

Aug. 16, 1938.

J. KOBOLD

2,127,300

METHOD FOR MAKING DRY ICE BLOCKS

Filed March 12, 1935

2 Sheets-Sheet 1

Fig. 1.

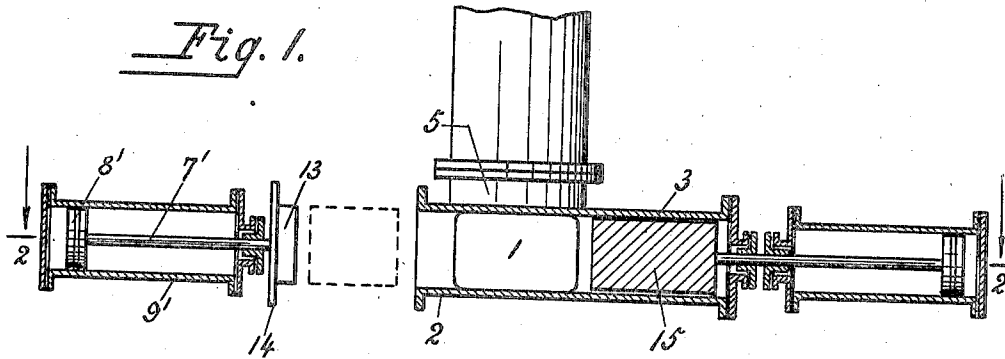
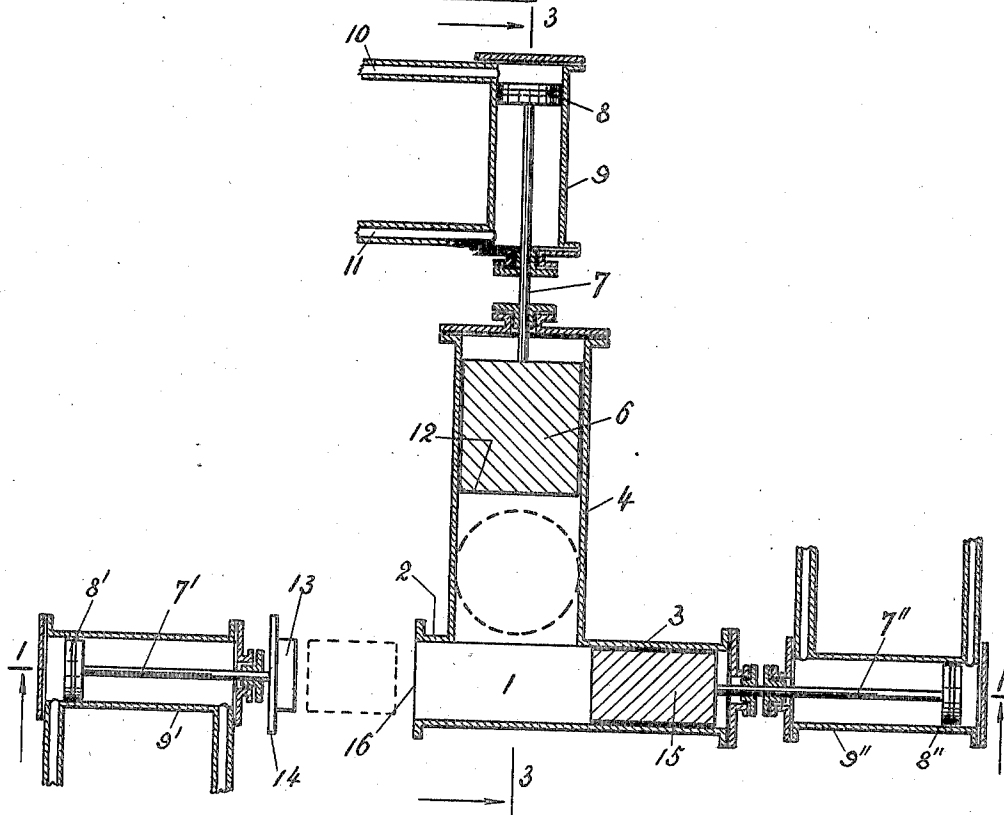


Fig. 2.



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Fig. 3.

