(No Model.)

2 Sheets—Sheet 1.

D. STEWART.

SUGAR CANE MILL.

No. 256,759. Patented Apr. 18, 1882.

FIG. 1.

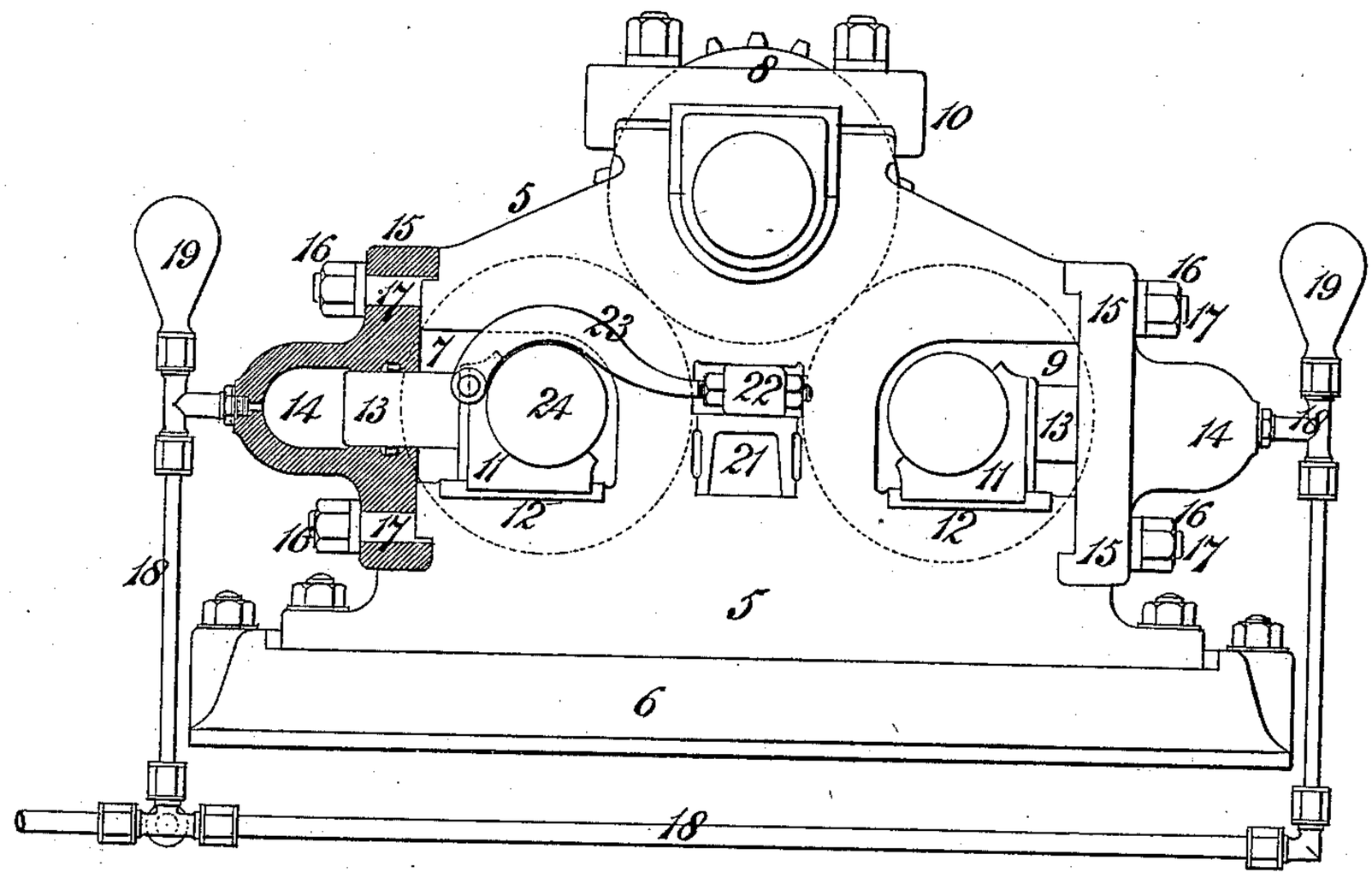
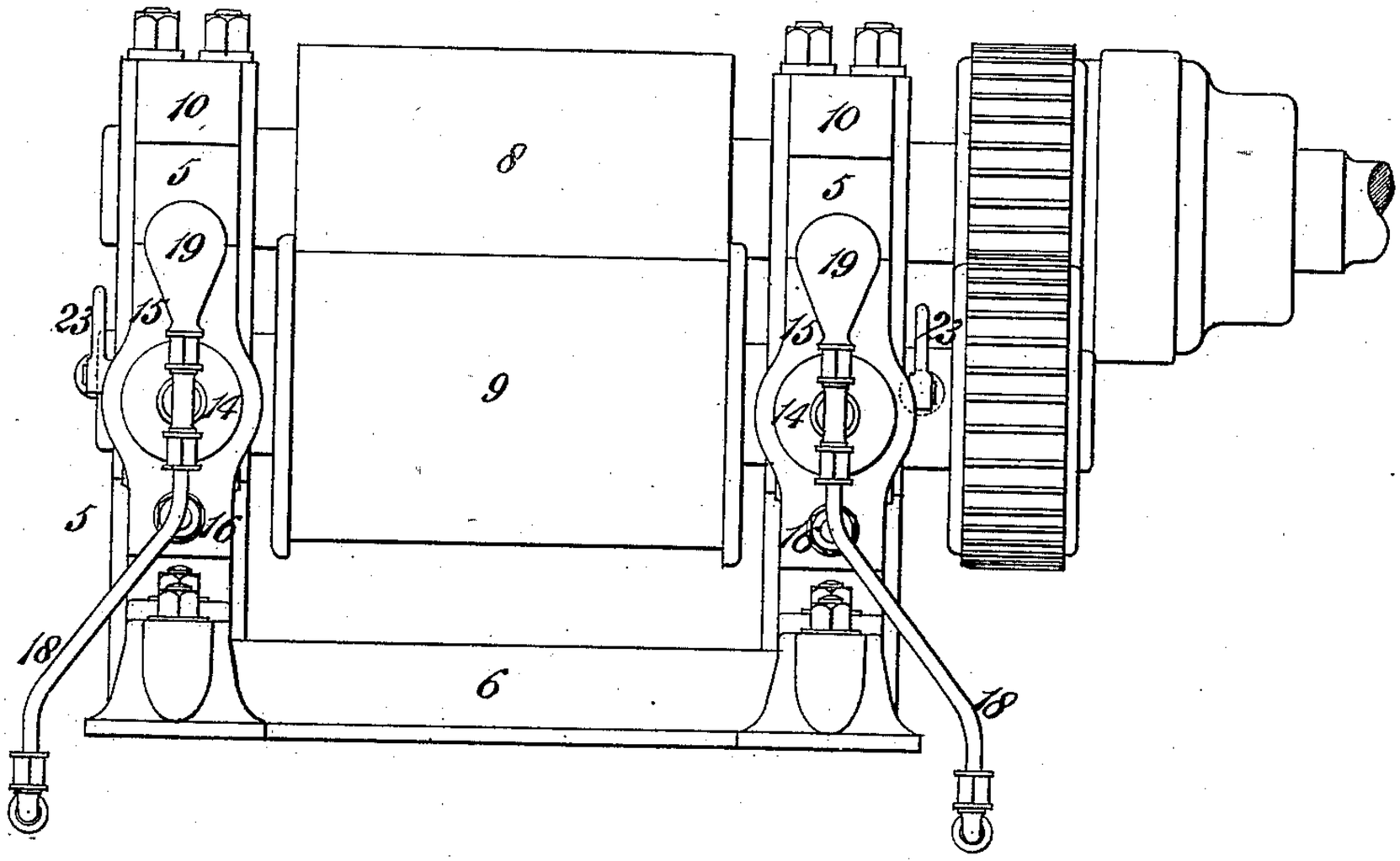


