

No. 679,426.

Patented July 30, 1901.

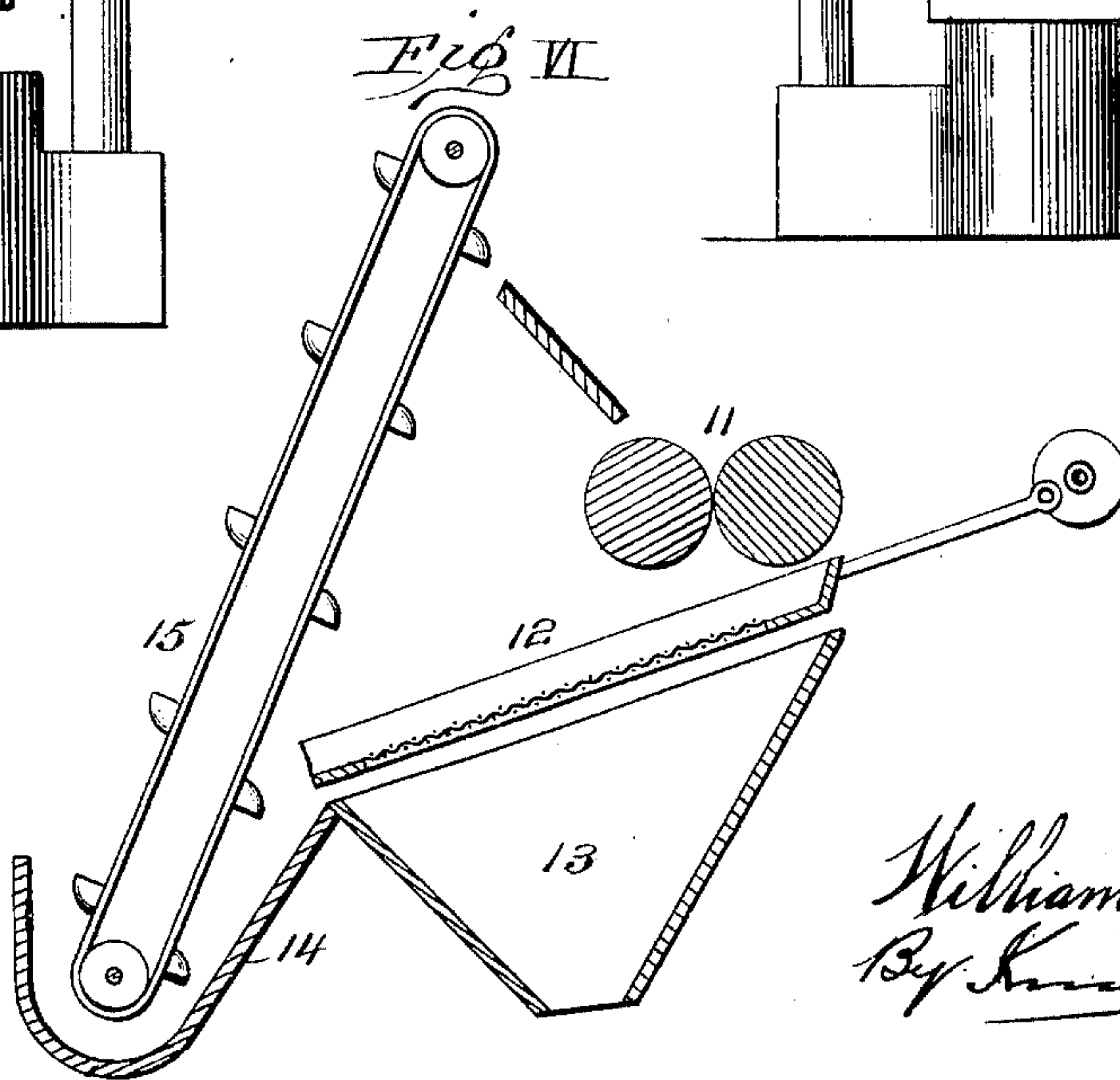
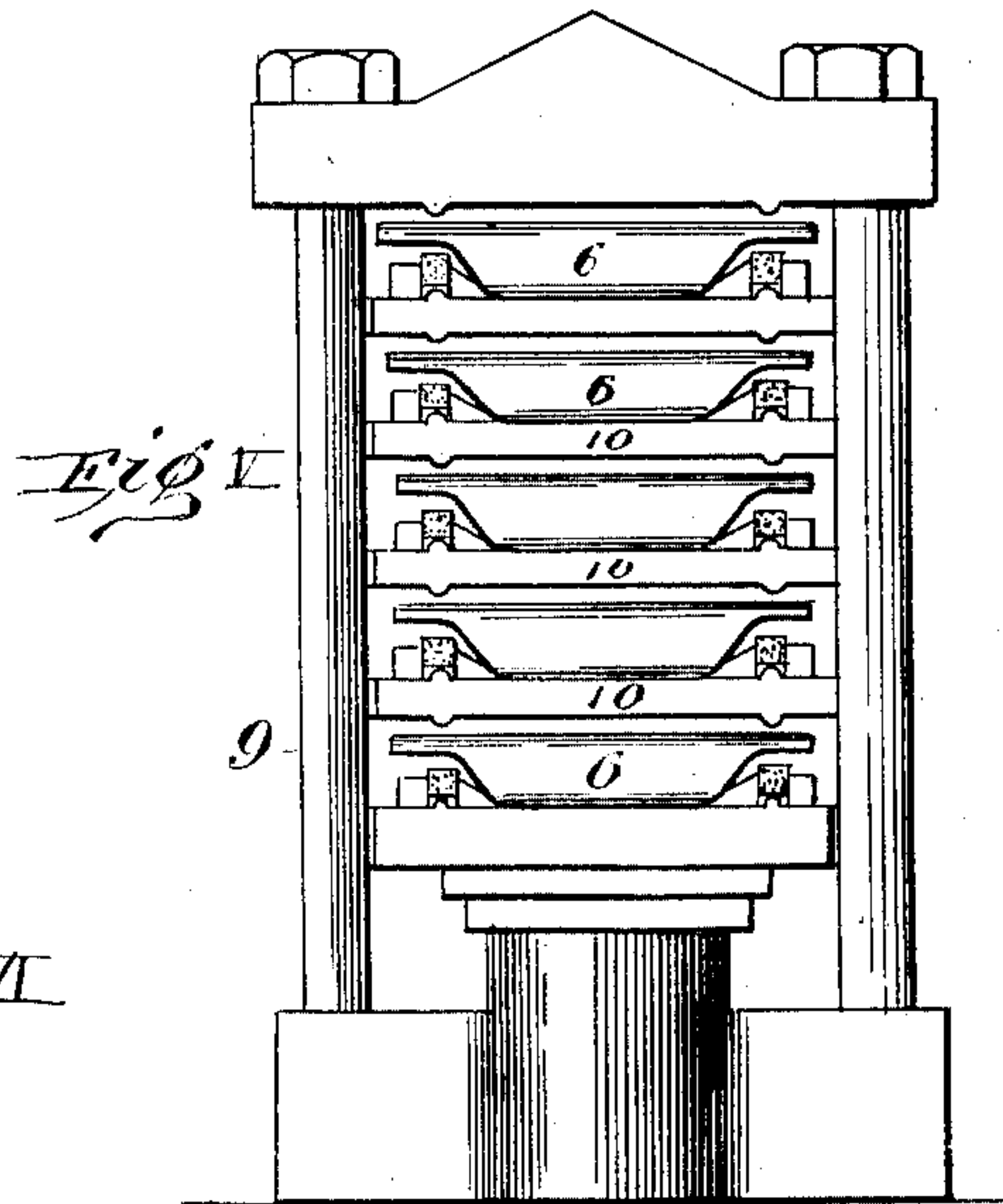
