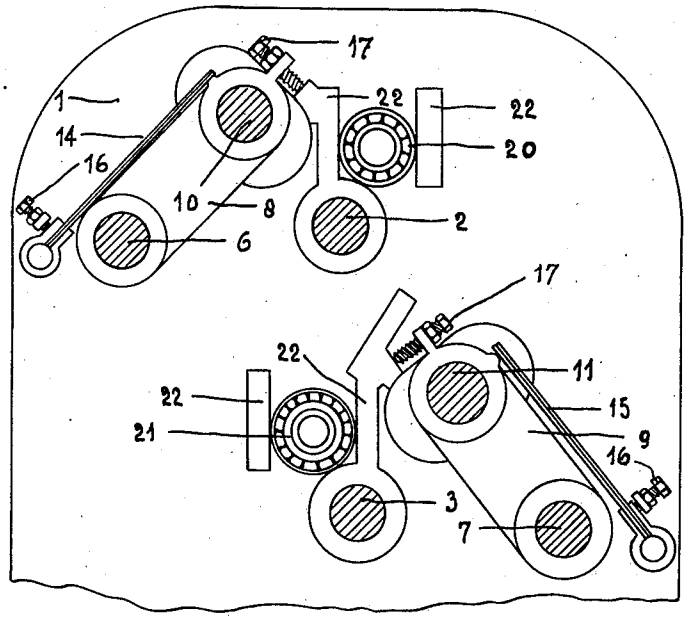
Sept. 19, 1939. J. B. UBBINK 2,173,404

MACHINE FOR RAISING THE PILE OF PILE FABRICS

Filed May 27, 1938 2 Sheets-Sheet 1

FIG. 1.



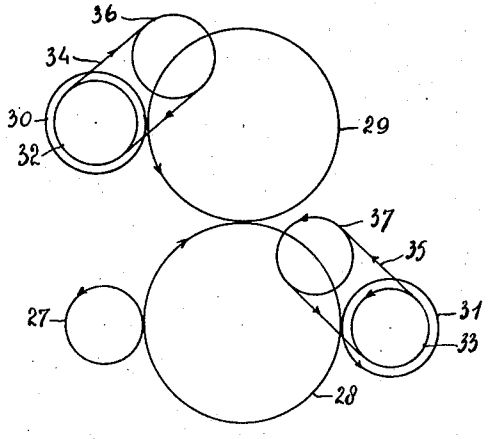


FIG. 3

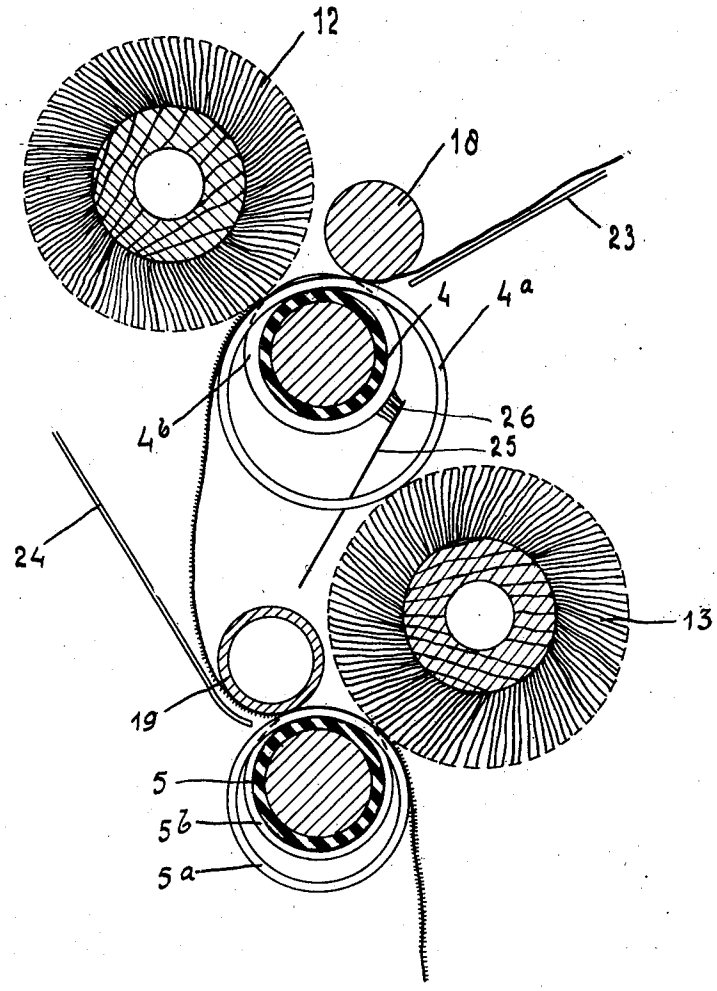
Inventor
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MACHINE FOR RAISING THE PILE OF PILE FABRICS

