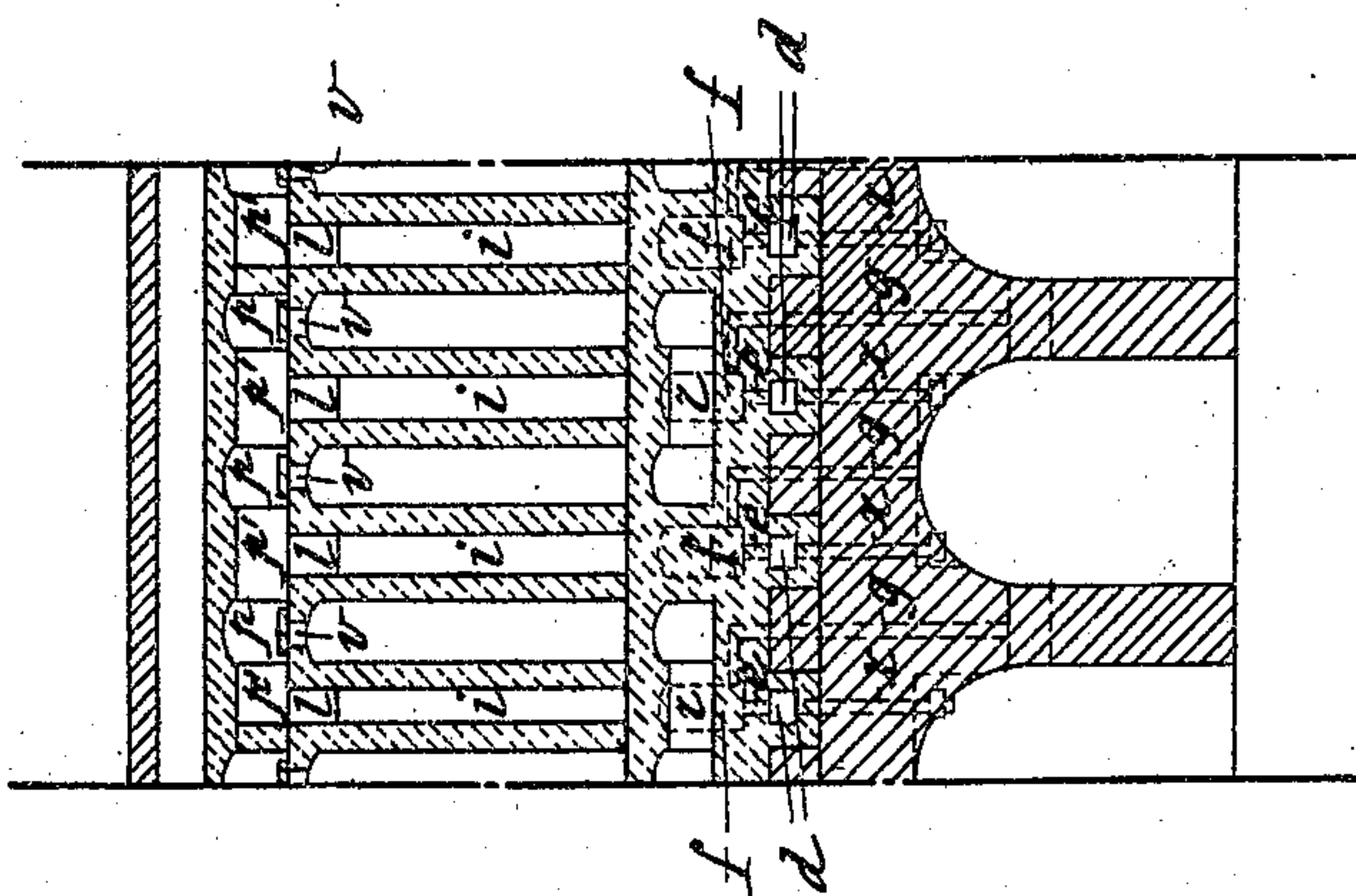
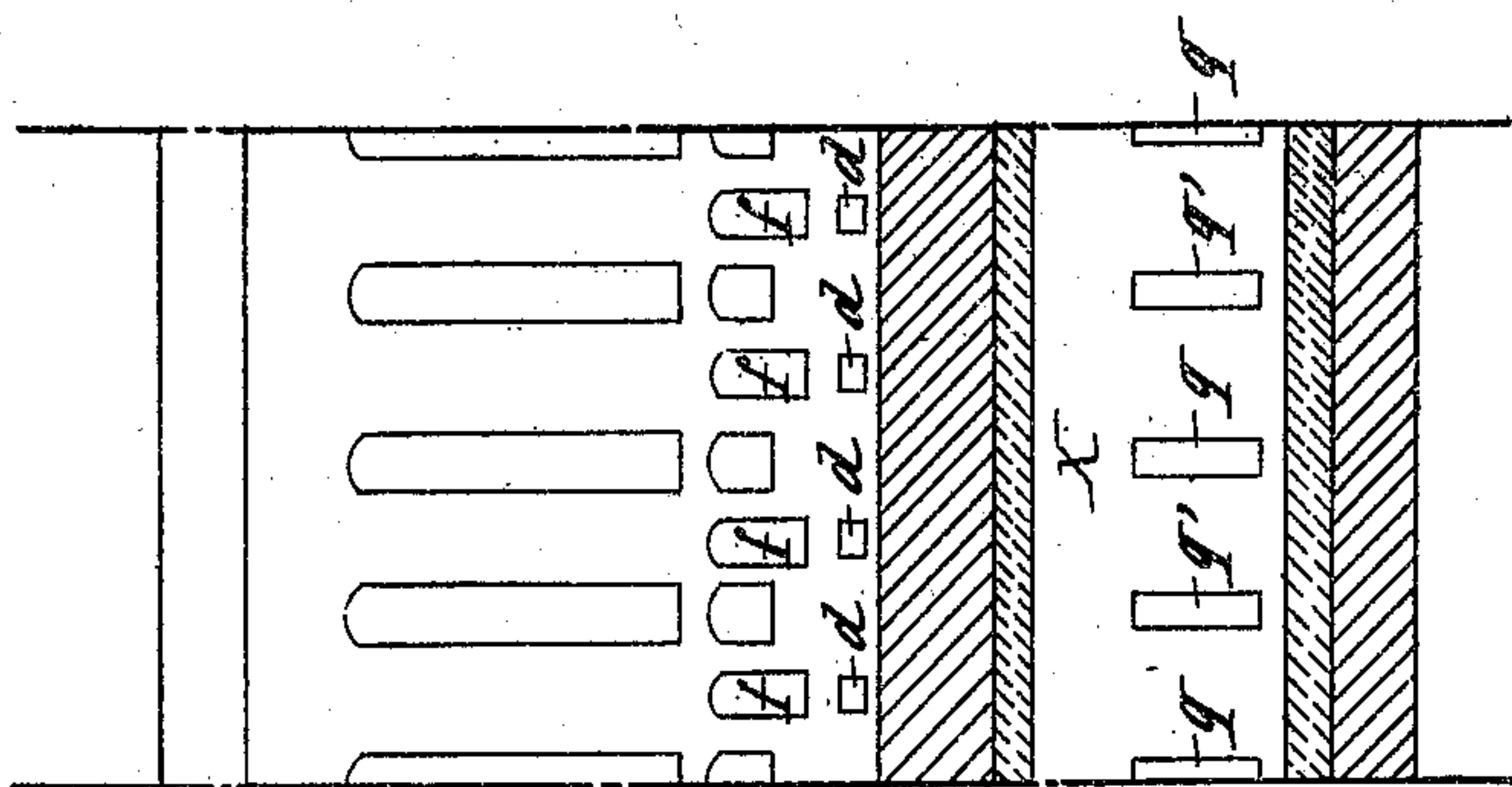