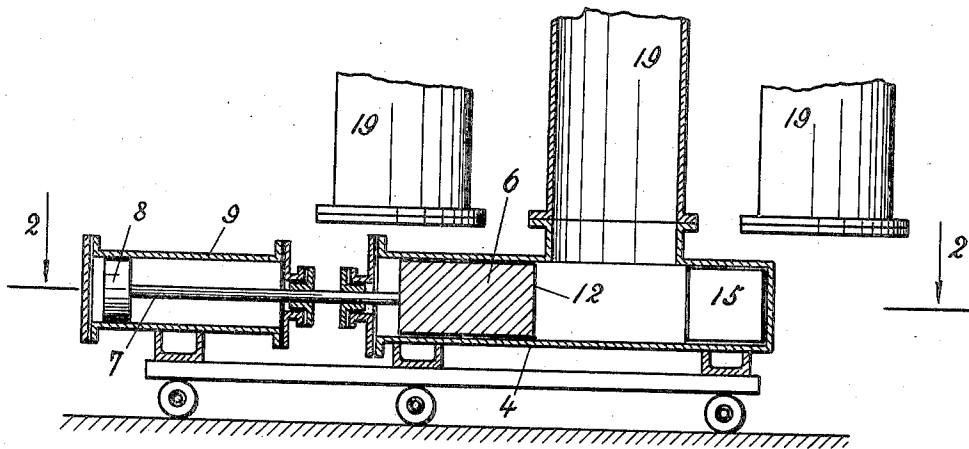
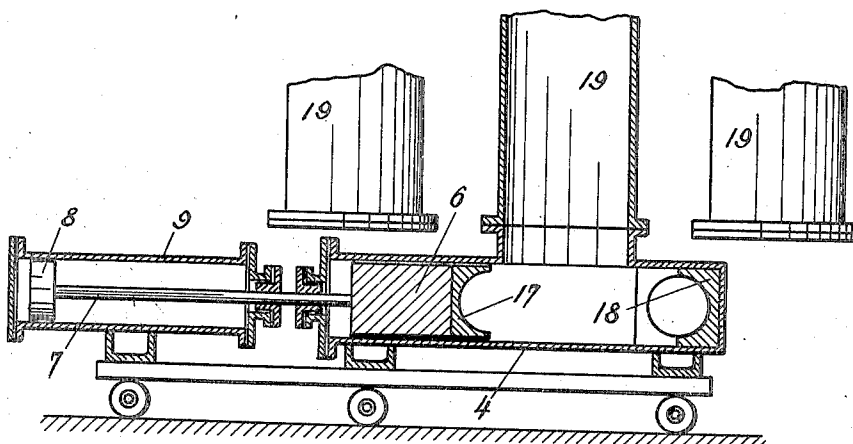


Fig. 4.



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UNITED STATES PATENT OFFICE

2,127,300

METHOD FOR MAKING DRY ICE BLOCKS

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4 Claims. (Cl. 62—121)

The present invention relates to a method for compressing carbon dioxide snow into blocks of dry ice.

It is an object of the present invention to provide a method and apparatus for compressing carbon dioxide snow into dry ice, whereby large blocks of dry ice can be obtained, and the snow producing chambers to which the compression apparatus is connected temporarily or permanently, may have any desired dimension and can be of large capacity.

A further object of the present invention resides in the provision of a method and apparatus for compressing carbon dioxide snow into dry ice by means of which large blocks of dry ice of any cross sectional dimension can be obtained and whereby the density of the ice is homogenous over the whole block.

Another object of this invention is to provide a method and apparatus for compressing carbon dioxide snow into dry ice by means of which large blocks of dry ice can be made and whereby the center part of the block is prepressed, and a particularly dense core of the block is obtained.

Another object of this invention resides in the provision of a method for compressing carbon dioxide snow into dry ice by means of which large blocks of dry ice of great specific weight can be obtained.

Further and other objects of the present invention will be hereinafter set forth in the accompanying specification and claims and shown in the drawings which, by way of illustration, show what I now consider to be a preferred embodiment of my invention.

In the drawings:

Fig. 1 is a part cross sectional side view of an apparatus according to my invention taken along line 1—1 in Fig. 2.

Fig. 2 is a part cross sectional top view of an apparatus according to my invention taken along line 2—2 in Fig. 1.

Fig. 3 is a part cross sectional side view of an apparatus according to my invention taken along line 3—3 in Fig. 2.

Fig. 4 is a part cross sectional side view of an apparatus according to my invention as shown in Fig. 3 and having provisions for making blocks of various cross sectional configurations.

Like parts are designated by like numerals in all figures.

Referring more particularly to the drawings: 1 represents the central part of a compression chamber having lateral parts 2, 3, and 4. The chamber is filled with carbon dioxide snow

through the charge conduit 5 which is connected to one of the lateral parts, namely, part 4. The width of part 4 is independent of the dimensions of the center part of the chamber or its other lateral parts and may have large cross sectional dimensions. Charge conduit 5 may be directly connected to the producer of the carbon dioxide snow or be part of the producer which, for the before stated reasons, may have large cross sectional dimensions and great capacity.

