(No Model.) 2 Sheets—Sheet 1.

G. H. REYNOLDS.

HYDRAULIC PISTON.

No. 328,613. Patented Oct. 20, 1885.

Fig. 2.

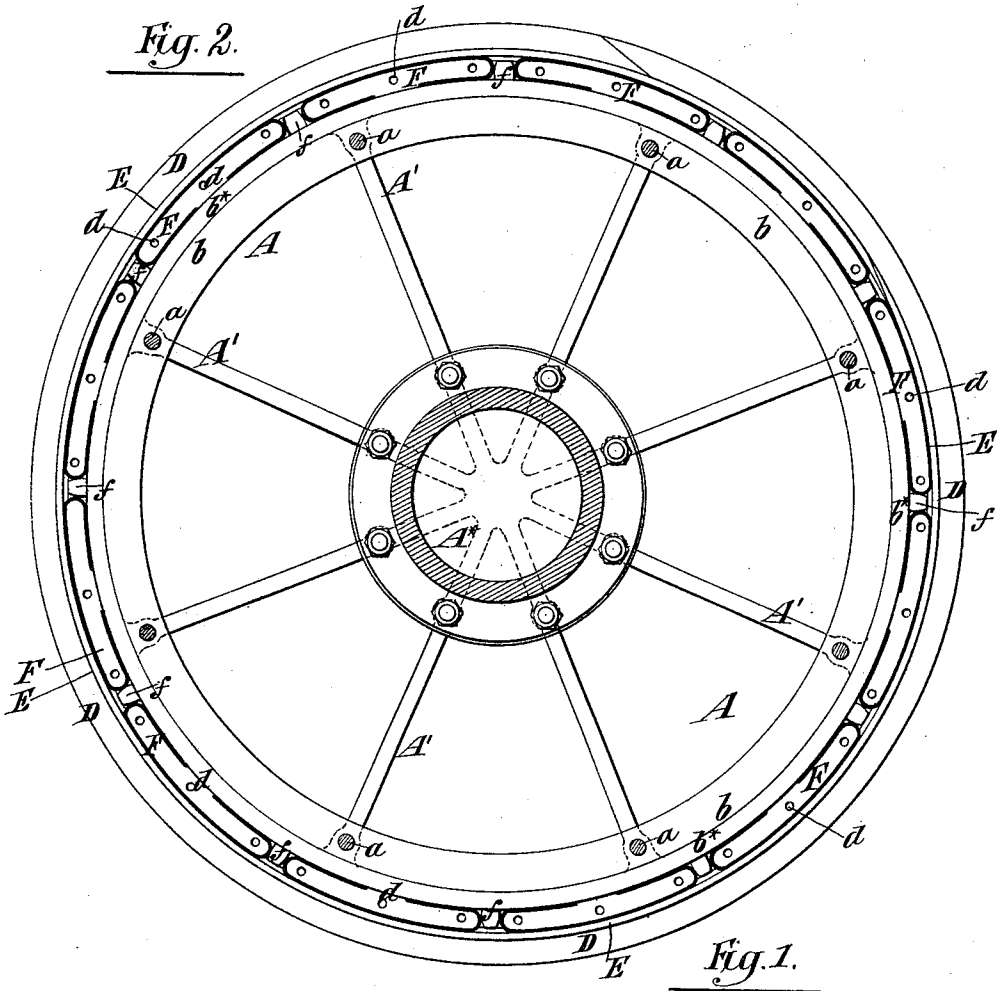
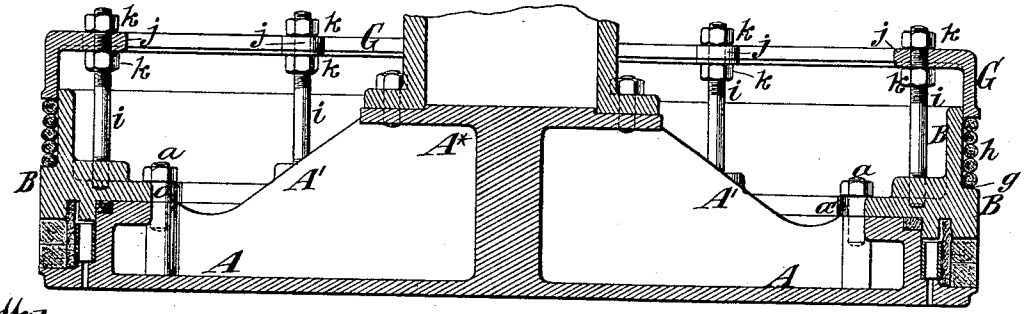


Fig. 1.