Fig. 7.



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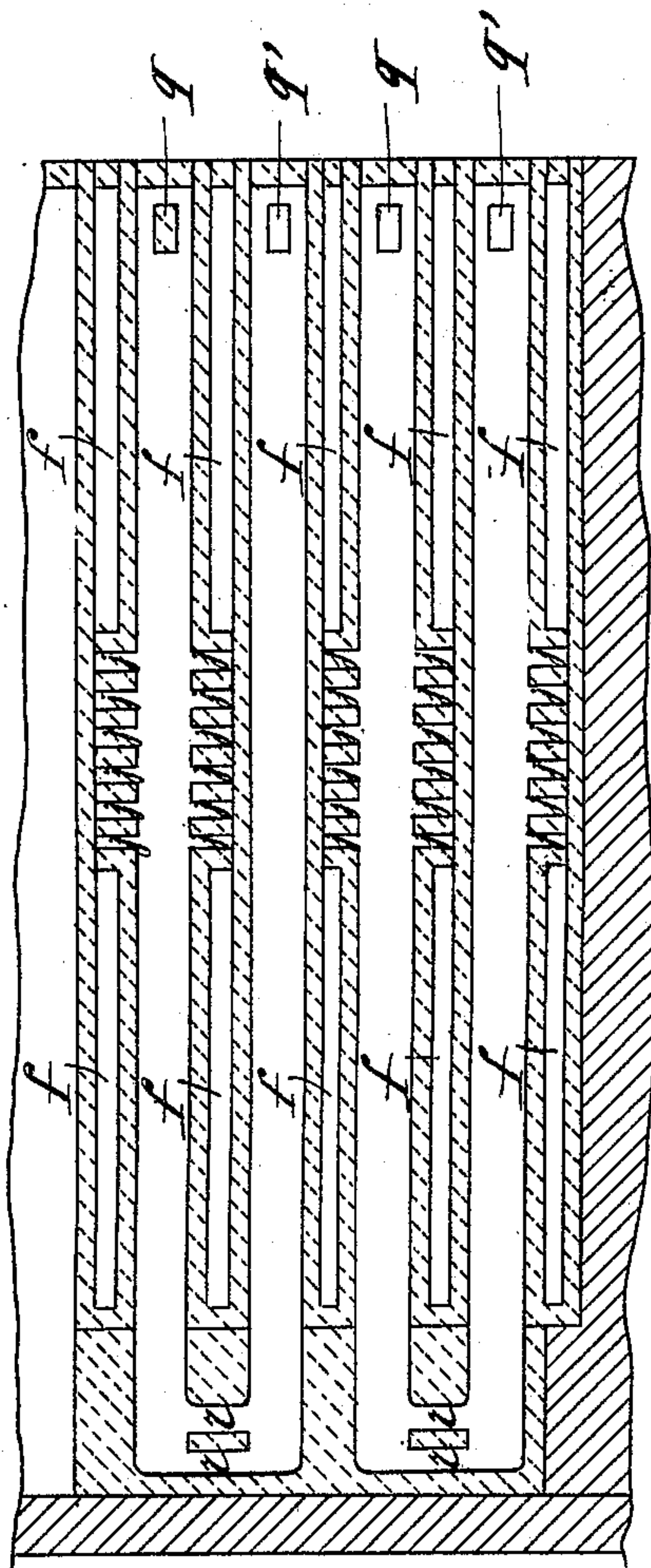
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10 SHEETS—SHEET 7.

Fig. 9.



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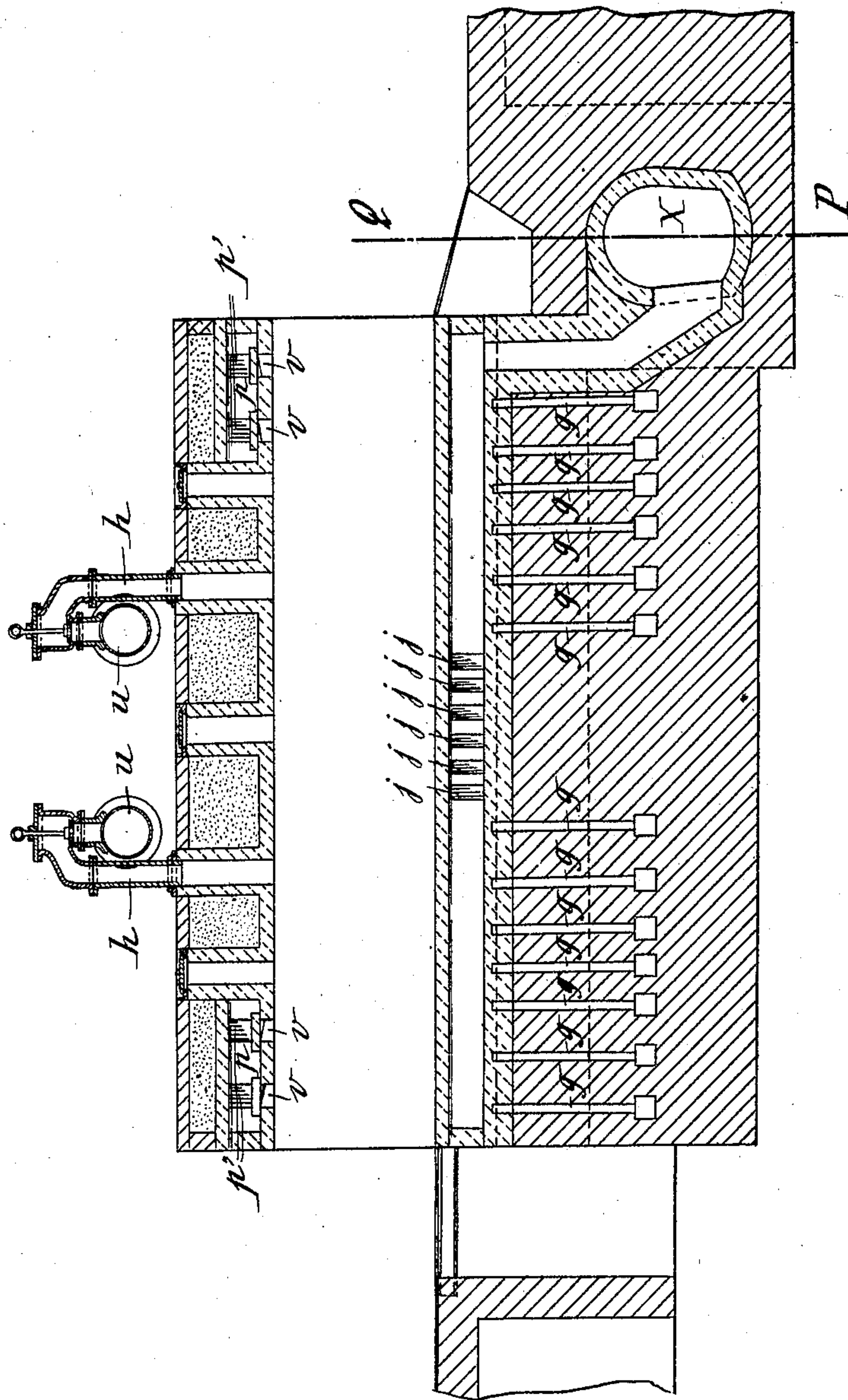
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10 SHEETS—SHEET 8.

