Nov. 17, 1959 J. S. FLEMING 2,913,160

MACHINE FOR TEARING PAPER

Filed March 11, 1957 2 Sheets-Sheet 1

Fig. 1.

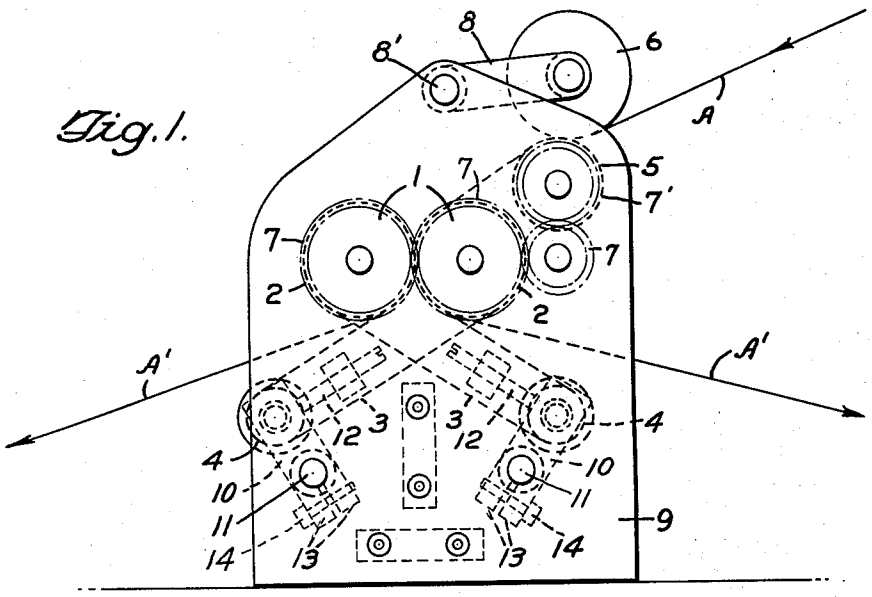


Fig. 2.

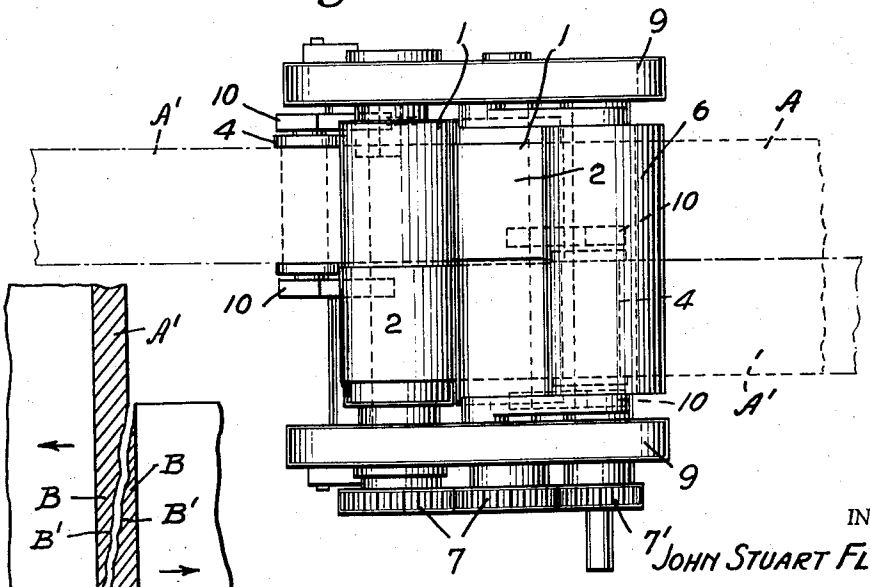


Fig. 5.