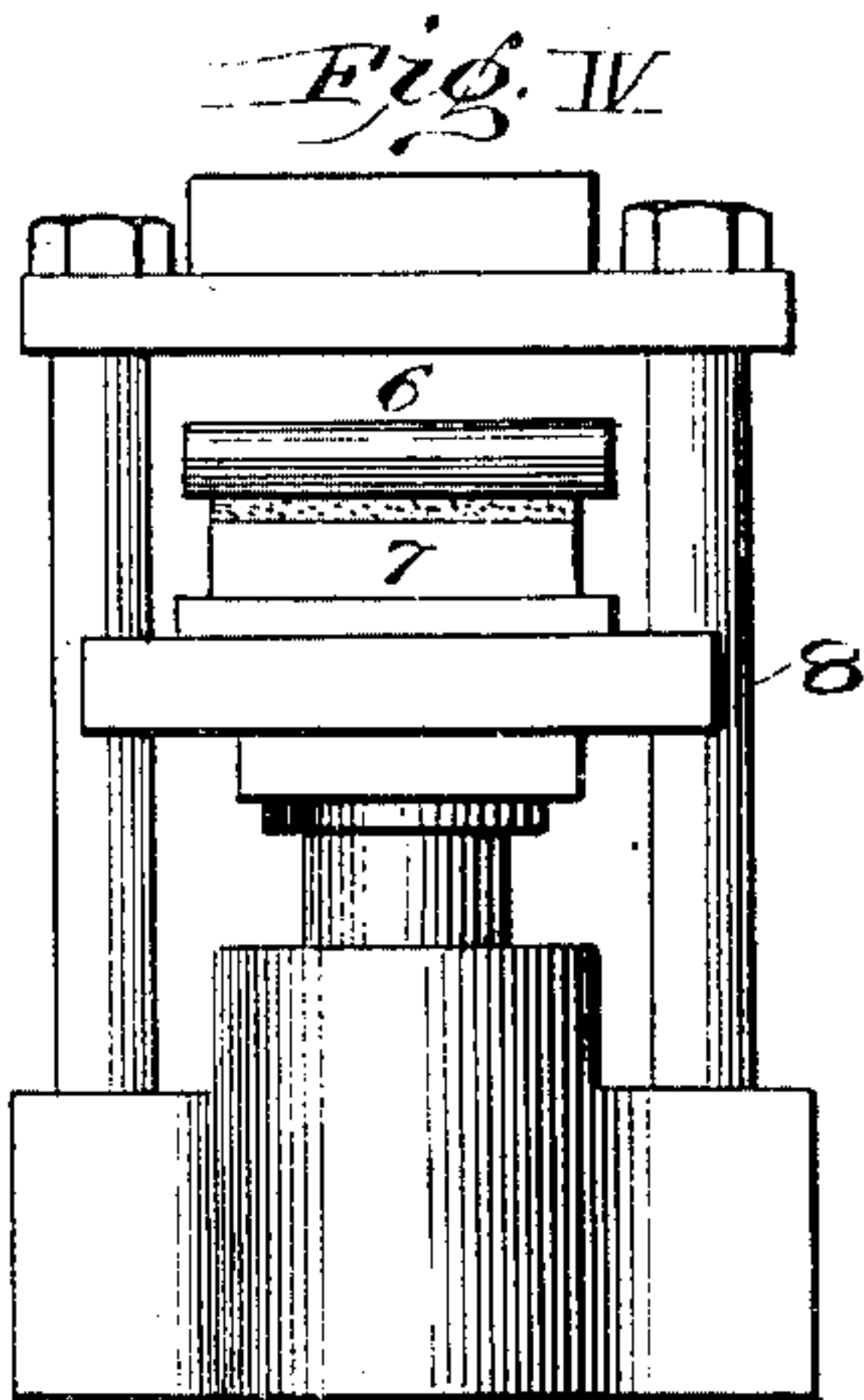