Filed May 27, 1938 2 Sheets-Sheet 2

FIG. 2



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UNITED STATES PATENT OFFICE

2,173,404

MACHINE FOR RAISING THE PILE OF PILE FABRICS

Johan Bernard Ubbink, Doesburg, Netherlands

Application May 27, 1938, Serial No. 210,305
In the Netherlands May 31, 1937

2 Claims. (Cl. 26—29)

My invention relates to means for raising the pile of pile fabrics such as terry (Turkish towelling), covers and the like. It has particular reference to a machine which serves for raising the pile by means of rotary brushes, and it is an object of my invention to provide a machine of this kind which is more efficient in action than similar machines hitherto designed.

In existing machines of this type the towel or the like is passed through between a pair of rotary brushes rotating at higher circumferential speed than corresponds to the linear speed of the towel (for instance Dutch Patent 36,418 and U. S. Patents 1,702,696 and 1,763,675). The operation of these machines is satisfactory if new towels are treated therein, but they involve the drawback that towels carrying fringes and less strong towels are liable to be torn. Besides this these machines are less suited for the brushing of covers.

In contradistinction thereto the machine according to this invention is characterised by two rotary brushes, each of which is combined with a cylinder rotating at a different speed. One brush acts on one side of the towel or cover, thereafter the other brush on the other side, and the surfaces of the cylinders cooperating with the two brushes are arranged to offer a considerable resistance to any slipping of the towel or cover, so that the traveling velocity of the towel or cover is determined by the circumferential speed of the cylinders and at the same time the pile raised by the first brush is depressed as little as possible by the cylinder cooperating with the second brush. By this arrangement of the brushes and cylinders the tensional effect exerted by the brushes is taken up directly by the cylinders cooperating with them, so that the towel or cover is not acted upon by any appreciable pull. By passing the towel or cover over the cylinders cooperating with the brushes I prevent the brushes from gripping the towel or cover and carrying it along, whereby it would be destroyed. While the machines hitherto designed comprise guide rolls serving to prevent the towels or covers from being carried along by the brushes, it has been found that no such protective effect is obtained whenever the towels or covers are slightly worn.

In order to prevent the towels or covers from winding around the cylinders, I provide grooves in the cylinders and rings in these grooves of a larger diameter than the cylinders.

The brushes may be acted upon by adjustable springs tending to press them in the direction of the cylinders cooperating with them.

The axles of the rotary brushes are preferably supported in arms pivotally connected to the machine bed and provided with sprocket wheels driven by means of chains passing over other sprocket wheels arranged coaxially of the hinge pins of the arms. I hereby prevent the pressure acting on the brushes from being directly proportionate to the power driving them, as would be the case if they were driven by means of gears in view of the reaction of the pressure exerted by the teeth.

With each cylinder may cooperate a pressure roller, and the pressure roller cooperating with the second cylinder may be forced against its cylinder with less force than the pressure roller cooperating with the first cylinder.

In the drawings affixed to this specification and forming part thereof an embodiment of my invention is illustrated diagrammatically by way of example.

In the drawings

Fig. 1 is an elevation of one of the uprights of the machine bed showing the cylinders, etc., in cross section.

Fig. 2 is a cross section of the principal members of the machine, drawn to a larger scale.

Fig. 3 is a mere diagram illustrating the means for driving the brushes, cylinders and rollers.

Referring to the drawings and first to Fig. 1, 1 is one of the two uprights forming part of the machine bed, and 2 and 3 are the axles of the two cylinders 4 and 5, these axles as well as hinge pins 6 and 7 of the arms 8 and 9 being supported in this upright. The arms 8 and 9 form bearings for the axles 10 and 11 of the rotary brushes 12 and 13 (Fig. 2). The brushes consist of non-curly fibres such as those sold under the trade names "Batria", "Colombo" or the like. These fibres do not extend radially to the axes, but a little to the rear, whereby the towels or covers are prevented from adhering to them.

