

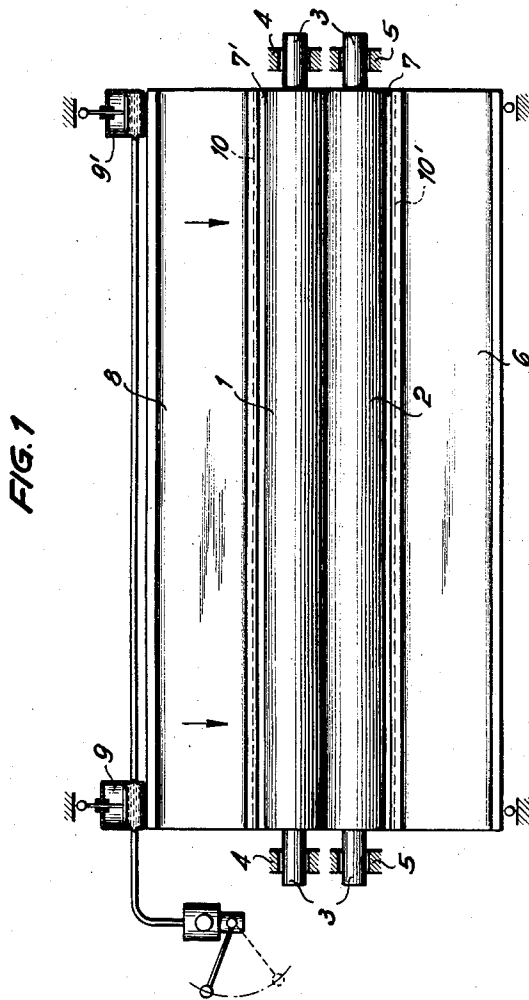
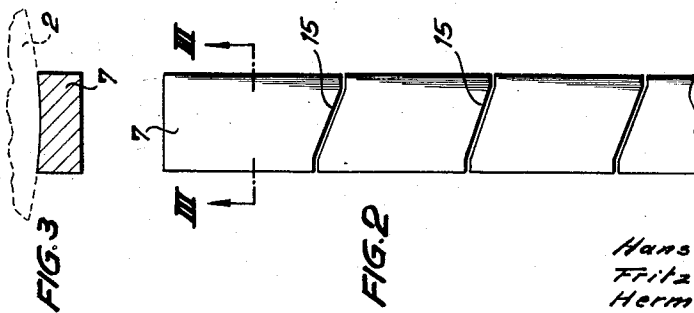
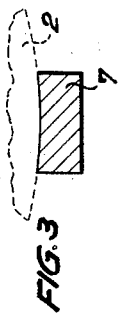
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H. A. CASPARI ET AL
ROLLER EQUIPMENT

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4 Sheets-Sheet 1



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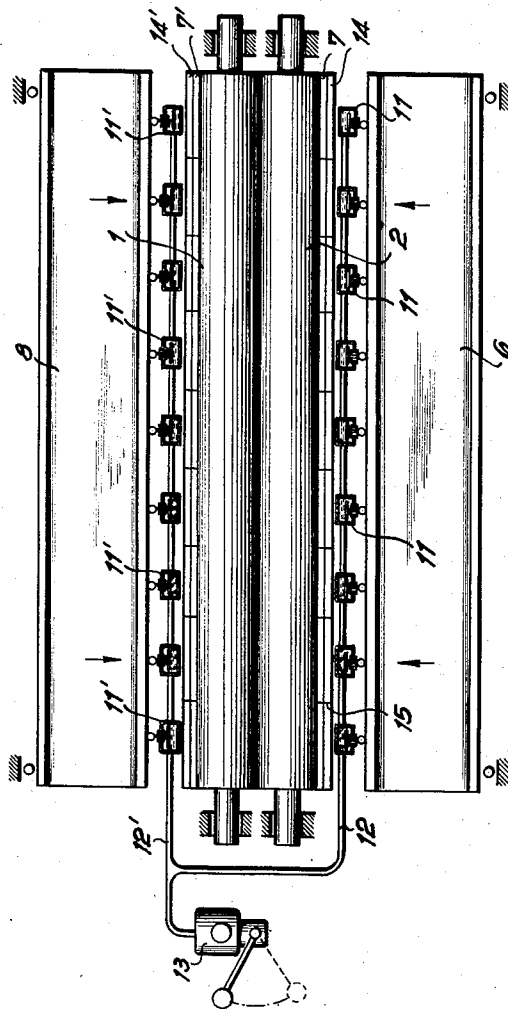
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FIG. 4