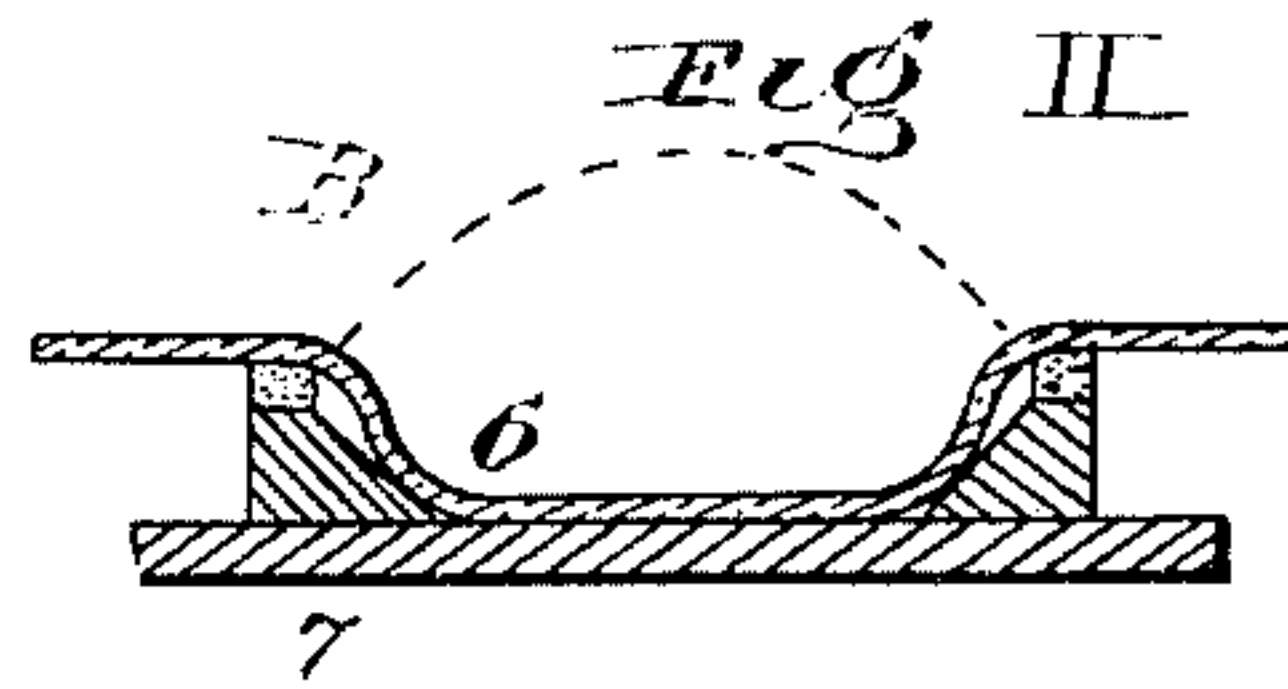
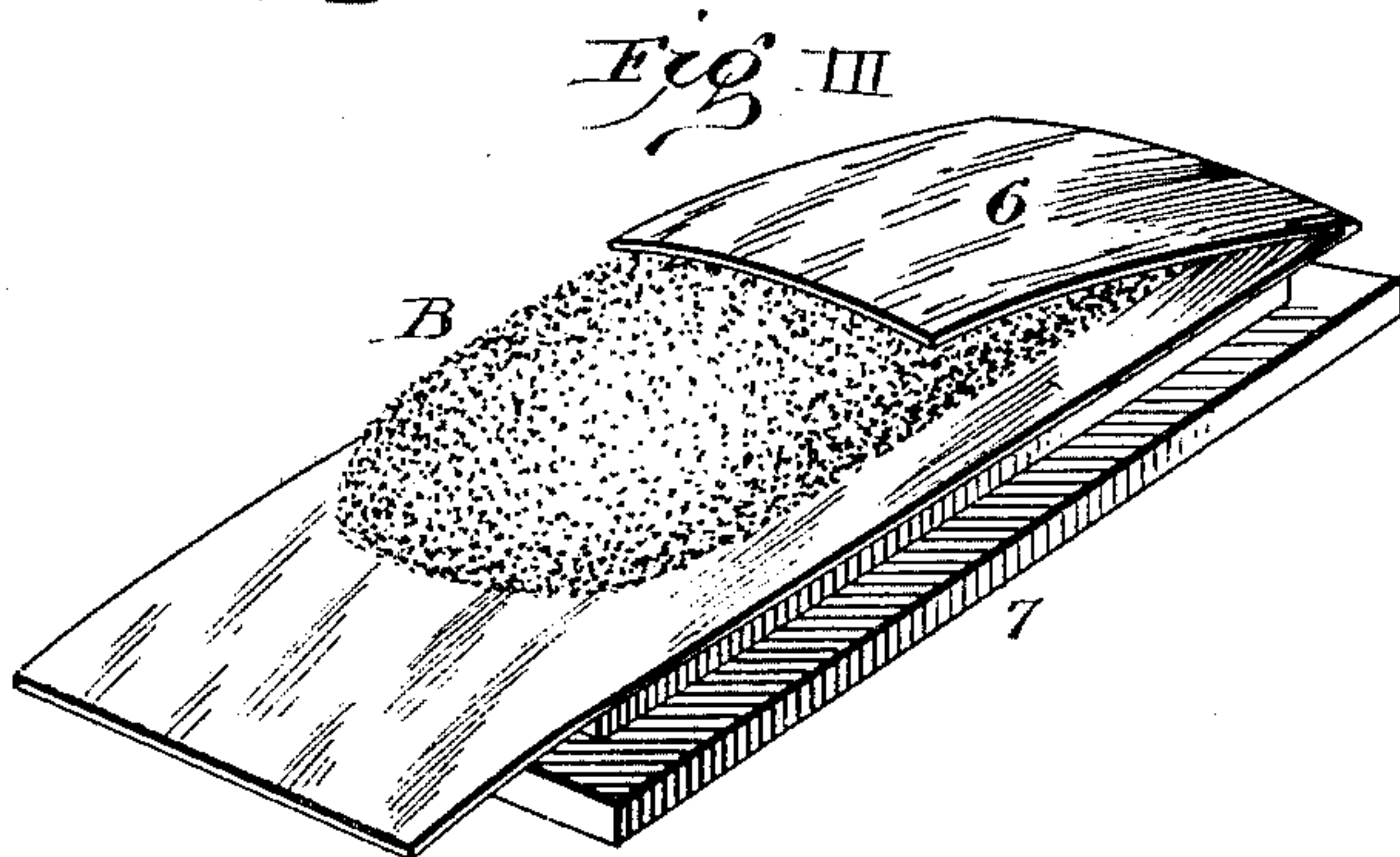
