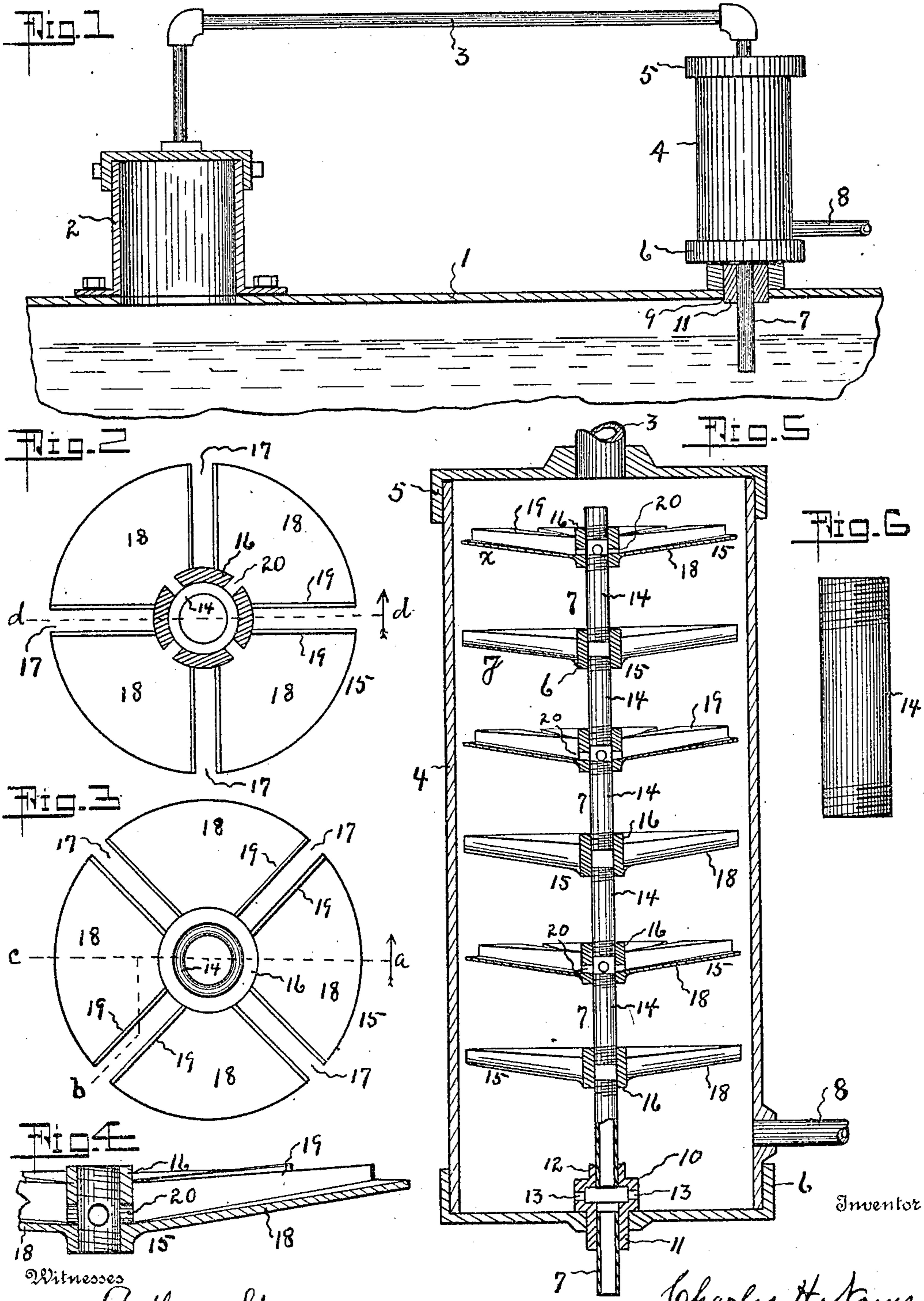


C. H. NOYES.  
STEAM DRIER.

APPLICATION FILED AUG. 9, 1909.

943,840.

Patented Dec. 21, 1909.



Witnesses

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# UNITED STATES PATENT OFFICE.

CHARLES H. NOYES, OF OMAHA, NEBRASKA.

## STEAM-DRIER.

943,840.

Specification of Letters Patent.

Patented Dec. 21, 1909.

Application filed August 9, 1909. Serial No. 511,870.

*To all whom it may concern:*

Be it known that I, CHARLES H. NOYES, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Steam-Driers, of which the following is a specification.

This invention relates to an apparatus for removing water from steam while the latter is under pressure, and returning the water to the boiler.

The object of the invention, briefly, is to provide means for this purpose which may be conveniently attached to any steam boiler, and which will have capacity for a considerable precipitation within a limited compass.

The invention also includes the employment of a series of mutilated disks for precipitation, found to be convenient and economical in manufacture, and so constructed that they may be readily assembled.

With these objects in view the invention comprises a novel combination and arrangement of parts as described herein, pointed out by the appended claim, and as illustrated in the drawing, it being understood that changes in form, size, proportion and minor details may be made within the scope of the claim without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawing, Figure 1 shows a broken away part of a boiler in section, with my newly invented steam drier attachment mounted thereon. Fig. 2 is a plan view of one of the mutilated disks employed, mounted upon one of the tubular sections, the tubular stem of the disk being in section, to disclose formation of exit ways. Fig. 3 is a similar view to that shown in Fig. 2, except the view shows the disk shifted horizontally 45 degrees, and the tubular shank is not shown in section. Fig. 4 is a broken away, side view of the mutilated disk, taken on line *a b* of Fig. 3. Fig. 5 is a side elevation of the device, the casing and disks being in section. Fig. 6 is a vertical, side view of one of the tubular sections or connecting tubes.