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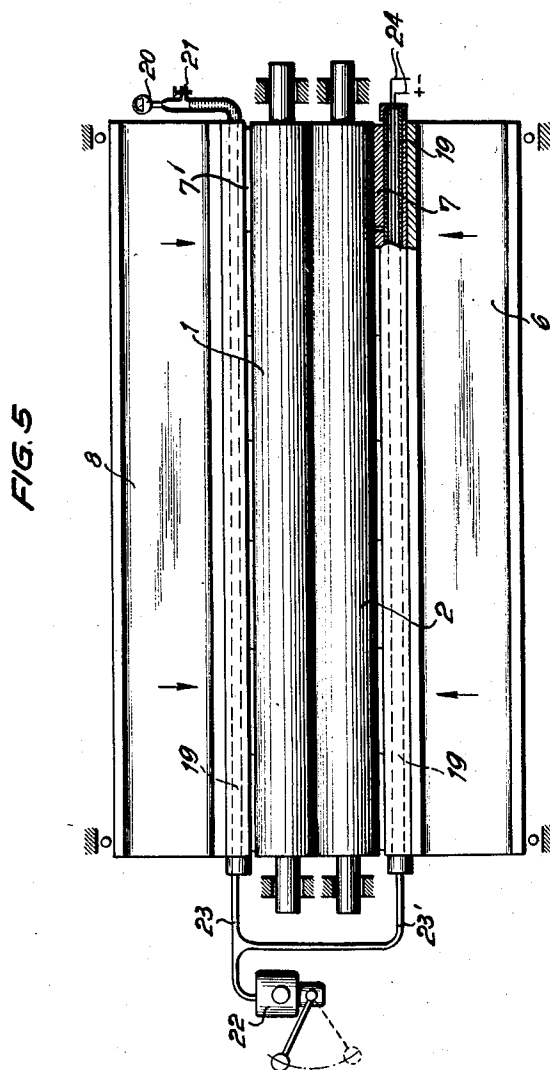
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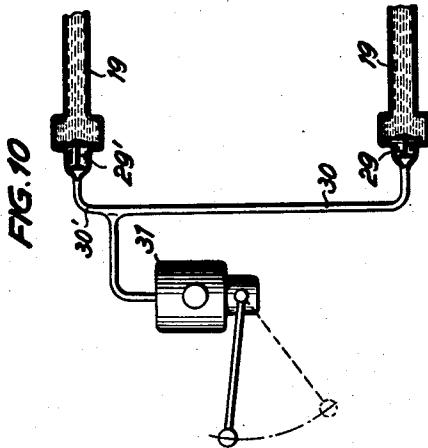
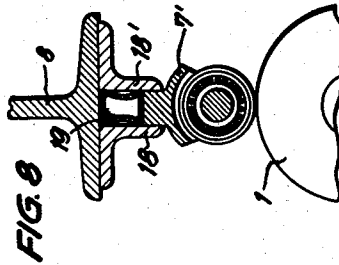
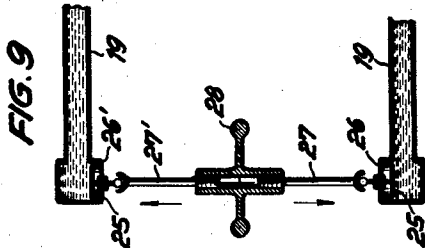
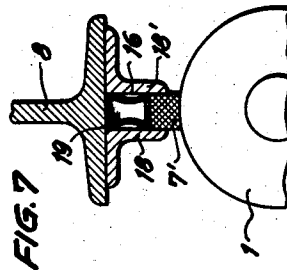
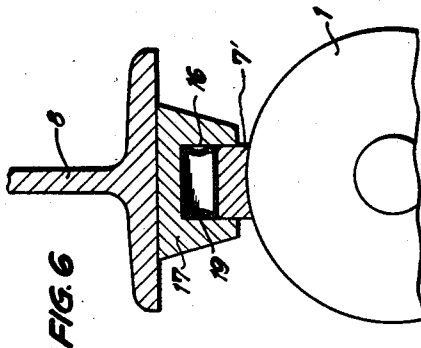
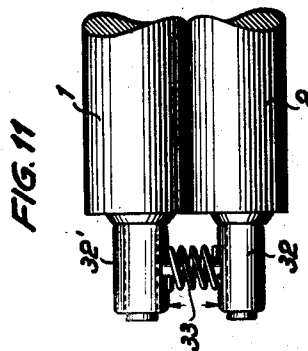
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ROLLER EQUIPMENT