Fig. 10.



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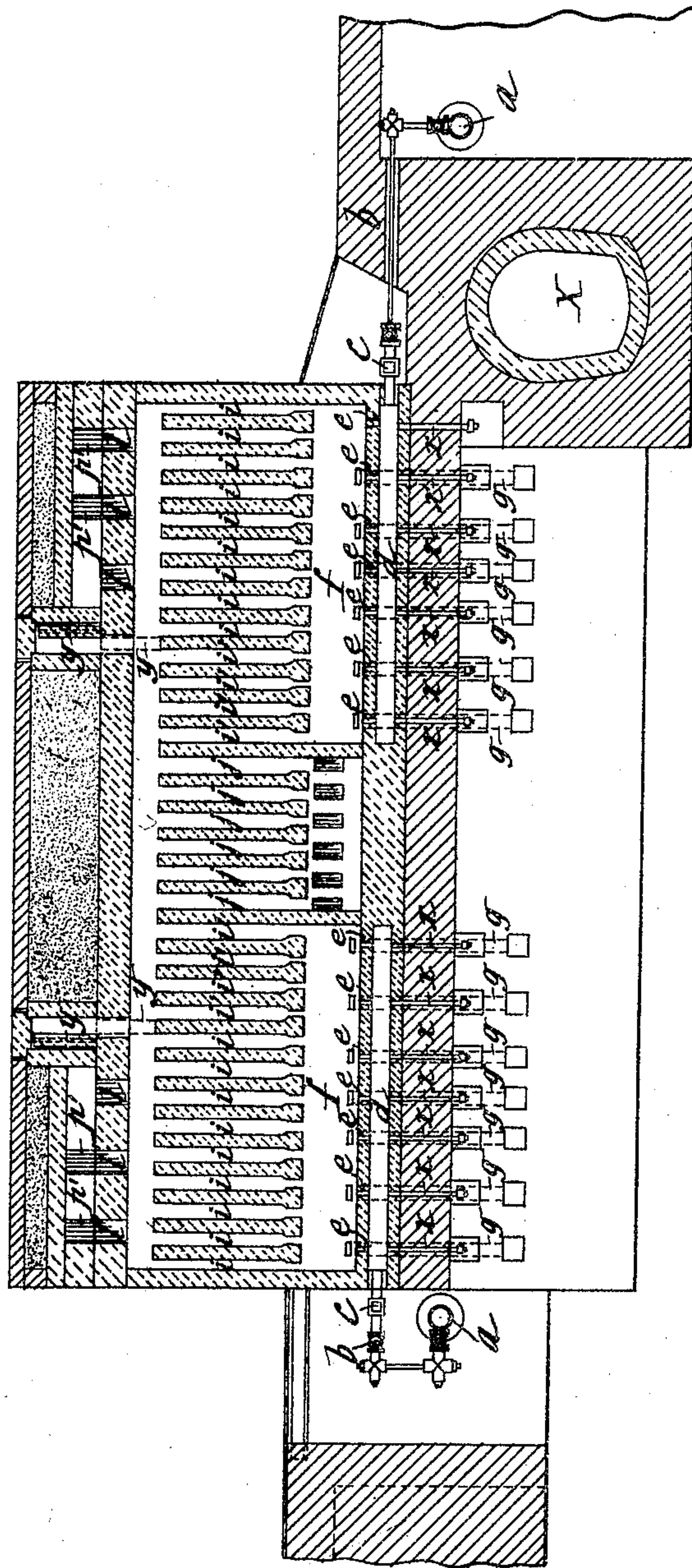
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10 SHEETS—SHEET 9.