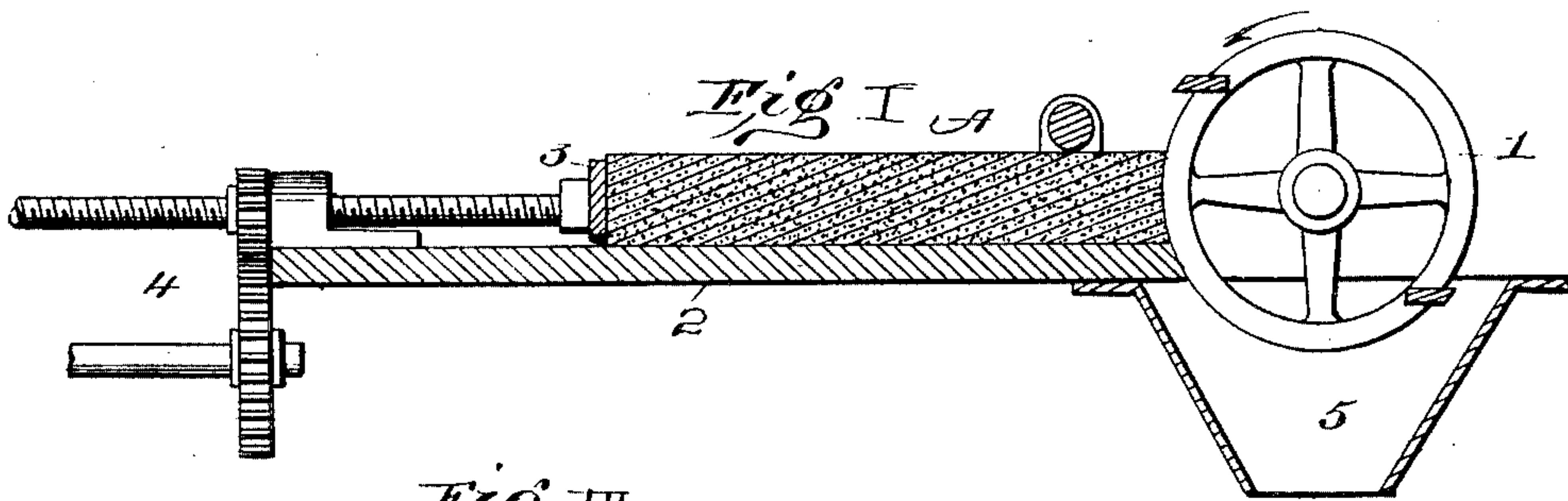
W. R. LONG.