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4 Sheets-Sheet 4



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2,854,700

ROLLER EQUIPMENT

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Application March 30, 1953, Serial No. 345,366

Claims priority, application Germany May 8, 1952

7 Claims. (Cl. 19—65)

The invention relates to a roller device and is a further improvement of our co-pending application Ser. No. 339,654 filed March 2, 1953 and now abandoned and directed to a roller mechanism for crushing impurities in card webs.

The problem of equal pressure distribution over the length of the rollers of a roller device was solved according to said co-pending patent application by supporting each working roller by at least one pressure-loaded beam preferably of the same strength of material, the supporting beam being in engagement with the working roller through a pressure transmitting member of the same length as the latter.

In order to compensate for unavoidable constructional inaccuracies and theoretically possible sagging of the thrust beam, which might influence the true parallelism of the working rolls during operation, it is proposed to provide hydraulically controllable means for acting through shoe means upon the working rolls.

According to a preferred form of the invention, a resilient hollow body is inserted, in a longitudinal direction, between pressure conveying shoe means and a supporting beam of a frame. This resilient body is alterable in shape by means of adjustable inside pressure. Advantageously the shoe means is divided up to separate sections.

The hollow body itself consist of tubing closed at one end and formed from rubber, synthetic rubber, resilient synthetic material or thin-walled yieldable sheet metal, and has with advantage at the closed end pressure controlling devices, the supply arrangement for the pressure medium being at the open end. The pressure control devices can, however, also be provided directly adjacent the supply system.

According to a further form of the invention, an electric heating device may be introduced into the flexible hollow body, in order to obtain in a simple manner a heating of the pressure transmission member, and through this of the working rollers, when the material being operated on requires heat treatment. When using a plurality of fluid pressure controllable members between a supporting beam and the adjacent shoe means, it is advantageous to connect together the several fluid pressure conveying means of communicating pipes.

It is, however, also possible, for example, to give to the lower pressure transmission member a definite pressure and to close the same, and only to impart the desired working pressure to the upper pressure transmission member, using the lower transmission member as an elastic or resilient pad or cushion.

In order to ensure that the working rollers separate from one another on a reduction or cutting off of the elastic pressure, the bearings of the working rollers may be resiliently connected.

Some ways of carrying out the invention are shown, schematically and by way of example, by the accompanying drawings.

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Figure 1 is a front view of a roller device according to the invention.

Figure 2 is a plan view of a pressure transmission member divided throughout its length.

Figure 3 is a section on the line III—III, Figure 2.

Figure 4 shows a front view of a different form of roller device.

Figure 5 represents a front view of a further form of the invention.

Figure 6 shows a detail of Figure 5 in cross-section.

Figure 7 is a cross-section through another form of pressure transmission member.

Figure 8 shows a cross-section through a further form of pressure transmission member.

Figure 9 represents schematically the supply of a pressure medium to the pressure transmission member.

Figure 10 is a further possible way of supplying the pressure medium according to Figure 9.

Figure 11 shows the bearing arrangement of the working rollers according to the invention.

Like references indicate the same parts in the figures.

