Aug. 27, 1963 W. E. HARRIS ETAL 3,101,730

ROTATING FLUID SPRAY APPARATUS FOR WASHING PAPER MACHINE HEAD BOXES

Filed June 12, 1961 2 Sheets-Sheet 1

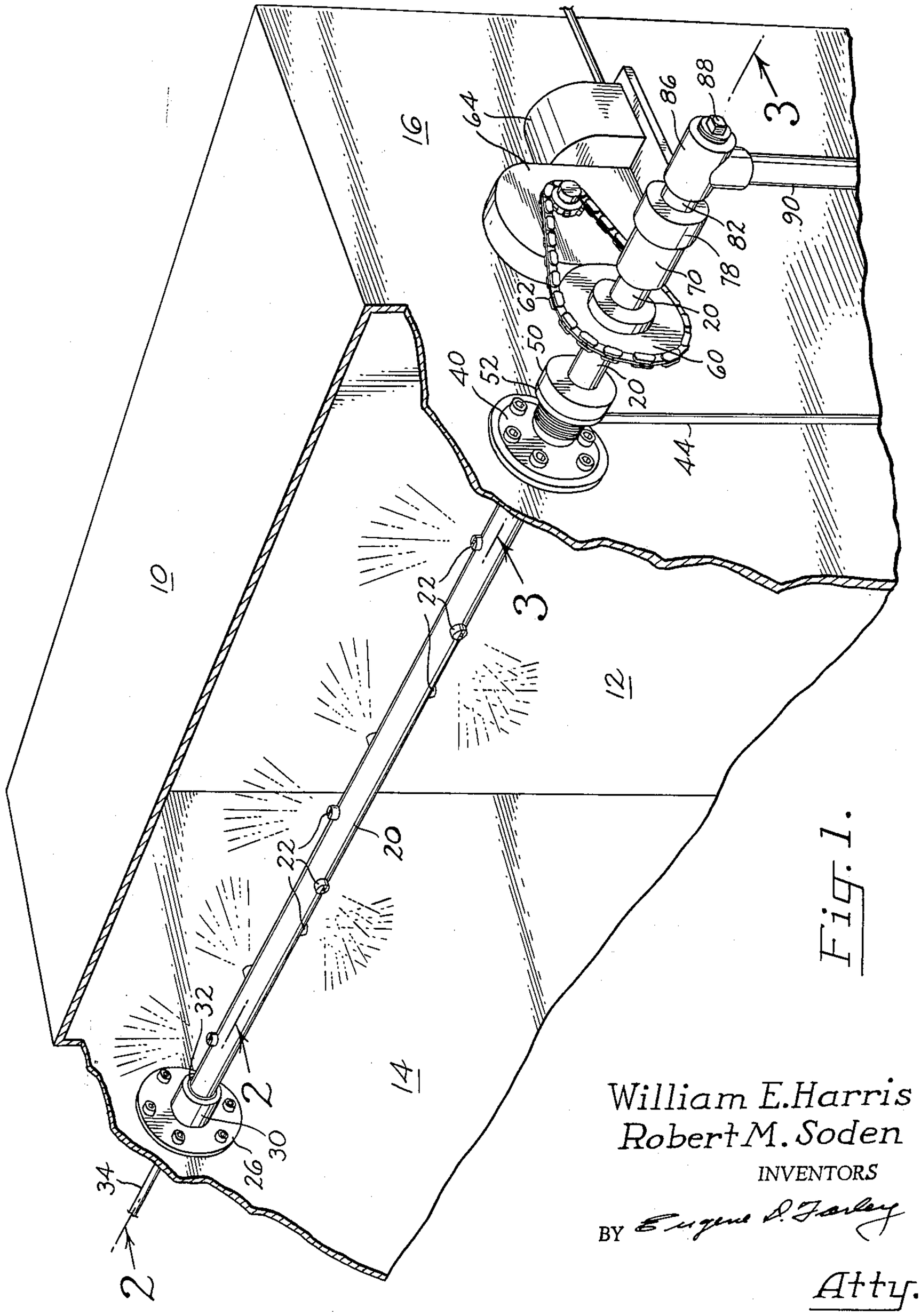

Fig. 1.