PROCESS OF REFINING GRAPE SUGAR.

(Application filed Feb. 6, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses  
J. M. Fowler  
H. G. Manning

Inventor  
William R. Long  
By Knight Bros  
Attorneys

No. 679,426.

Patented July 30, 1901.

W. R. LONG.

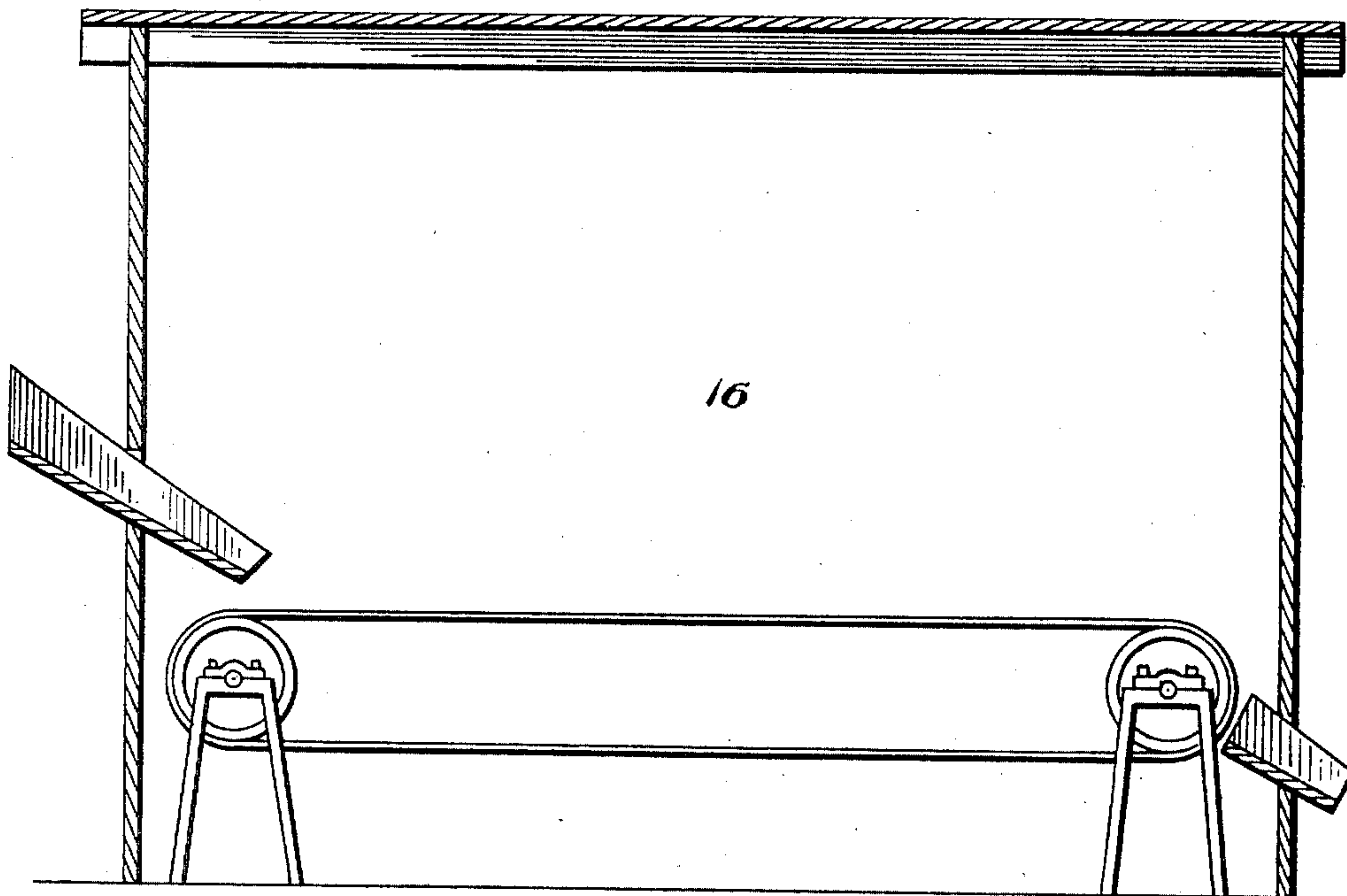
PROCESS OF REFINING GRAPE SUGAR.

