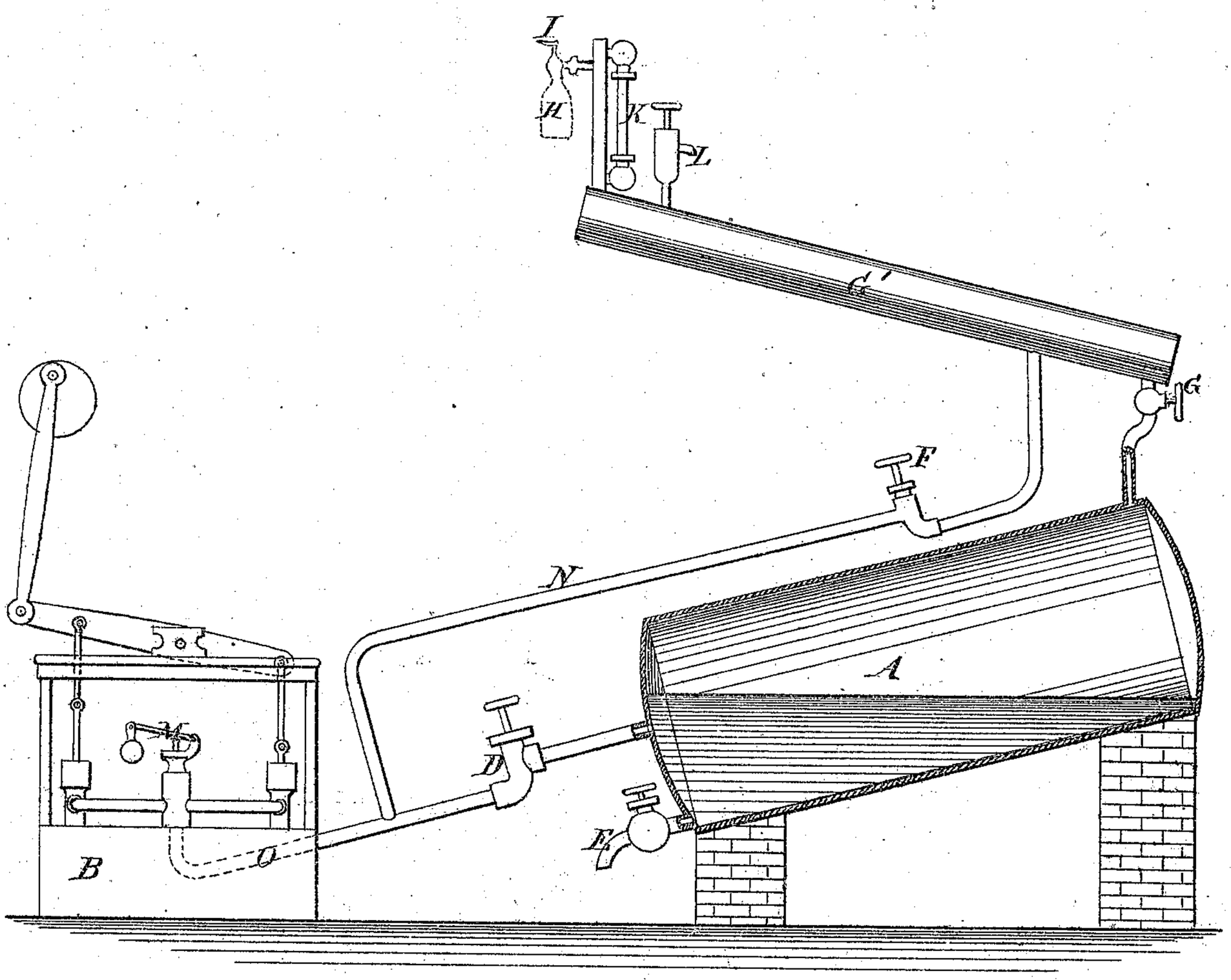
Wilbur F. Johnston & Wm. A. Johnston,
Hydraulic Gas Filling Apparatus.

No. 120,978. Patented Nov. 14, 1871.



Witnesses
Algernon A. Johnston
Melville M. Johnston.

Inventors.
Wilbur F. Johnston
William A. Johnston

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

120,978

UNITED STATES PATENT OFFICE.

WILBUR F. JOHNSTON AND WILLIAM A. JOHNSTON, OF BROOKLYN, N. Y.

IMPROVEMENT IN METHODS OF COMPRESSING AND LIQUEFYING NITROUS OXIDE AND OTHER GASES.

Specification forming part of Letters Patent No. 120,978, dated November 14, 1871.

To all whom it may concern:

Be it known that we, WILBUR F. JOHNSTON and WILLIAM A. JOHNSTON, of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Gas-Liquefying Apparatus, of which the following is a specification:

The essential parts of this apparatus are, first, a hydraulic pump; second, one or more strong tanks; third, a receiver or bottle into which the product of the apparatus is collected.

In the annexed drawing, B is the hydraulic pump; A and G′, strong tanks, of which G′ is much the stronger. H is a receiving-bottle or tank connected with G′. O is a pipe connecting pump B with tank A. N is a pipe connecting G′ with pump B. D, F, and G are stop-valves. K is a glass gauge-pipe. M is a safety-valve. L is a valve through which gas is admitted into the apparatus. E is a pipe closed by the stop-cock, from which the tank can be emptied. Of course such liquid will be used in transmitting the pressure as will be least operated upon by the corrosive powers of the material compressed.

In liquefying nitrous-oxide gas we first fill both tanks A and G′ and all the pipes with water for the purpose of expelling the air from them. We next admit nitrous-oxide gas through L, at the same time letting off the water from both tanks through E. When A and G′ are filled with gas we close L, E, and F, and at the same time open D and G and set the hydraulic pump in motion. As the tank A is filled with water the gas is forced through G into the tank G′, which is very much smaller than A. We then close D and G and open F. The pump still running, the water is forced through N into G′, which will stand a much greater strain than could be safely borne by tank A. The gas is still forced before the water until it is shown in the glass tube K. Then the stop-cock I is opened, and the gas soon fills the bottle H, when I is again closed. The operation may now be again repeated, after first filling the apparatus with water.

By the use of a hydraulic pump we avoid the difficulty that continually arises where compression is attempted by an air-pump. We also gain greatly in speed and efficiency of operation. By making use of two or more tanks instead of one large one we secure great economy of construction, as it would be enormously expensive, if not impossible, to make a tank capable of holding one or more hundred gallons and still of sufficient strength to stand the strain needful for the completion of the process of liquefaction.

We claim—

1. The combination of a hydraulic pump with one or more tanks, substantially as described, and for the purposes set forth.

2. In apparatus for condensing gas or æriform matter, the use of a series of tanks of varying strength, substantially as and for the purposes set forth.

W. F. JOHNSTON.
W. A. JOHNSTON.

Witnesses:
D. D. WHITNEY,
J. C. WHITNEY.

(46)