Fig. 11.



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10 SHEETS—SHEET 10.

Fig. 13.

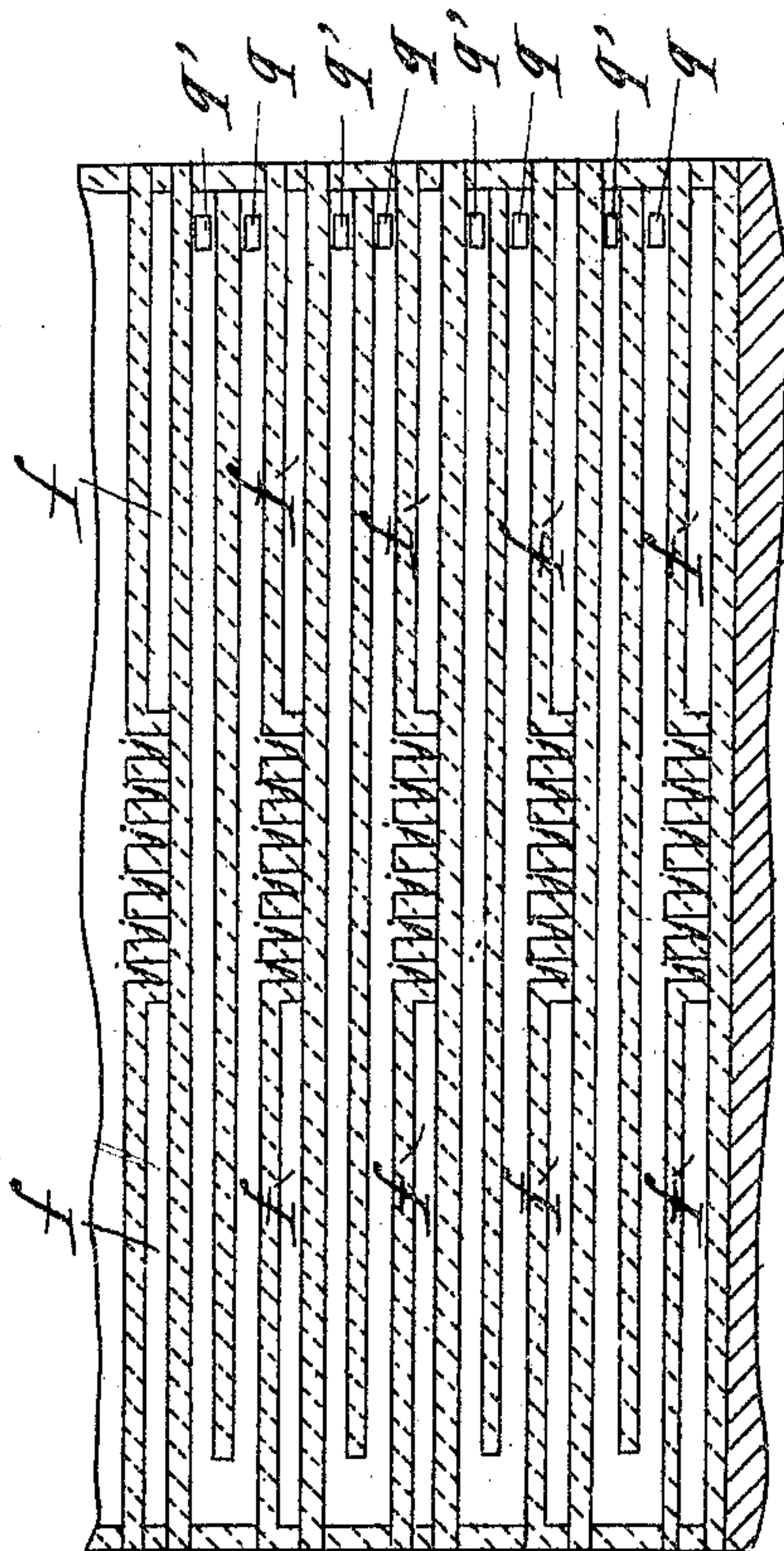
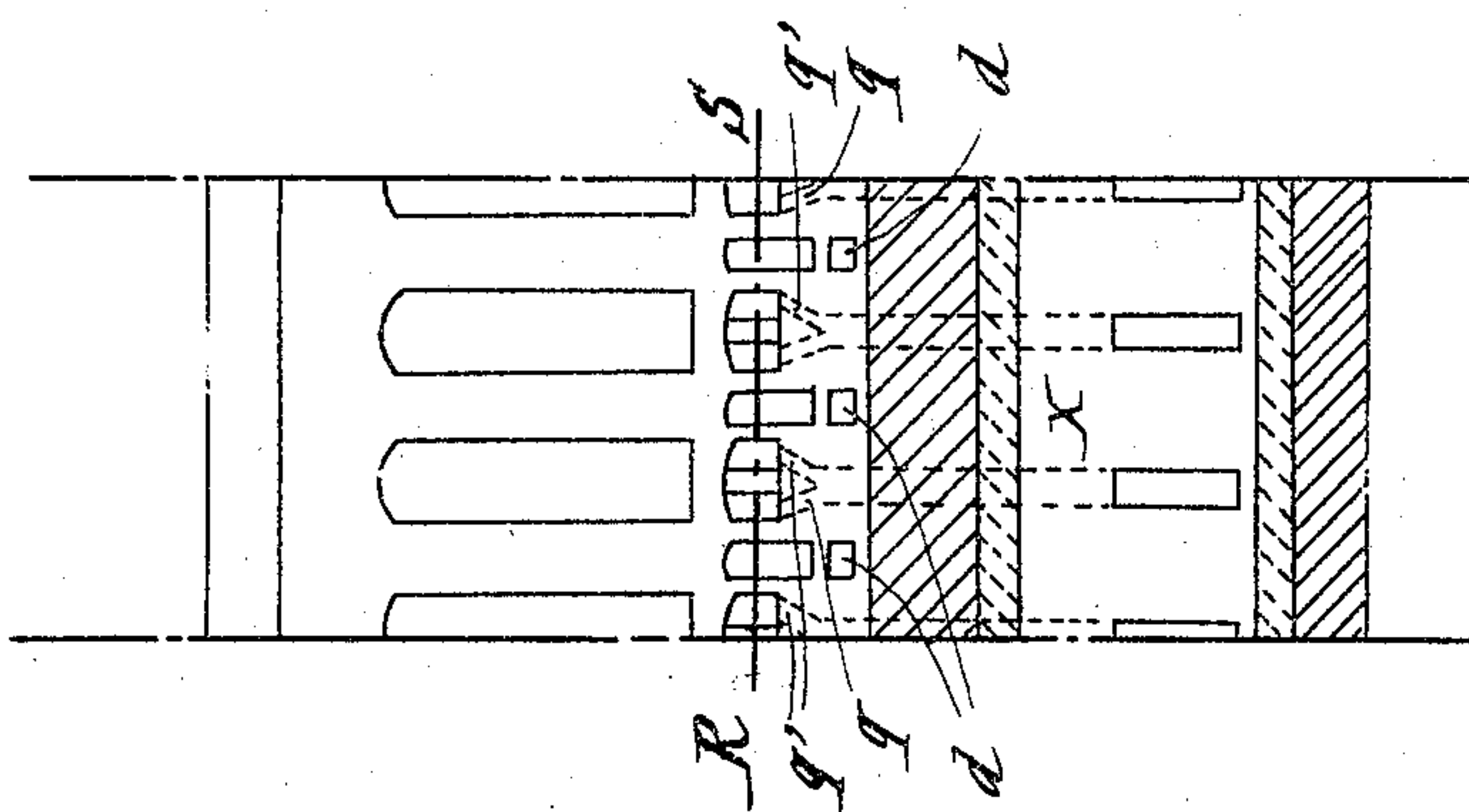