Similar to the arrangement of our co-pending patent application Ser. No. 339,654 and now abandoned, the working rolls 1, 2, with their trunnions 3, are rotatably mounted in suitable plain or roller bearings 4, 5, which are adjustably mounted, one above the other, in side members (not shown) of the frame of the roller device, so that they are placed under load. The lower ends of the side members of the frame are flexibly or rigidly connected together by means of a beam 6 of substantially the same strength throughout its length. Between the working roller 2 and the supporting beam 6 is provided the pressure transmission member 7, which, according to the invention, consists of a material whose elastic modulus is smaller than the elastic modulus of the material of the working roller 2 and of the supporting beam 6. Against the working roller 1 presses from above the supporting beam 8 on which the required bearing pressure operates by way of example by means of interconnected cylinders 9, 9'. The supporting beam 8 is slidable in the side frame members (not shown) in a vertical direction. Also, between the beam 8 and the working roller 1 is provided a flexible or expansible pressure transmission member 7', formed in the same manner as the already mentioned pressure transmission member 7. Suitable elastic materials are plastic, bronze or the like, whose moduli of elasticity must comply with the above mentioned conditions. It is obvious that the elastic formation of the pressure transmission members 7, 7' must be such as to compensate for any structural inaccuracies and theoretically possible sagging of the supporting beams 6, 8, and the respective pressure transmission members 7, 7' are, for example, individual hydraulic cylinders 11, 11', which are connected by communicating conduits 12, 12' with the supply arrangement, for example a pump 13, for the pressure medium. Between the pressure transmission members 7, 7' and the pressure devices 11, 11' intermediate members 14, 14', in the form of bars or strips may be provided in addition. To obtain as far as possible an individualized pressure action on the pressure transmission members 7, 7' it is advantageous to divide up the pressure transmission members in the longitudinal direction, as at

15 in Figure 4. The divisions 15 are disposed obliquely, with regard to the rotation of the working rollers, as shown in Figure 2. A theoretically and practically completely equalised pressure distribution on the working rollers 1, 2 is obtained, if, in the preferred arrangement according to Figure 5, flexible hollow bodies, for example tubes or pipes of rubber or thin-walled metal, which alter in shape according to the pressure prevailing in them, are provided between the supporting beams 6, 8 and the pressure transmission members 7, 7'.

With reference to Figs. 6 and 8, it may be stated that while the pressure means is shown in these figures for the top roll 1, only, it is to be understood that the pressure means is duplicated for the bottom roll 2. As shown in Figures 6 to 8, a closed chamber 16 is provided on the supporting beam 8, which chamber may be formed either from a single profiled bar 17 (Fig. 6) or from two profiled bars 18, 18' (Figs. 7 and 8), and in which is displaceable in a vertical direction the pressure transmission member 7'. The transmission member 7' may be formed either as a sliding bar (Figure 6 and Figure 7) or as a rolling body (Figure 8). Inside the chamber 16 is the flexible pipe or tubular hollow body 19 which extends for the full length of the working roller 1 (Figure 5). The hollow body 19 in the form shown in Figure 5 is closed at the right-hand end and there is provided with pressure control devices, namely a pressure gauge 20 and a regulating valve 21, by the help of which the filling and pressure of the pressure medium in the hollow body 19 may be controlled and watched. The pressure medium is here supplied to the hollow body 19, for example from the other (left) side, through the communicating passages 23, 23' from a supply apparatus, for example a pump 22. If desired, the hollow body 19 may be tempered or heated by means of an electrical heating arrangement 24 (Fig. 5) fitted in the hollow body preferably at its closed end, in such a manner that a desired temperature is communicated to the pressure transmission member 7'. This arrangement is shown in Figure 5 on the supporting beam 6.

The arrangements for the supply of pressure medium to the hollow body 19 may also take other forms. According to Figure 9, the pistons 25 of hydraulic cylinders 26, 26' are connected mechanically with screwthreads of opposite hand, so that rotation of the hand-wheel 28 varies the pressure of the pressure media in the upper and lower hollow bodies 19 simultaneously in conformity with the direction in which and to the extent to which the hand wheel 28 is turned.

In the arrangement according to Figure 10, check valves 29, 29' are provided at the open ends of the hollow bodies 19. The hollow bodies 19 are adapted to communicate with the supply pump 31 for the pressure medium through the communicating passages 30, 30'. The desired pressure in the hollow bodies 19 may, with this arrangement, be easily obtained. Among other things the check valve 29 may be so adjusted that the respective hollow body 19 will only take a predetermined pressure and will then close, whilst the desired working pressure is communicated to the working rollers through the check valve 29'.