Referring now to the drawing for a more particular description, numeral 1 indicates a steam boiler, 2 the dome thereof, and 3 a connecting-pipe. I provide a cylindrical casing 4 preferably having a screw cap 5 mounted upon its upper end, this cap providing a mounting for the end of connecting

pipe 3, the bottom of this casing being provided with screw cap 6 for a mounting of drain pipe 7 which communicates interiorly of the boiler. This drain pipe consists of several pipe sections 14 having exteriorly threaded ends, and the sections are mounted end-to-end, their terminals being separated, however; the means for mounting these sections will be presently described. The several sections, when the parts are assembled, provide the drain pipe 7 and extends nearly the entire length of the casing, as illustrated by Fig. 5, and as shown in Fig. 1, extends within the boiler.

Casing or cylinder 4, together with screw caps 5 and 6 mounted upon its ends provide a strong receptacle, and it will be understood that steam may pass from the boiler or dome through pipe 3 to the service pipe 8, and from pipe 8 to the engine, and in its passage the steam will traverse almost the entire length of cylinder 4.

Drain pipe 7 is disposed in opening 9 provided in the wall of the boiler, and has a length sufficient to reach below the water line therein, and the receptacle may be disposed vertically upon or above the boiler, and supported in any convenient manner. I have shown a T pipe coupling 10 having a lower stem 11 threaded both exteriorly and interiorly. The exterior of this stem is adapted to have a threaded connection within aperture 9 of the boiler, and the upper end of that part of drain pipe 7 disposed within the boiler may have a mounting within said stem.

I provide apertures 13 in coupling 10 and the lower one of the series of pipe sections 14 may have a mounting of its lower terminal within stem 12 of coupling 10. The threaded connections mentioned while not particularly important, have been found to be convenient for readily assembling the parts and for mounting the device in a manner so that the drain pipe will communicate interiorly of the boiler.

I provide a plurality of disks each having at its middle a transverse, interiorly threaded, tubular stem or sleeve 16, and each formed with recesses 17 extending radially from the stem to its periphery, and thereby providing fan-shaped wings 18 to operate as precipitating-plates. The adjacent, parallel edges of wings 18 are upset, and thereby the middle portion of each wing is somewhat lower than its side edges.

Apertures 20 are provided in stems 16, intermediate edges 19 of each disk 15, and said disks are mounted at substantially equal distances apart, transversely of and within casing 4, their outer edges, preferably, being close to the casing wall. They are connected by means of tubular sections 14, one of said sections being disposed between each disk, the ends of stems 16 providing convenient mountings for the ends of said tubular sections.

Each of wings 18 has a suitable downward, radial inclination, and it will be understood that while steam is passing through the receptacle or casing, water will be precipitated and will be deposited upon plates or wings 18 and may pass therefrom through apertures 20, and from thence may pass within tubular sections 14, and finally will pass into the boiler, the several tubular sections 14 together with the tubular stems 16, operating, practically, as a continuous drain pipe 7, as above explained, extending from the uppermost disk  $\alpha$ , to the water within the boiler. The disks therefore operate as precipitating members, and steam, during its movement as described, will become more dry and effective, this being the object to be attained. A portion of the water may gather and drop from the under sides of disks 15, and might accumulate at the lower end of the casing, but, by reason of apertures 13, as mentioned, such portions will pass to the boiler through the lower part of the drain pipe.

As is apparent, steam, to reach service pipe 8 must pass through recesses 17, or between the outer edges of the wings and the inner surface of the casing. In order to increase the degree of precipitation, each alternate disk 15 is disposed with recesses 17 thereof in vertical alinement, and the recesses of any lower disk are disposed beneath the middle portion of the wings of the disk immediately above them. By reference to Fig. 5 it will be seen that the wings of the disk indicated at  $\alpha$  or uppermost disk are radially sectioned, and this section is illustrated by the broken line  $c\alpha$  in Fig. 3; and by reference to Fig. 5 it will be noted that

the stem of disk  $y$ , disposed next lower that disk  $\alpha$ , is sectioned, and this section is illustrated by the broken line  $d\delta$  in Fig. 2. In each instance, therefore, the recesses 17 of a disk, are disposed substantially 45 degrees from the recesses of a disk located immediately below it, horizontally considered. Since recesses 17 of the disks are disposed as described, it is considered that the precipitation will be greater, steam passing in an irregular course from pipe 3 to the service pipe.

The size of the cylinder or casing may be increased, of course, and the number of disks varied, as desired, an increased number of disks, resulting in increased precipitation.

By use of the device a considerable economy may be practiced, the heated, precipitated water being again used for producing steam, and resulting in a saving of fuel; also the steam will pass to the service pipe in an improved and more effective condition.

Having fully described my invention, what I claim and desire to secure by Letters Patent is,—

In a device of the character described, the combination with a steam boiler, of a receptacle located exteriorly thereof, an exit from said receptacle, a drain pipe centrally arranged in said receptacle and leading to said exit way, a return pipe leading from said exit way to the boiler, a steam pipe leading from the receptacle, and a plurality of superimposed, concave, imperforate drain baffles supported from the drain pipe and having ribbed upper faces, there being ports formed in the drain pipe to establish separate communication between the interior of the drain pipe and each of the drain baffles, the outer edges of said baffles being spaced from the inner wall of the receptacle and said baffles being supported entirely by the drain pipe.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES H. NOYES.

Witnesses:

HIRAM A. STURGES,  
ARTHUR STURGES.