FIG. 2.



Witnesses:
Harry Drury
Harry Smith.

Inventor:
Duncan Stewart
by his attorneys
Howson and Sons

(No Model.)

2 Sheets—Sheet 2.

D. STEWART.

SUGAR CANE MILL.

No. 256,759. Patented Apr. 18, 1882.

FIG. 3.

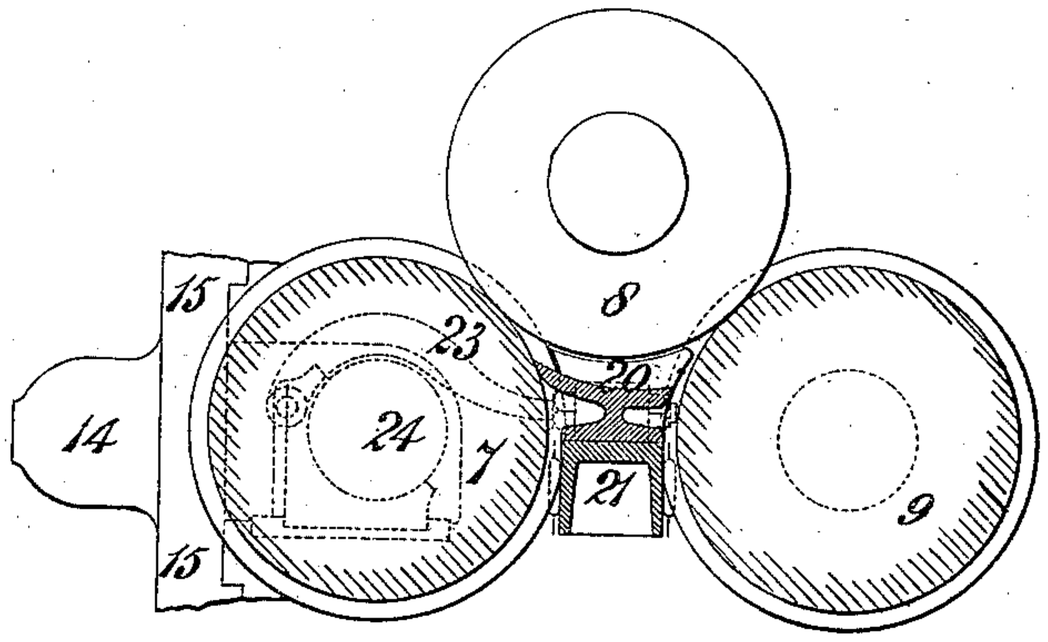
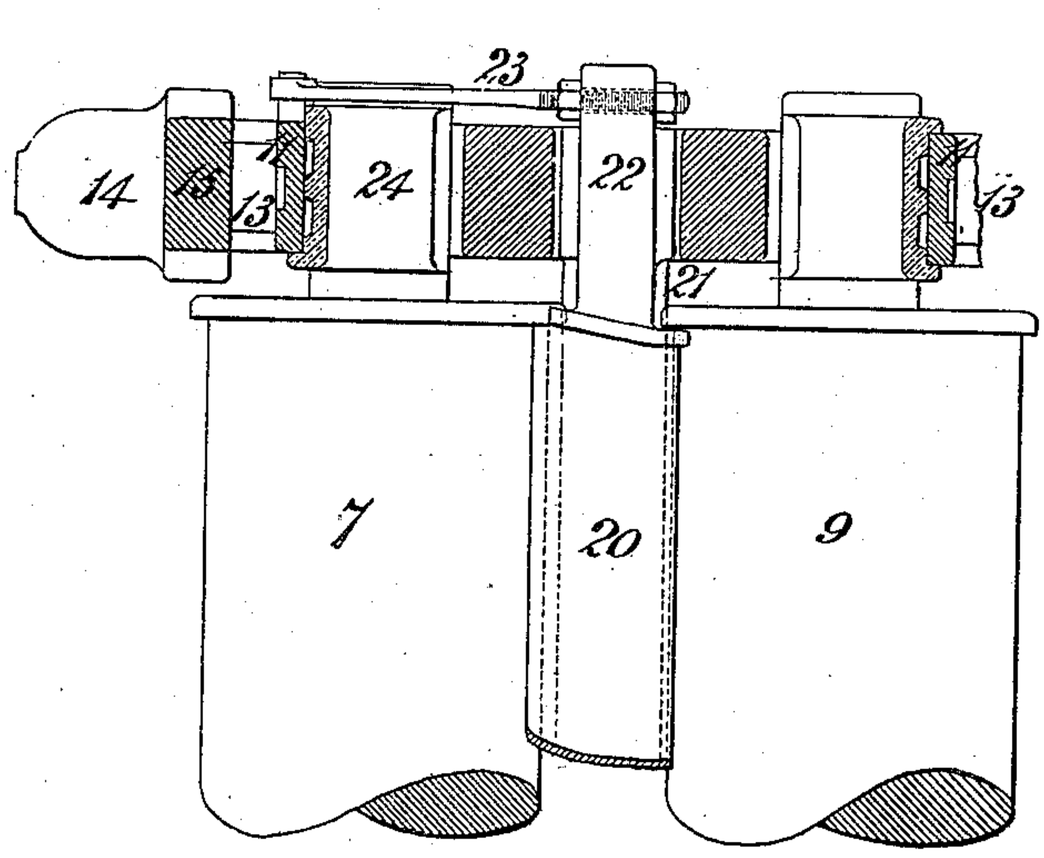


FIG. 4.



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UNITED STATES PATENT OFFICE.

DUNCAN STEWART, OF GLASGOW, COUNTY OF LANARK, SCOTLAND.

SUGAR-CANE MILL.