The carbon dioxide snow entering lateral part 4 is pushed towards the center part of the compression chamber by means of piston 6, the cross section of which conforms with the interior cross section of part 4. Piston 6 is adapted to slidably move within part 4. Piston rod 7 connects piston 6 with an operating piston 8 adapted to reciprocatingly move within operating cylinder 9 having admission and outlet openings 10 and 11 for the passage of an operating medium in and out of cylinder 9. When in the position furthest inward, i. e., closest to center part 1, the front surface 12 of piston 6 closes the opening formed by the intersection of part 4 and center part 1 and forms, together with lateral parts 2 and 3, a continuous chamber consisting of parts 2, 1, and 3. Part 2 serves chiefly for receiving the counter piston 13 which is mounted on cover 14 for closing part 2 of the compression chamber. Piston 13 and cover 14 are mounted to a piston rod 7' carrying operating piston 8' adapted to reciprocatingly move within operating cylinder 9' and to thereby operate piston 13. 15 is the compression piston proper operating in part 3 of the compression chamber. Similarly as are the other pistons, piston 15 is provided with and operated by piston rod 7'' carrying piston 8'' operating in cylinder 9''. The snow is first pushed into center part 1 by means of piston 6 and then further compressed by piston 15, while piston 13 either stands still and prevents the exit of snow and dry ice through outlet opening 16 of part 2 or moves towards the center part of the compression chamber and counter to piston 15. Pistons 6 and 15 may also move simultaneously or partly simultaneously towards center part 1. It is obvious that, by this action of the pistons and the configuration of the compression chamber, a homogenous and effective compression of the snow is obtained; of particular importance is the precompression of the mass of snow by means of piston 6, whereby a solid core is created in the ice block in contradistinction to other methods, whereby the core of the ice block is usually quite soft. With my method and apparatus, the snow is actively compressed from three

sides, and the highest possible specific weight of the dry ice block is obtained.

With my method and apparatus, blocks of dry ice of any desired cross sectional configuration can be obtained. For example, if cylindrical blocks are desired, piston 15 shown in Figs. 1, 2, and 3 and having rectangular cross section is replaced by a cylindrical piston, and the face 12 of piston 6, which is flat when making blocks of rectangular cross section, is provided with a mould 17 having a negative half-cylindrical surface as shown in Fig. 4. A corresponding mould 18 is inserted into the center part 1 of the compression chamber and opposite to mould 17. Insertion or changing of such moulds and of piston 15 requires very little time and effort.

The compression apparatus according to my invention and as described may be mounted on wheels as indicated in Figs. 3 and 4 and, thereby, be adapted to serve a plurality of carbon dioxide snow generators 19; these generators may have large dimensions and capacity for the previously described reasons, and the number of individual generator cylinders can be considerably reduced in plants using my new compression system as compared with plants using other compression systems.

While I believe the above described embodiments of my invention to be preferred embodiments, I wish it to be understood that I do not desire to be limited to the exact details of method, design and construction shown and described, for obvious modifications will occur to a person skilled in the art.

What I claim as new is:

1. The method of producing a block of dry ice from carbon dioxide snow consisting in filling the snow into a precompression chamber, in simul-

taneously precompressing the snow in said chamber, and in pushing the snow into another chamber and then subjecting the snow to forces acting in opposition to each other and exerting further pressure on the precompressed snow in a direction which is different from the direction in which pushing and precompressing takes place.

2. The method of making a block of solid carbon dioxide consisting in shearing from a column of carbon dioxide crystals a body of carbon dioxide crystals, in pushing said body into a compression chamber and thereby precompressing it, and then further actively exerting pressure on said body in a direction which is different from the direction in which said body is pushed and precompressed and in thereby compressing said body into a block of solid carbon dioxide.

3. The method of making a block of solid carbon dioxide consisting in shearing from a column of carbon dioxide crystals a flat body of carbon dioxide crystals, in pushing said body into a compression chamber and thereby compressing it, and then further actively exerting pressure on said body in a direction which is different from the direction in which said body is pushed and precompressed and in thereby compressing said body into a block of solid carbon dioxide.

4. The method of treating solid carbon dioxide which consists in forming a mass of snow of a predetermined outline, and in subjecting the mass to a plurality of forces acting with such intensity and in such directions with respect to each other as to deform said mass and form a block of dry ice of homogeneous structure throughout.

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