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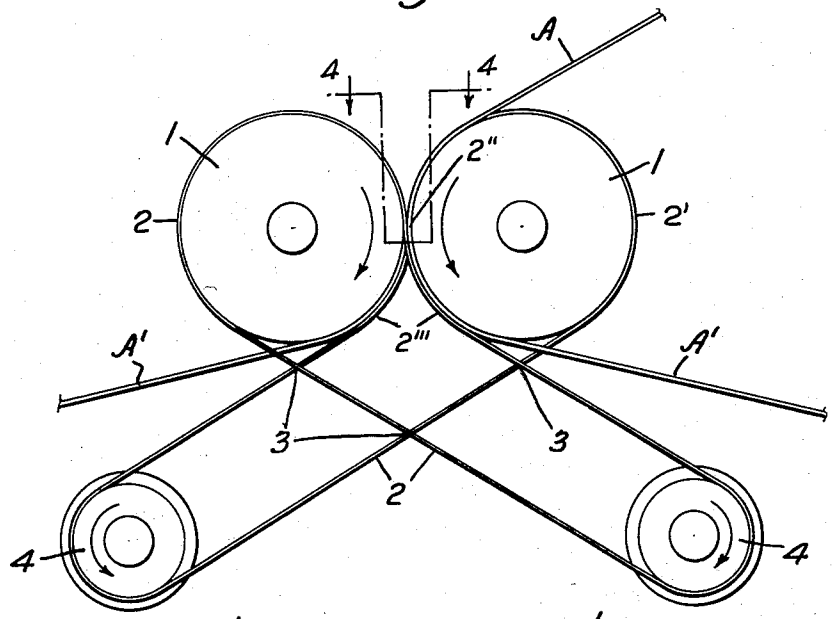
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Fig. 3.



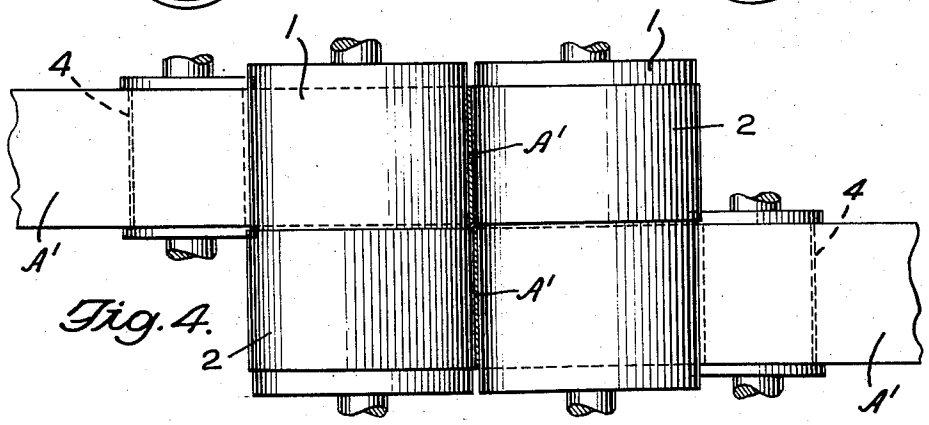


Fig. 4.

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MACHINE FOR TEARING PAPER

John Stuart Fleming, Niagara Falls, N.Y.

Application March 11, 1957, Serial No. 645,211

6 Claims. (Cl. 225—99)

The invention relates to machines for tearing paper, more particularly for tearing a paper work sheet into parallel strips, an object being to provide such a machine capable of providing said strips with the soft cushioned edges of the dental cleaners disclosed in the Fleming patents dated October 21, 1958, Numbers 2,856,938 and 2,856,939, and the Fleming Patent Number 2,771,084, dated November 20, 1956. Other objects and advantages will appear hereinafter or will be obvious.

The invention consists in the novel construction and combination of parts hereinafter set forth in the claims.

In the accompanying drawings:

Figure 1 is a side view of a machine showing an embodiment of the invention, with parts in dotted lines, and showing the work sheet and said strips.

Figure 2 is a plan view of the same, showing the work sheet and said strips in dotted lines.