(Application filed Feb. 6, 1901.)

(No Model.)

2 Sheets—Sheet 2.

*Fig III*



Witnesses  
*J. M. Fowler Jr.*  
*A. E. Manning.*

Inventor  
*William R. Long,*  
*By Knight Bros.*  
Attorneys



# UNITED STATES PATENT OFFICE.

WILLIAM R. LONG, OF ST. LOUIS, MISSOURI, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ST. LOUIS TRUST COMPANY, OF MISSOURI.

## PROCESS OF REFINING GRAPE-SUGAR.

SPECIFICATION forming part of Letters Patent No. 679,426, dated July 30, 1901.

Application filed February 6, 1901. Serial No. 46,214. (No specimens.)

*To all whom it may concern:*

Be it known that I, WILLIAM R. LONG, a citizen of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Processes of Refining Grape - Sugar, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to the art of refining sugar, and more particularly crude grape-sugar. Broadly stated, the process now in use of refining sugar of this class consists in removing from the sugar certain impurities found therein, which may be removed in liquid or moist form, some of the impurities being carried by the moisture in the form of a solution. Prior to my invention the most approved process for thus refining grape-sugar consisted in moistening the finely-divided sugar and then treating it in a centrifugal machine for the purpose of eliminating the moisture and other impurities which were carried out by the moisture in solution. While this process removes a portion of the impurities, it is one requiring much time and labor for its completion, and hence it is expensive, and in addition to this it results in an inferior product, which has a marked bitter taste and rapidly deteriorates with age and acquires a very disagreeable odor and a yellow color, which greatly injure its market value.

The object of the present invention is to produce a refined grape-sugar which shall be free from the objectionable features above noted and to accomplish this result in a shorter time and with less labor and expense than heretofore.

With this object in view the invention resides in a process of refining crude grape-sugar which, broadly stated, consists in subjecting said sugar when in a hard non-pasty condition to high pressure, whereby the moisture which is found even in hard crude grape-sugar is expelled, carrying with it other impurities held therein in solution. I have found that a pressure of from two thousand five hundred pounds to five thousand pounds to the square inch or even higher is desirable to secure the best results, the pressure

required varying according to the temperature of the room. The lower the temperature the higher the pressure required. According to the best way known to me of practicing the invention the hard non-pasty crude sugar is inclosed in an envelop, preferably of duck or other suitable fabric, and then placed in the press, superior results being attained if the crude sugar is first divided into small particles. Care should be taken not to treat the sugar when in a soft pasty condition, as I have learned from repeated experiments that it will flow under the high pressure to which it is subjected and burst the inclosing envelop. It is therefore essential that the crude sugar under treatment should be of such a hard non-pasty consistency that while it will yield under the pressure it will not flow, so as to readily transmit the pressure to the envelop to an extent greater than can be sustained by the latter. Any sugar of a consistency which will act under pressure as indicated above may be employed, and I have found the crude sugar known commercially as "No. 70" to be particularly adapted for the treatment by my process.

Any suitable apparatus may be employed in practicing the invention, and in the accompanying drawings I have shown one form of apparatus that may be used, in which drawings—

Figure I is a vertical section of a mechanism that may be used when it is desired to divide the crude sugar into small particles before subjecting it to pressure. Fig. II is a section of one of the initial cake-forming frames and envelop in which the sugar is incased. Fig. III is a perspective view of one of the forming-frames and sugar-incasing envelops. Fig. IV is a view in elevation of a cake-forming press. Fig. V is a view in elevation of the main press. Fig. VI is a view in vertical section of a mechanism for pulverizing and screening the refined sugar after it comes from the main press. Fig. VII is a vertical section of a drying-kiln.

In practicing my invention a cake of crude grape-sugar of the proper consistency and of a suitable size may be placed in the forming-frame 7, (shown in Fig. II,) inclosed in the envelop 6, and subjected to preliminary pres-



sure in the press 8, after which it is transferred to the press 9 and subjected to high pressure, as hereinafter described; but I prefer to first take the cake A of hard non-pasty crude grape-sugar and divide it into small particles or reduce it to a broken mass by the use of a revoluble chipping-cutter 1, to which the cake A is fed in a table 2 by a screw-follower 3, driven by suitable gearing 4.