Fig. 12.



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UNITED STATES PATENT OFFICE.

EVENCE COPPEÉ, OF BRUSSELS, BELGIUM.

COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 794,662, dated July 11, 1905.

Application filed January 20, 1903. Serial No. 139,848.

To all whom it may concern:

Be it known that I, EVENCE COPPEÉ, a subject of the King of Belgium, and a resident of 71 Boulevard d'Anderlecht, Brussels, Belgium, have invented certain new and useful Improvements in Coke-Ovens, of which the following is a specification.

This invention relates to improvements in the arrangement of coke-ovens described in the United States Patent No. 654,307, of September 23, 1899, having for their object a better distribution of the points of introduction of gas and air to insure still greater uniformity of temperature throughout the length of the ovens and to achieve a more perfect regulation of the gas and air introduced both at the front and the back of the oven. These improvements are effected by the following characteristic arrangements:

First. Identical construction of the half of the wall in front and of the rear half, the partition compelling the gases to follow identical courses both at the front and at the rear of the oven, the circulation of the gases under the floor, being according to the circumstances, as follows: Half under the front part and half under the back part of the floor, each half subsequently entering separately a collecting-flue, whence they pass to the chimney, when the oven has two such collecting-flues, or in variable and adjustable proportions, according to the necessities of the mode of working, when the oven has a single collecting-flue and is arranged for the return of the gas or for its subdivision under the floor.