The cylinders 4 and 5 are formed with circumferential grooves 4b and 5b, respectively, in which rings of great width or hollow cylinders are seated, the diameter of which is larger than that of the cylinders 4 and 5 and which serve to prevent the towels or covers from winding around the cylinders.

The axles 10 and 11 of the rotary brushes extend into longitudinal perforations of the uprights so that the brushes can move relative to the cooperating cylinders. By means of springs 14 and 15, the pressure of which can be regulated

by means of set screws 16, the brushes are pressed in the direction of the cylinders. The arms 8 and 9 are provided with set screws 17 which cooperate with fixed abutments in order to limit the movement of the brushes 12 and 13. Above the cylinders 4 and 5 are arranged pressure rollers 18 and 19, whose weight acts on the cylinders. On the ends of the axles of these pressure rollers are mounted ball bearings 20 and 21 which are guided for vertical displacement between vertical guide pieces 22.

In the operation of this machine, as illustrated more particularly in Fig. 2, the towel or cover to be treated is introduced by means of a guide plate 23 between the cylinder 4 and the pressure roll or cylinder 18 cooperating therewith, the speed of rotation of the cylinder 4 determining the travelling speed of the towel or cover. This latter then passes through between the cylinder 4 and the brush 12, whereby the pile on one side is raised in consequence of the fact that the circumferential speed of the brush is greater than that of the cylinder 4, the pull exerted on the towel or cover by the brush being taken up by the cylinder. The towel or cover is then guided by a guide plate 24 to pass through between the cylinder 5 and the pressure roll or cylinder 19, which latter is lighter in weight than the pressure roll 18 in order not to press the towel or cover against the cylinder 5 with such force that the raised pile would be depressed again. The side of the towel or cover which was not yet acted upon by the brush, is now brushed by the brush 13, which also rotates at a higher velocity, and the cylinder 5 again prevents any considerable tensional stresses from arising in the towel or cover in consequence of the brush action. The towel or cover then drops out. Below the cylinder 4 is arranged another guide plate 25 provided at its top end with a small brush 26 which serves to remove from the cylinder any particles which may adhere to it.

The cylinders 4 and 5 are provided with elastic surfaces, and in the surface of the cylinder 5 there may be formed, besides the circumferential grooves 5*b*, also longitudinal grooves 5*c*. These latter grooves prevent the brush from carrying the towel or cover along with greater speed than the circumferential speed of the cylinder. Rubber has been found to be excellently suitable as a cover for these cylinders.

Fig. 3 illustrates the manner of driving the several parts of the machine. A gear 27 drives a toothed wheel 28 mounted on the axle of the cylinder 5. The toothed wheel 28 meshes with another toothed wheel 29 of the same diameter which is mounted on the axle of the cylinder 4, so that the two cylinders 4 and 5 are driven at equal speed, but in opposite senses. With the toothed wheel 29 meshes a gear 30 mounted concentrically of the hinge pin 6 of the arm 8. Similarly the toothed wheel 28 meshes with a gear 31 mounted concentrically to the hinge pin 7 of arm 9. The gears 30 and 31 drive, by means of sprocket wheels 32 and 33, chains 34 and 35 and sprocket wheels 36 and 37, the axles 10 and 11 of the rotary brushes 12 and 13, respectively. Since the gears 30 and 31 are smaller than the toothed wheels 29 and 28 meshing with them, the brushes rotate at a higher speed than the cylinders.

The mounting of the axles 10 and 11 of the cylinders 12 and 13 in the arms 8 and 9, respectively, serves to render the pressure exerted by the brushes on the textile material treated independent from the reaction of the driving means. In an ordinary gear drive this reaction would exert a highly undesirable effect and would render impossible a satisfactory control of the pressure exerted by the brushes. Apart therefrom the chain drive involves the further advantage that by the vibrations of the chains the brushes are driven with jerks, whereby the brushing action is increased and the releasing of the towels or covers expedited.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. A machine for raising the pile of pile fabrics comprising in combination, two rotary brushes arranged in series, a cylinder arranged for cooperation with each brush, said cylinders being formed with annular grooves, rings of larger diameter than the cylinders arranged in said grooves and means for rotating said cylinders at a speed differing from that of said brushes.

2. The machine of claim 1, in which the cylinder arranged for cooperation with the second brush is formed with axially extending grooves.

JOHAN BERNARD UBBINK.