SPECIFICATION forming part of Letters Patent No. 256,759, dated April 18, 1882.

Application filed October 27, 1881. (No model.) Patented in England August 17, 1881.

To all whom it may concern:

Be it known that I, DUNCAN STEWART, residing at Glasgow, in the county of Lanark, Scotland, have invented certain Improvements in Sugar-Cane Mills, (for which I obtained British Letters Patent, dated August 17, 1881, No. 3,583, and still in force,) of which the following is a specification.

My said invention has for its objects to render sugar-cane mills less liable to breakage or injury from careless or irregular feeding, and to provide convenient means for adjusting or regulating the pressure of the rolls.

My invention consists in improved appliances for holding the rolls, so that they may yield on the occurrence of excessive strains, instead of being rigid or unyielding, as formerly.

I apply my invention to a mill of the well-known three-roller class, the bearing-caps of the upper or middle roll being held down in the usual way, while the two lower rolls are pressed horizontally inward by the rams of hydraulic cylinders, the rams acting on the bearing-blocks, which are fitted on horizontal guide-beds. The hydraulic cylinders are held in their places by rods or long bolts passing horizontally and completely through the housings or head-stocks, a pair of such rods or long bolts, one above and the other below the bearing, serving for the two lower bearings in each housing. The hydraulic cylinders are supplied with water or other suitable liquid under pressure from an accumulator loaded to a suitable pressure. When strains occur corresponding to a greater pressure than that for which the accumulator is loaded the rams yield and breakage is avoided, and to give a still greater elasticity of action and sensitiveness air-vessels are fitted in connection with the hydraulic cylinders. The lower rolls being thus liable to horizontal movement, it is necessary to provide means to keep the edge of what is known as the "returner" in contact with that one of the lower rolls between which and the middle roll the canes are first passed. For this purpose the ends of the returner have adjustably fixed to them links or bars, which are curved to pass without frictional contact over the journals of the roll, and are attached to the bearing-blocks, so that the returner moves with the blocks, and in consequence its edge keeps close to the roll.

In the accompanying drawings, Figure 1 is an end elevation, partly in section; and Fig. 2 is a side elevation. Figs. 3 and 4 are vertical and horizontal sections explanatory of the returner details.

The framing consists, as usual, of a pair of massive housings or head-stocks, 5, fixed on a bed-plate, 6, and it carries three rolls, 7 8 9, the middle one, 8, being partly between and partly above the other two, which are at the same level. The upper or middle roll, 8, is held in ordinary bearings, the caps 10 of which are held down in the usual way. The lower rolls, 7 9, are held on bearing-blocks 11, which are fitted to slide on horizontal guide-beds 12, and which are pressed inward by the rams 13 of hydraulic cylinders 14. These cylinders 14 are formed with collars or lugs 15, by means of which they are fixed to the framing, and they are securely held by nuts 16, screwed on the ends of horizontal rods or long bolts 17, passing completely through the housings 5 and through the lugs 15, and transmitting the horizontal strains between the opposite cylinders. The cylinders 14 are supplied with water or other suitable liquid under pressure by branch pipes 18, leading it from a suitably-loaded accumulator, and near each cylinder there is connected to its pipe an air-vessel, 19, the air in which renders the relieving action quicker when sudden strains occur.

The returner 20, which guides the canes round under the middle roller, 8, rests and is movable on the upper horizontal surface of a bearer, 21, fixed in openings in the housings 5, and the returner is made with ends 22, which project through the same openings, and which have curved bars or links 23 attached to them. These links 23 are curved to pass without frictional contact over the roller-journals 24, and they are formed with eyes at their outer ends, to be set on studs or projecting pins formed on the bearing-blocks 11 or on the heads of the rams 13, which bear against the blocks 11. The inner ends of the links 23 are screwed and passed through holes in the returner ends 22, to which they are adjustably fixed by screw-nuts at each side.

I claim as my invention in sugar-cane mills—

1. The combination of the rolls of a sugar-cane mill and movable bearings for one or more of the rolls with hydraulic cylinders, rams acting on said movable bearings, supply-pipes, and air-vessels 19, substantially as and for the purpose set forth.

2. The combination of the housings and three rolls, one above and between the two others, with bearings, rams, hydraulic cylinders, and rods or long bolts passing through the housings and connecting the cylinders at opposite parts thereof, all substantially as described.

3. The combination of the rolls of a sugar-cane mill and movable bearings for one of said rolls with a returner and curved links 23, connecting said returner to said movable bearings, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DUNCAN STEWART.

Witnesses:
EDMUND HUNT,
DAVID FERGUSON.