Figure 3 is a side view on a larger scale of the two cylinders, the two rolls, the two endless belts, the work sheet and the strips.

Figure 4 is a plan view of the same, showing by a section taken on the line 4—4, Figure 3, said strips exaggerated as to their thicknesses.

Figure 5 is a detail fragmentary diagrammatic transverse section of said strips, showing on a much larger scale the soft cushioned edges of said strips.

Referring to the drawings, the machine for tearing a work sheet A into parallel strips A′ comprises two parallel longitudinally approximated cylinders 1 slightly spaced apart from each other, two parallel longitudinally spaced rolls 4 widely spaced apart from each other and parallel to said cylinders, said cylinders and said rolls being located in parallel horizontal planes, said rolls being of less diameter than that of said cylinders, and two endless belts 2, said cylinders being each at least as long as the combined width of the belts. Said belts have arcuate bends 2′ passing around and over said cylinders for more than 180 degrees along arcuate converging paths and having their inner edges slightly spaced apart and approximated in the plane passing through the axes of said cylinders and having arcuate reverse bends 2‴ passing around and under the cylinders for less than 180 degrees along arcuate diverging paths and thence around said rolls, each belt around and over the cylinder farthest from the related roll, said belts crossing each other at 3 below said cylinders and crossing each other at 2″ immediately below said plane during said passage. The arcuate bends 2′ and arcuate reverse bends 2‴ of said belts pass around and over and around and under opposite longitudinal halves of the cylinders. The cylinders and rolls are rotatably mounted in a fixed frame 9, gears 7 being provided for rotating the cylinders in opposite directions, said belts being driven in opposite directions by said cylinders. The above described machine provides means for continuously and simultaneously gripping the work sheet A fed between said belts at said plane, gripping and dragging said strips A′ between said belts and said cylinders along arcuate diverging paths and tearing the work

sheet along an unweakened line of straight direction into said strips.

Said belts 2 are capable of having their inner edges spaced apart varying distances where they are approximated at said plane for varying the breadths and softness of the soft edges of said strips resulting from said tearing.

The soft edges of said strips shown as straight may be slightly scalloped, resulting from the inner edges of said belts being slightly scalloped, this feature being not shown. Winding rollers, not shown, may be provided upon which said strips A′ may be wound.

The soft cushioned torn edges B of said strips A′ resulting from said tearing are beveled at B′ upon one side thereof as shown in Fig. 5, and may be provided with the thin superficial coating of water repellent reinforcing material upon their non-beveled sides shown in said Fleming patents but not shown herein.

Obviously there may be more than two of the endless belts 2 for the purpose of tearing a sufficiently wide work sheet A into more than two of the strips A′, in which case the cylinders 1 will be long enough to carry more than two of said belts.

Means are provided for taking up slack in the endless belts 2 comprising arms 10 mounted upon transverse shafts 11 of the fixed frame and in the upper ends of which said rolls 4 are rotatably mounted, screws 12 having threaded engagement with lugs of the fixed frame bearing against the upper ends of said arms to adjust them pivotally upon said shafts, said arms having lower bifurcated ends 13 with which screws 14 have threaded engagement to tighten said arms upon said shafts. Said rolls 4 shown as indirectly mounted upon the fixed frame through the medium of said arms 10, may obviously be directly rotatably mounted upon the fixed frame, in which case said means for taking up slack in said belts 4 by pivotal arms 10 would be omitted.

Means are provided for taking up slack in the work sheet A as it is fed between said belts, comprising upper and lower rollers 6 and 5 between which the work sheet is fed, and arms 8 pivoted at 8′ upon the fixed frame and in the outer ends of which said upper roller is mounted, said upper roller resting by gravity upon the lower roller, the gears 7 for rotating said cylinders having driving connection with said lower roller by gears 7′, whereby said cylinders are rotated at a speed faster than that of said lower roller.