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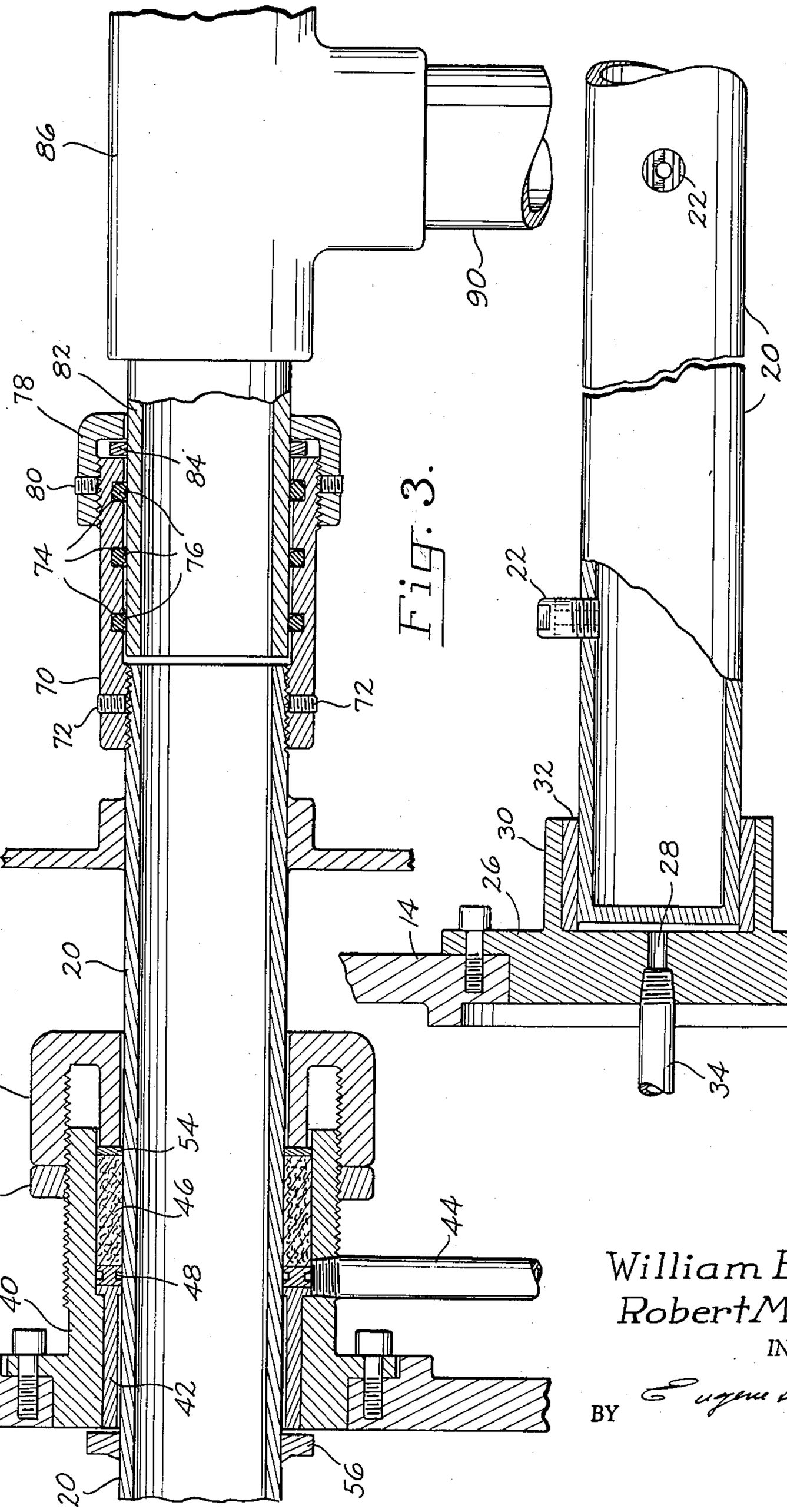

Fig. 3.