The cake of sugar is thereby cut into small chips and falls through the hopper 5 into an envelop 6, laid in a forming-frame 7. When the desired amount of sugar has been placed in the envelop 6, the ends of the envelop are folded over onto the mass B of sugar, as partially shown in Fig. III, ready for the next step in the process. The next step in the process consists in placing the forming-frame 7, with the incased mass of sugar thereon, in a suitable press 8, (see Fig. IV,) and on the press being put into operation the mass of sugar incased within the envelop 6 is formed into a compact cake therein.

After forming the cakes of sugar as described said cakes in the envelops 6 are taken from the press 8 and from the forming-frames 7 and placed in the main press 9, (preferably hydraulic,) between divisions 10 in the press. Then by the application of high pressure upon the sugar the moisture is expelled therefrom, with the impurities therein, the envelops 6 serving to retain the incased sugar, while the moisture, with the impurities, is driven through the envelops, thus leaving the sugar in a purified condition. When the sugar has been subjected to the required degree and extent of pressure in the press 9 and the impurities have been expressed, the pressure thereon is relieved and the sugar is removed from the incasing envelops and is ready for reduction by pulverization to marketable condition.

To pulverize the sugar, it is passed through rollers 11 and falls upon a vibrating screen 12 and therethrough into a receiver 13, the coarser particles of the sugar falling from the screen into a trough 14, from which they are taken up by a conveyer 15 and again delivered to the pulverizing-rollers 11. The screened sugar from the receiver 13 is passed to a suitable drying-kiln 16, (shown in Fig. VII,) where it is allowed to remain until thoroughly dry and from which it is taken in a finely-pulverized state ready to be barreled for use.

Practical experience has demonstrated that by the use of my process grape-sugar can be transformed directly from its crude, fully crystallized, and comparatively hard state into a marketable, purified, and pulverized state in a very much shorter period of time than where a centrifugal machine is employed to expel the moist impurities, (in which case it is necessary to have the sugar in a moist or wet condition, containing a larger amount of foreign

matter to be expelled,) the difference in time being about four hours, according to my process, as compared with forty-eight hours required by the centrifugal process, (which latter process is the one heretofore universally employed to the best of my knowledge.)

While the sugar is going through the various steps of my process down to the drying of it in the kiln, the temperature in the rooms is preferably kept at from 70° to 90° Fahrenheit.

While I have described my process as consisting of a number of steps and prefer to so carry the process into effect, yet it can in a measure be accomplished by putting the crude sugar, inclosed in envelops 6, in the press 9 and expelling the moist impurities therefrom, after which it may be dried either with or without pulverization.

I claim as my invention—

1. The process of treating crude grape-sugar which consists in expressing impurities therefrom when the sugar is in a hard, non-paste-like condition.

2. The process of refining sugar which consists in taking sugar of a hard non-paste-like consistency, inclosing it in an envelop and subjecting it to high pressure.

3. The process of refining sugar which consists in taking sugar of a hard non-paste-like consistency, separating it into small flakes or particles, inclosing it in an envelop and subjecting it to high pressure.

4. The process of refining grape-sugar which consists in taking crude No. 70 grape-sugar and subjecting it to high pressure.

5. The process of refining grape-sugar which consists in taking crude No. 70 grape-sugar, confining it in an envelop and subjecting it to high pressure.

6. The process of refining grape-sugar which consists in taking crude No. 70 grape-sugar, separating it into small flakes or particles, inclosing it in an envelop and subjecting it to high pressure.

7. The process of refining grape-sugar which consists in taking crude grape-sugar of a hard non-paste-like consistency and subjecting it to a pressure exceeding two thousand five hundred pounds per square inch.

8. The process herein described, of refining grape-sugar, which consists in chipping the sugar when of a hard non-paste-like consistency, then placing the same in an envelop, then pressing it into a cake, then subjecting it to a high pressure, and finally pulverizing and drying it, substantially as set forth.

In testimony whereof I have hereunto affixed my signature this 1st day of February, 1901.

WILLIAM R. LONG.

In presence of—

E. S. KNIGHT,

N. V. ALEXANDER.