Witnesses:-
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C. L. Sundgren

Inventor:-
Geo. H. Reynolds
by his Attys.
Brown & Hall

N. PETERS. Photo-Lithographer. Washington, D. C.

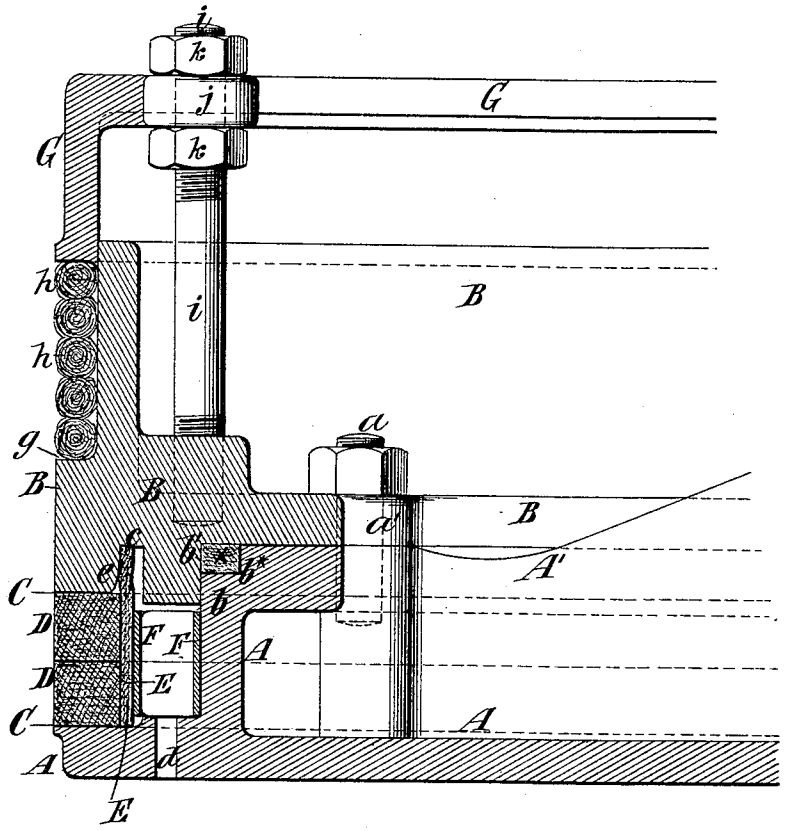
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Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE H. REYNOLDS, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO CRANE BROTHERS MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS.

HYDRAULIC PISTON.

SPECIFICATION forming part of Letters Patent No. 328,613, dated October 20, 1885.

Application filed September 20, 1884. Serial No. 143,523. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. REYNOLDS, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Hydraulic Pistons, of which the following is a specification.

My invention is applicable to pistons for hydraulic elevators or hoisting apparatus and to hydraulic pistons for other purposes.

The invention relates to pistons which have the outer or wearing surface composed of rings of soft packing material—such as hemp, rubber, and canvas, or other flexible material—and a backing consisting of a band of leather or like material on which the pressure of liquid acts to force the backing and rings outward.

The invention consists in novel combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a sectional view of a piston embodying my invention. Fig. 2 is a plan of the body of the piston and its packing, the follower being removed; and Fig. 3 is a sectional view of one side portion of the piston, on a larger scale, showing better the parts of the packing, the construction of the follower and piston, and their combination with the packing and with each other.

Similar letters of reference designate corresponding parts in all the figures.

A designates the body of the piston, which is constructed with a central boss or flanged projection, A*, to which a piston-rod may be secured, and which is webbed or provided with radial arms A′ to give it strength.

B designates the follower, which is of annular form, and is secured to the piston-body A by the bolts *a*, passing through inwardly-projecting lugs or ears *a′* on the follower and entering the arms A′ of the piston-body. The body and follower are rabbeted together to preserve their concentricity, and, as here shown, the body has a circular projection, *b*, which enters a rabbet or recess, *b′*, in the follower. The body and follower are bolted together, metal to metal, and in order to prevent leakage between them I form in the projection *b* of the body a small rabbet, *b**, in which is placed in circular form a strip of rubber packing, *. Before the body and follower are brought tightly together the packing is less in width and greater in depth than the rabbet *b**, but the pressure to which it is subjected between the opposite surfaces of the body and follower causes it to expand radially and tightly fill the rabbet *b**.