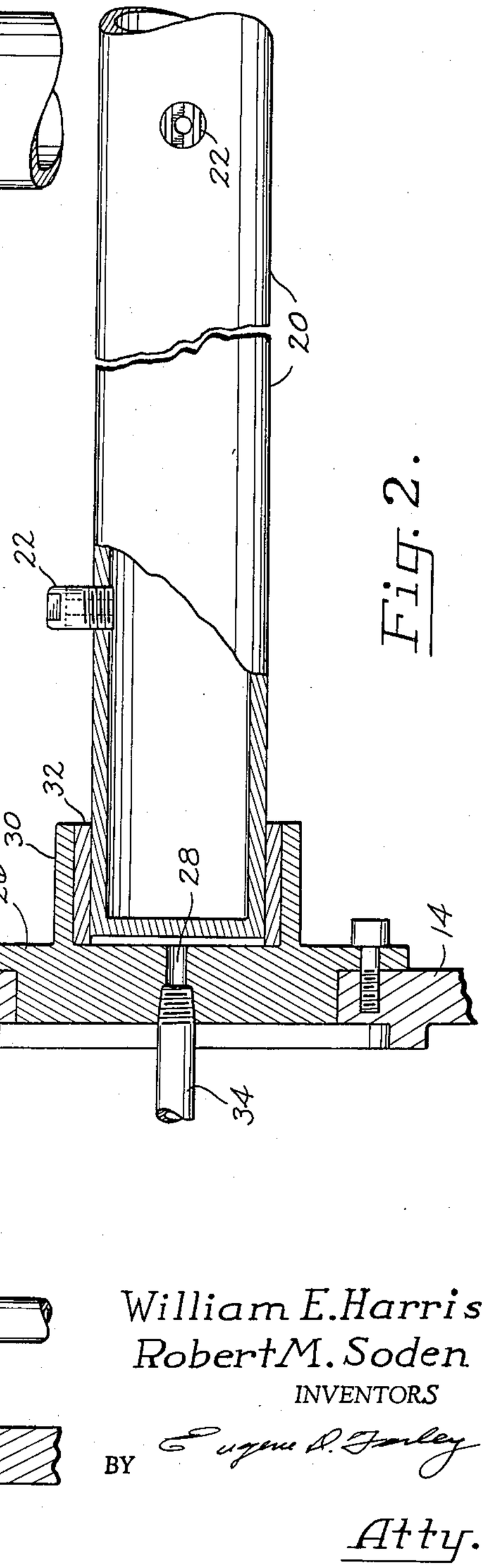

Fig. 2.

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ROTATING FLUID SPRAY APPARATUS FOR WASHING PAPER MACHINE HEAD BOXES

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This invention relates to rotating fluid spray apparatus for washing paper machine head boxes and like installations.

A problem commonly encountered in paper machine head boxes, which supply pulp slurry to the forming wire, is the accumulation of slurry which splashes against the walls and ceiling above the slurry pond. This accumulation is subject to bacterial action, resulting in slime formation. As it sloughs off at frequent intervals, it falls into the pulp slurry and causes clot- and slime-induced defects in the paper produced by the machine.

Accordingly it is common practice to include several stationary sprays in the upper part of the head box for spraying the head box interior. These fixed spray arrangements are unsatisfactory, however, in that they are cumbersome, several units being required for each head box; in that they are inefficient in removal of the accumulated material from all the head box areas; and in that they cause frothing and surface disturbance of the slurry in the pond. This in turn affects adversely the delivery of the slurry from the head box to the forming wire.

It is the general object of this invention to provide spray apparatus for washing paper machine head boxes which overcomes the foregoing and other difficulties and which cleans the head box efficiently, continuously and without affecting adversely the quality of the paper produced by the machine of which the head box is a component.

In the drawings:

FIG. 1 is a perspective view, partly broken away, illustrating the presently described fluid spray apparatus during its operation;

FIG. 2 is a detail view in elevation, partly in section taken along line **2—2** of FIG. 1 of one end of the presently described fluid spray apparatus, illustrating its manner of mounting; and

FIG. 3 is a view in side elevation, partly in section taken along line **3—3** of FIG. 1 and illustrating the manner of mounting the other end of the spray apparatus, as well as the manner of supplying it with washing fluid under pressure.

In general, the fluid spray apparatus of our invention, adapted for washing paper machine head boxes, comprises a pipe or conduit, a plurality of spray nozzles arranged at spaced intervals, preferably spirally, along the length of the conduit, bearing means for mounting the conduit rotatably in the head box above the pond therein, means for supplying fluid under pressure to the conduit and drive means connected to the conduit for driving it at a predetermined rotational speed. Means also are provided for supplying washing and lubricating fluid under pressure to the bearing means and for coupling a stationary fluid supply means to the rotating conduit through a fluid-sealed coupling.

Considering the foregoing in greater detail and with particular reference to the drawings:

In FIG. 1 there is illustrated the head box of a paper making machine. It includes a ceiling **10**, a back wall **12**, and a pair of side walls **14, 16**. These enclose a pulp slurry pond, not illustrated, which feeds the forming wire of the machine, also not illustrated.

The presently described spray apparatus is located above

the head box pond in a position in which it cleans effectively the interior surfaces of the head box and prevents the accumulation of slurry splashed on these surfaces from the pond.

The spray apparatus includes a conduit or pipe **20**, which mounts at spaced intervals a plurality of spray heads **22**. Each of these communicates with the interior of the conduit and is provided at its outlet with a slot delivering a flat spray overlapping the adjacent sprays.

The spray is delivered with energy sufficient to clean the interior surfaces of the head box, but insufficient to disturb the surface of the pond since it is dissipated before it reaches the pond. In addition, the spray heads preferably are arranged spirally about the conduit to avoid imparting a surging motion to the pond slurry.