Second. The arrangement in the front and the rear of the oven at the lower part of the wall of a canal for introducing a mixture of gas and air, which is brought without loss of heat to the part of the flues of the wall where it should burn, in combination with air-inlets in the foundations of the oven, bringing to the said part the air necessary for complete combustion.

Third. Special arrangements for working the oven with recovery of by-products, whereby the gas and air introduced under the walls of the ovens are mixed in variable proportions, as may be desired to prevent formation of gas-carbon near the ports and

to insure complete combustion and a uniform and regular temperature throughout the length of the oven.

Fourth. Pipes or ducts formed in the foundations of the ovens and accessible by vaults in these foundations for cleaning the distributing-ports for the mixture of gas and air in the combustion-chamber.

In the accompanying drawings three forms of ovens constructed according to this invention are shown.

Figures 1 to 4 represent the first form, which is characterized by having two collecting-channels. Figs. 5 to 9 represent the second form, which has only one collecting-channel and is arranged for the return of the gas. Figs. 10 to 13 represent the third form, characterized by arrangements for subdividing the gases beneath the floor, combined with a single collecting-channel.

Fig. 1 is a longitudinal section through the coking-chamber. Fig. 2 is a longitudinal section through the wall. Fig. 3 is a transverse section on line A B C D of Fig. 1. Fig. 4 is a horizontal section on line E F of Figs. 1 and 2. Fig. 5 is a horizontal section across the coking-chamber of the second form. Fig. 6 is a longitudinal section across the wall. Fig. 7 is a transverse section on line G H of Fig. 5. Fig. 8 is a transverse section on lines I K L M of Figs. 5 and 6, and Fig. 9 is a horizontal section on line N O of Figs. 5 and 6. Fig. 10 is a longitudinal section across the coking-chamber of the third form. Fig. 11 is a longitudinal section across the wall. Fig. 12 is a transverse section on line P Q of Fig. 10, and Fig. 13 is a horizontal section on line R S of Fig. 12. As in the earlier arrangements, the present ones are arranged for working without recovery of by-products as well as for working with recovery.

Working without recovery of by-products.—Referring to Figs. 1 to 4, the dampers y are closed, as shown in dotted lines in Fig. 2. The gas evolved from the coal passes in the upper part of the oven through the four openings v , the valves in which (shown in the drawings) are in this case raised. The gases thus enter the chambers p , whence they pass into the wall by the four chambers p' , and

then passing through the openings *l*, descend into the partition by eighteen flues *i*, of which nine are in front and nine behind. The gases thus arrive in the chambers *f* to ascend
 5 eight flues *i'*, four of which are in front and four behind. The two currents of gas thus reunited then descend by six flues *j* and pass beneath the floor, where they depart by flues *q* in the front half and by flues *q'* in the rear
 10 half to the collecting-channels X X, which are connected to the chimney. Where the oven has only one collecting-channel, with a return-passage *r* for the gas, Figs. 5 to 9, the progress of the gas is the same as in the pre-
 15 vious case up to the point where it descends by the six flues *j*. It then passes under the floor, where it meets the gas from the neighboring oven, to be turned in proportions suitable for the mode of working, one part di-
 20 rectly to the flue *q* of the oven, the other part toward the front of the oven, to pass under the floor of the neighboring oven, through the gas-return passage *r*, and thence through the flue *q'* to the collecting-channel and to the
 25 chimney. This arrangement, by which the ovens communicate in pairs underneath the floor, there being provided a gas-return passage *r*, allows regulation of the draft before and behind the oven in the flues.

30 In the third modification, having the subdivision under the floor and shown in Figs. 10 to 13, the progress of the gas is just the same up to the point where it descends through the six flues *j*. Having arrived
 35 under the floor, the gases divide according to the necessities of the working, one part going directly through the flue *q* to the collecting-channel X and to the chimney, the other part passing toward the front of the oven to be de-
 40 livered into the other half of the floor, whence they reach the collecting-channel X, and consequently the chimney, by way of the flue *q'*. It is obvious that in this case, as in the pre-
 45 ceding one, the subdivision of the gas beneath the floor is regulated by appropriately adjusting the dampers, the more or less complete closing of the dampers of the flues *q* forcing the gas to take its course toward the
 50 front and to pass by a less direct but longer passage to the flues *q'* and the collecting-channel.