Between the body A and follower B there is formed a peripherical seat or channel, C, in which rubber and canvas, hemp, or other flexible packing is placed in circular form to produce two or more rings or coils, D, and the packing D is backed by a band or belt, E, of canvas, rubber, leather, or other flexible material, and which is of greater width than the two or more rings of packing, D. The belt or band E projects upward beyond the packing D and into an annular groove, *c*, in the follower, thereby covering the joint between the packing D and the follower.

Within the belt or band E are holes *d* in the body of the piston, through which water under pressure may enter behind the band or belt, and by its outward pressure the water forces the band or belt outward and holds the packing D tightly against the cylinder when the piston is moved by the pressure of water upon it. The pressure of water forces the portion of the band or belt E which projects beyond the packing D against the inner side of the circular rim or projection *e* of the follower, which holds the packing, and thus tightly seals the joint between the packing D and the follower B, and prevents leakage between them. The inner surface of the rim *e* is curved or flared outward, as best shown in Fig. 3, so that as the packing D wears a proper seat will be formed for the belt or band E, which holds the packing out. The belt or band E distributes the water-pressure evenly over the packing D, conforms to any irregularities due to wear of the cylinder or packing, and accommodates itself to the decreasing size of the packing as it is reduced by wear.

In order to hold the belt and packing E D properly in place when water-pressure is not on the cylinder, I prefer to support the belt or band by springs, and I have in Fig. 2 shown springs F, consisting of strips of spring-brass or other metal having their ends bent back or doubled on themselves and curved to conform

to the circular form of the piston. These springs are held in place in a direction circumferential to the piston by ears or projections *f* on the body, as shown in Fig. 2.

In order to lubricate the cylinder in advance of the packing D, I may construct the follower B to receive hemp or other absorbent material saturated with tallow or other lubricant.

I have here shown the follower B as having a rabbet, *g*, in its periphery, which receives rings or coils *h* of such absorbent material, and an annular gland or junk-ring, G, whereby such material may be compressed to cause the lubricant to exude from the material which contains it.

I have shown standing bolts *i* inserted in the follower and passing through ears or lugs *j* on the gland G, and by adjusting the nuts *k* the gland may be drawn down on the follower to compress the material *h*.

The piston may be made with or without the absorbent material *h*, and if without the gland G would be dispensed with.

I am aware that it is not new to employ in a hydraulic piston rings of flexible packing material and a backing of flexible material on which the water acts to force the backing and encircling rings outward, and I do not claim such a combination broadly as of my invention.

I am also aware that it is not new to employ in a hydraulic piston broad bands or rings of metal, springs for forcing such bands or rings outward, and a number of narrower packing-rings encircling the broad bands or rings, and I do not claim this as of my invention.

I am also aware of Patent No. 246,008, granted August 23, 1881, to A. Hampe, wherein is shown a packing consisting of divided metal rings having inwardly-projecting ears and spiral springs extending in a direction circumferential of the piston with their ends bearing against the inwardly-projecting ears on the adjacent ends of two ring sections. In this construction the spiral springs exert their force in a direction circumferential of the piston, and by pressing with their ends against the ears on the ring-sections, tend to separate the sections, and thereby enlarge the diameter of the piston. In my construction the piston-body A has outwardly-projecting integral ears *f*, and I employ bent springs F, which are arranged in the spaces between these ears, and are thereby held against shifting circumferentially. These springs do not, however, exert any force upon the ears, but their force is exerted in a radial direction, and they press outward upon the band or belt E, within which they are arranged.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the body and follower A B, the former having holes *d* for the admission of water, and having outwardly-projecting integral ears *f* at different points in its circumference, of the circular band or belt E, of flexible material—such as leather—surrounding the body A, packing-rings D, of flexible material surrounding the band or belt E, and bent springs F, arranged in the spaces between the ears *f*, and thereby held against shifting in a circumferential direction, the said springs being interposed between the body A and the band or belt E, and exerting a direct outward pressure on the said band or belt E, substantially as herein described.

2. The combination, with the body and follower of a hydraulic piston, the follower having a circular rim, *e*, of the circular band or belt E, of flexible material—such as leather—and the rings D, of flexible packing, encircling said band or belt and forming the wearing-surface of the piston, the band or belt E being made wider than the packing D and bearing on the inner side of the rim *e*, and the body having holes for admitting water to exert an outward pressure on the band or belt, whereby the band or belt is pressed outward to form a water-tight joint on the rim *e*, and its surrounding rings are pressed outward against the cylinder, substantially as herein described.

GEO. H. REYNOLDS.

Witnesses:
C. HALL,
EMIL SCHWARTZ.