In order to make certain that the working rollers 1, 2 follow up a desired pressure reduction in the pressure transmitting members 7, 7', the bearings 32, 32' of the working rollers are interconnected by a spring 33 (Fig. 11). If the pressure in the pressure transmission members 7, 7' alters, the spring 33 ensures that the working rollers are separated from one another by the required distance.

Flexible pressure transmitting members of the kind described give a sensitive adjustment in such a manner that the load is spread evenly over the entire length of the working rollers and any deviations from the parallel positions of the working rollers, due to the load or other

circumstances, are compensated for. This has the result that the supporting beams 6, 8 may be of a lighter construction, because theoretically large deflections are permissible and also large manufacturing tolerances may be allowed. In this case one may connect both supporting beams 6, 8, either movably with the frame walls of the roller device, or rigidly thereto so that a vertical slide-guide for the upper supporting beam is no longer necessary.

10 We claim:

1. In a web squeezer for crushing impurities in card webs comprising: a pair of rotatable work rolls mounted in parallel relationship for movement toward each other for squeezing a card web between them and means for urging said rolls toward each other, said urging means comprising shoe means extending axially along each of said rolls on the sides outwardly from the mutually contiguous sides thereof and adapted to bear thereagainst, a beam outwardly from and generally parallel to each shoe means, housing means respectively fixed to each of said beams and including guiding means slidably guiding said shoe means, said housing means respectively confining with the respective adjacent shoe means a longitudinal chamber with three fixed longitudinal sides and one movable longitudinal side formed by the adjacent shoe means, and a flexible hollow member mounted in said longitudinal chamber between each beam and its associated shoe means, and being expansible by pressure fluid to force said shoe means away from said beam and against its associated roll, the shoe means, the beams, the housing means, and the hollow members being substantially co-extensive with the working length of said rolls whereby the forces thereby exerted on said rolls are uniformly distributed along the working length thereof.

2. A web squeezer according to claim 1, which includes electric heating means mounted within said flexible hollow member and arranged for connection with an electric source outside said hollow member.

3. A web squeezer according to claim 1, in which said shoe means includes a roller contacting the adjacent roll.

4. A web squeezer according to claim 1, in which the flexible hollow member consists of a hose of elastic material.

5. A web squeezer for crushing impurities in card webs, which comprises: a pair of rotatable work rolls mounted in parallel relationship for movement toward each other for squeezing a card web between them and means for urging said rolls toward each other, said urging means comprising shoe means extending axially along each of said rolls on the sides outwardly from the mutually contiguous sides thereof and adapted to bear thereagainst, each of said shoe means comprising a plurality of aligned shoe segments, a beam outwardly from and generally parallel to each shoe means, housing means respectively fixed to each of said beams and including guiding means slidably guiding said shoe means, said housing means respectively confining with the respective adjacent shoe means a longitudinal chamber with three fixed longitudinal sides and one movable longitudinal side formed by the adjacent shoe means, and a flexible hollow member mounted in said longitudinal chamber between each beam and its associated shoe means and being expansible by pressure fluid to force said shoe means away from said beam and against its associated roll, the shoe means, the beams, the housing means and the hollow members being substantially coextensive with the working length of said rolls whereby the forces thereby exerted on said rolls are uniformly distributed along the working length thereof.

6. In a web squeezer for crushing impurities in card webs, the combination of: a pair of rotatable work rolls mounted in parallel relationship for movement toward each other for squeezing a card web between them and means for urging said rolls toward each other, said

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urging means comprising shoe means extending axially along each of said rolls on the sides outwardly from the mutually contiguous sides thereof and adapted to bear thereagainst, a beam outwardly from and generally parallel to each shoe means, fluid expansible means mounted between each beam and its associated shoe means for forcing said shoe means away from said beam and against its associated roll, the shoe means, the beams, and said fluid expansible means extending substantially over the entire working length of said rolls whereby the forces thereby exerted on said rolls are uniformly distributed along the working length thereof.

7. A web squeezer according to claim 6, which includes a pressure fluid source common to said fluid expansible means, and conduit means arranged for connecting said pressure fluid source with each of said fluid expansible means.

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