Working with recovery of by-products.—The dampers *y* are raised, as shown in full lines in Figs. 2, 6, and 11, and a valve is
 55 closed in each of the two ports *v* in front and the rear parts of the ovens, as is shown in Figs. 1, 5, and 10. These dampers prevent the gas from the ovens passing into the flues of the wall. The draft causes the gases to
 60 pass into the pipes *h* and *u*, arranged above the ovens, and are conducted therethrough to condensers. From these condensers they return to the special ducts *a*, Figs. 2, 6, and 11, to which are attached branches *b*, lead-
 65 ing to mixing apparatus, such as injec-

tors *c*, which mix the gases with a certain proportion of air. The mixture thus introduced into the flues *d* rises into the flues or combustion-chambers *f*, arranged under the wall, by way of the ports *e* beneath the said
 70 chambers *f*. The air necessary for complete combustion enters by the ducts *g* in the foundations of the ovens and passes into the combustion-chambers *f*, where it meets the mixture of gas and air arriving by the flues
 75 *d*. From the combustion-chambers *f* the gases rise through twenty-six flues *i i'*—thirteen in the front and thirteen in the rear—and then descend again through the six flues *j*
 80 and pass beneath the floor to the collecting-channel X and to the chimney, as was described for working without recovery of by-products in the three modifications.

Comparison of the construction just described with that formerly used shows, first,
 85 in the new arrangement the wall comprises thirty-two vertical flues instead of twenty-two; second, the two ports for the passage of gas arranged in the old form near the middle of the arch are here suppressed; third, the
 90 arrangement in the present construction of the flues *d* for the mixture of gas and air both in the front and in the rear of the ovens, (see Figs. 2, 3, 6, 7, 8, 11, 12;) fourth, the arrangement of two collecting-channels X,
 95 Figs. 1 and 2; fifth, the arrangement of gas-return passage *r*, Figs. 5, 6, 8, and 9; sixth, the arrangement by which the gas-current is subdivided under the floor throughout the length of the oven, Figs. 12 and 13; seventh,
 100 the arrangement of ducts *g* for admitting air in the foundations of the ovens, Figs. 1, 2, 5, 6, 8, 10, and 11; eighth, special arrangements *c* for mixing the gas and air, Figs. 2, 6, and 11; ninth, the arrangement of pipes or ducts
 105 *x* in the foundations of the oven and accessible by vaults in the foundations to allow the ports *e* for distribution of the mixture of gas and air to be cleaned, Figs. 2, 6, 8, and 11.

Having thus described the nature of this
 110 invention and the best means I know of carrying the same into practical effect, I claim—

1. In combination with a series of horizontal externally-heated coke-ovens, which can be worked with or without recovery of by-
 115 products, and having walls constructed similarly in the front and rear of the ovens, gas-return passages *r r* beneath the ovens distributing the mixture of gas and air arriving from the walls of two contiguous ovens, in
 120 variable and adjustable proportions according to the necessities of the working, one part under the floor of one of said ovens and the other part under the floor of the neighboring oven, substantially as described. 125

2. In combination with a series of horizontal externally-heated coke-ovens which can be worked with or without recovery of by-
 130 products, and having walls constructed similarly in the front and rear of the ovens, a

subdividing-partition under the floor of each oven, terminating in the masonry at the rear of the oven while leaving in front a passage for the gaseous mixture, so that the gases arriving under the floor are distributed according to the necessities of the working, into both parts of the floor, one part passing toward the front and the other part going directly toward the rear, substantially as described.

3. In combination with each oven of a series of horizontal externally-heated coke-ovens working with recovery of by-products and having walls constructed similarly in the front and rear of the ovens, two horizontal combustion-chambers *f* arranged below the front part and the rear part of the wall respectively, two horizontal channels *d* for introducing a mixture of gas and air arranged in the masonry underneath said chambers *f* respectively, vertical ports *e* leading from said chambers *f* into said channels *d* for introducing the mixture of gas and air into said chambers *f*, and ducts *g* leading from the at-

mosphere into said chambers *f*, substantially as described.

4. In combination with each oven of a series of horizontal externally-heated coke-ovens working with recovery of by-products and having walls constructed similarly in the front and rear of the ovens, two horizontal combustion-chambers *f* arranged below the front part and the rear part of the wall respectively, two horizontal channels *d* for introducing a mixture of gas and air arranged in the masonry underneath said chambers *f*, respectively, vertical ports *e* leading from said chambers *f* into said channels *d* for introducing the mixture of gas and air into said chambers *f*, and ducts *x* extending from the vaults to said ports *e* for the purpose of cleaning the latter, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

EVENCE COPPEÉ.

Witnesses:

C. COUTIER,

GREGORY PHELAN.