I claim:

1. A machine for tearing a work sheet into parallel strips, comprising two parallel longitudinally approximated cylinders slightly spaced apart from each other, two parallel longitudinally spaced rolls widely spaced apart from each other and parallel to said cylinders, said cylinders and said rolls being located in parallel horizontal planes, two endless belts each passing around and over the cylinder farthest from the related roll, thence around and under the other cylinder to and around the related roll, said cylinders being each at least as long as the combined widths of the belts, said belts having their inner edges slightly spaced apart and approximated in the plane passing through the axes of said cylinders and crossing each other immediately below said plane during said passage, a fixed frame in which said cylinders and said rolls are rotatably mounted and means for rotating said cylinders in opposite directions, said belts being driven in opposite directions by said cylinders.

2. A machine for tearing a work sheet into parallel strips, comprising two parallel longitudinally approximated cylinders slightly spaced apart from each other, two parallel longitudinally spaced rolls widely spaced apart from each other and parallel to said cylinders, said cylinders and said rolls being located in parallel horizontal

planes, two endless belts, said cylinders being each at least as long as the combined widths of the belts, said belts having arcuate bends passing around and over said cylinders along arcuate converging paths and having their inner edges slightly spaced apart and approximated in the plane passing through the axes of said cylinders and having arcuate reverse bends passing around and under the cylinders along arcuate diverging paths and thence around rolls, each belt around and over the cylinder farthest from the related roll, said belts crossing each other immediately below said plane during said passage, a fixed frame in which said cylinders and said rolls are rotatably mounted and means for rotating said cylinders in opposite directions, said belts being driven in opposite directions by said cylinders.

3. A machine for tearing a work sheet into parallel strips, comprising two parallel longitudinally approximated cylinders slightly spaced apart from each other, two parallel longitudinally spaced rolls widely spaced apart from each other and parallel to said cylinders, said cylinders and said rolls being located in parallel horizontal planes, said rolls being of less diameter than that of said cylinders, two endless belts, said cylinders being each at least as long as the combined widths of the belts, said belts having arcuate bends passing around and over the cylinders for more than 180 degrees along arcuate converging paths and having their inner edges slightly spaced apart and approximated in the plane passing through the axes of said cylinders and having arcuate reverse bends passing around and under the cylinders for less than 180 degrees along arcuate diverging paths and thence around said rolls, each belt around and over the cylinder farthest from the related roll, said belts crossing each other immediately below said plane during said passage, a fixed frame in which said cylinders and said rolls are rotatably mounted and means for rotating said cylinders in opposite directions, said belts being driven in opposite directions by said cylinders, thereby providing means for continuously and simultaneously gripping the work sheet fed between said belts at said plane, gripping and dragging said strips between said belts and said cylinders along arcuate diverging paths and tearing the work sheet along an unweakened line of straight direction into said strips.

4. A machine for tearing a work sheet into parallel strips, as defined in claim 1, in which said belts are capable of having their inner edges spaced apart varying distances where they are approximated to vary the breadths and softness of the soft edges of said strips resulting from said tearing.

5. A machine for tearing a work sheet into parallel strips as defined in claim 1, in which means are provided for taking up slack in said belts comprising pivotal arms mounted at their lower ends upon shafts of the fixed frame and in the upper ends of which said rolls are rotatably mounted, screws having threaded engagement with lugs of the fixed frame and bearing against the upper ends of said arms for adjusting said arms pivotally upon said shafts, said arms having bifurcated lower ends, and screws having threaded engagement with said bifurcated ends for tightening said arms upon said shafts and securing said pivotal adjustment.

6. A machine for tearing a work sheet into parallel strips, as defined in claim 1, in which means are provided for taking up slack in the work sheet fed between said belts, comprising upper and lower rollers between which the work sheet is fed, arms pivoted upon the fixed frame and in the outer ends of which said upper roller is mounted rotatably, said upper roller resting by gravity upon the lower roller, said means for rotating said cylinders having driving connection with said lower roller and being adapted to rotate said cylinders at a speed faster than that of said lower roller.

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