Bearing means may be provided for mounting the conduit within the head box. Accordingly in an opening in wall **14**, there is bolted an insert **26** having a central perforation **28**. The insert supports an inwardly extending bearing housing **30** in which is seated a bushing **32**. A pipe **34** is threaded into perforation **28** and connected to a source of water under pressure which, when introduced into the bearing, cleans it and keeps it lubricated.

The other end of conduit **20** extends completely through side wall **16** and is supported in a bearing assembly illustrated in FIG. 3.

A combination bearing housing and stuffing box casing **40** is bolted to the side wall. The bearing housing is bushed with bushing **42**. It is washed and lubricated by water introduced through pipe **44**.

The stuffing box casing contains packing **46**, separated from the bushing by a labyrinth ring **48**. A packing gland **50** is threaded on the threaded exterior of the casting, being retained in place by lock ring **52**. A washer **54** is superimposed on the packing, and takes the thrust of the packing gland.

The conduit is maintained within the head box, properly positioned with respect to the bearings, by means of a ring **56** welded to the exterior to the conduit and spaced slightly from the interior surface of side wall **16**.

One type of drive for the conduit, by means of which it is rotated at the predetermined rate, is illustrated in FIG. 1.

Fixed to the outboard segment of the conduit is a sprocket **60**, driven by a chain **62** which engages the sprocket of a ratio motor **64** of suitable horsepower. The motor is adjusted to turn the conduit at the desired rotational speed, for example, from 5–10 r.p.m.

The fluid fed to conduit **20** preferably comprises filtered white water derived from the paper making operation, since it will not plug the spray heads and since its use does not effect adversely the consistency of the pulp slurry. It is fed under pressure to the rotating conduit from a stationary assembly, the construction of which is illustrated in FIG. 3.

Rotating conduit **20** terminates in a threaded section on which is threaded a sleeve **70** maintained in position by set screw **72**. The sleeve extends beyond the end of the conduit. Its interior is formed with spaced annular recesses **74**, in each of which is seated on O-ring **76** of rubber or other suitable material. A cap piece **78** is threaded onto the end of the sleeve and is anchored in position with set screws **80**.

A stationary pipe **82** extends into rotating sleeve **70** in sealing engagement with the O-rings. The pipe bears a locating flange **84** which is received in cap piece **78** and assists in locating properly conduit **20**. The pipe is threaded into a T **86** which has a cleanout plug **88** and communicates with another pipe **90** leading to the source of supply of the washing fluid.

Operation

In operating the presently described, rotating, fluid spray apparatus, filtered white water or other fluid is introduced at a selected pressure through stationary pipes **90** and **82** into conduit **20** which is rotated at the desired speed by motor **64**. The bearing assemblies in which the conduit is supported are lubricated and cleansed by water fed to them through pipes **34, 44**, respectively.

The fluid under pressure in conduit **20** passes into spray heads **22** where it is dispensed in flat, overlapping sprays in such a manner as to wash thoroughly all the interior surfaces of the head box, dislodging any accumulated material and returning it to the pulp slurry in the pond below. This is accomplished using a single spray assembly, and without imparting a rhythmic disturbance to the pond surface, which would affect adversely the head box delivery to the forming screen. It also is accomplished without affecting adversely the composition of the slurry so that a uniform paper product is obtained.

It is to be understood that the form of our invention herein shown and described is to be taken as a preferred example of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of our invention or the scope of the subjoined claims.

Having thus described our invention, we claim:

1. Fluid spray apparatus for washing paper machine head boxes, comprising a conduit, a plurality of spray nozzles arranged at spaced intervals along the length of the conduit and communicating therewith, bearing means for mounting the conduit rotatably in a head box above the pond therein, means connecting the conduit to a supply of washing fluid under pressure for ejection through the

nozzles onto the interior surfaces of the head box above the pond therein, drive means connected to the conduit for driving it at a predetermined rotational speed, and conduit means communicating with the bearing means for supplying washing and lubricating water to the bearing surfaces.

2. Fluid spray apparatus for washing paper machine head boxes including a pair of spaced side walls, comprising a first hearing adapted for mounting on one side wall of a head box above the pond therein, a second bearing adapted for mounting through the other side wall opposite the first bearing, a pipe journaled for rotation in the bearings and extending through the second bearing outboard of the latter, a plurality of spray nozzles arranged at spaced intervals along the length of the pipe between said bearings, drive means coupled to the pipe for driving it at a predetermined rotational speed, a stationary pipe communicating with a source of fluid under pressure and aligned with the rotating pipe, water-sealed coupling means coupling the stationary pipe to the outwardly extending end of the rotating pipe, and conduit means connecting the first and second bearings to a supply of lubricating and washing water.

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