P. BOZZO.

MACHINE FOR CUTTING CARDBOARD STRIPS FOR MAKING MATCHES.

APPLICATION FILED MAR. 28, 1921.

1,395,473.

Patented Nov. 1, 1921.

3 SHEETS—SHEET 1.

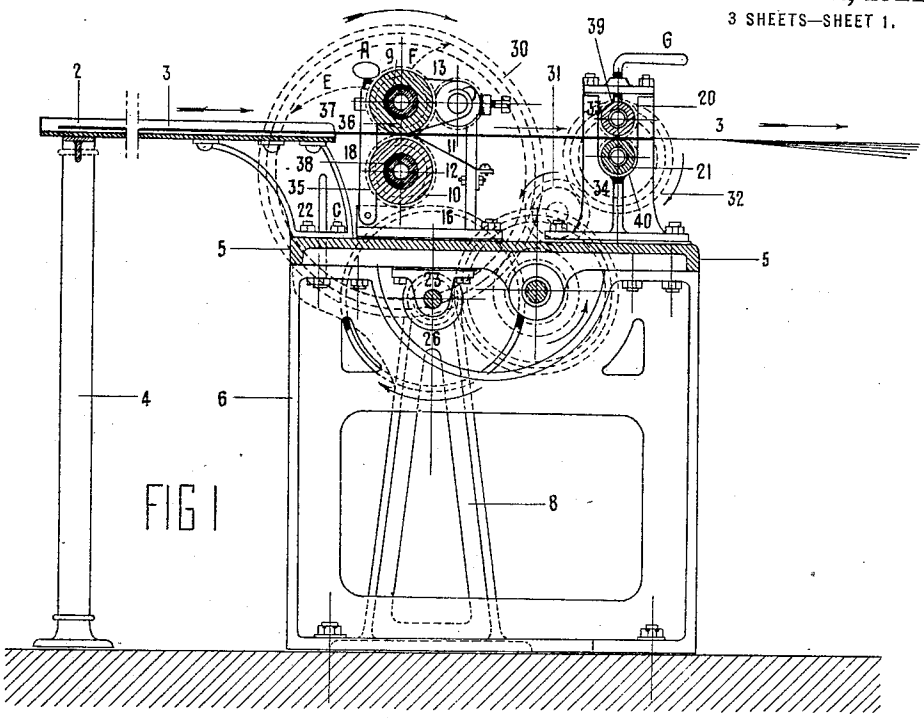


FIG 1

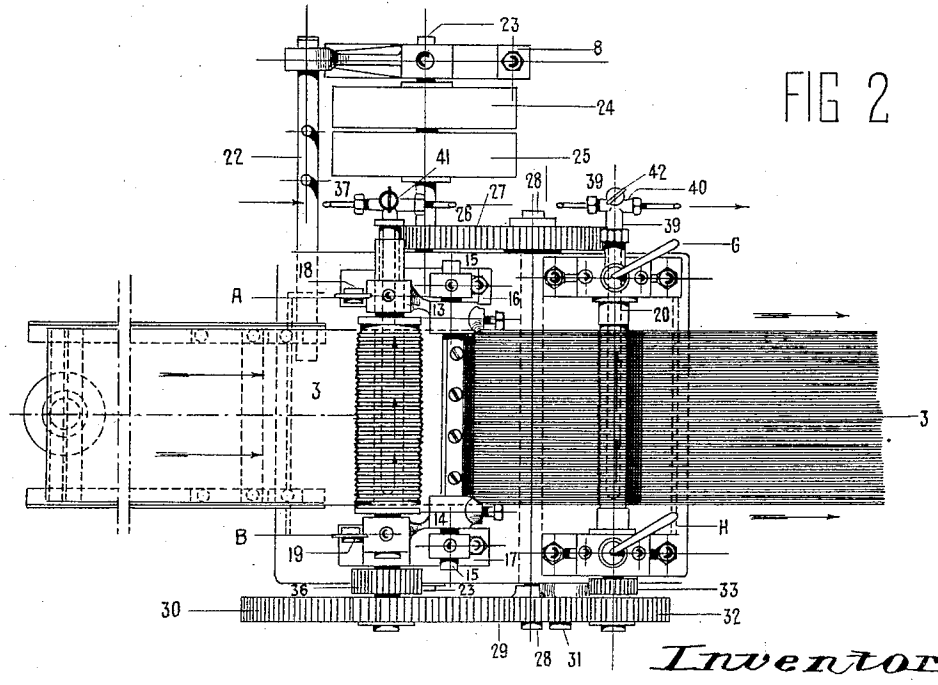


FIG 2

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3 SHEETS—SHEET 2.

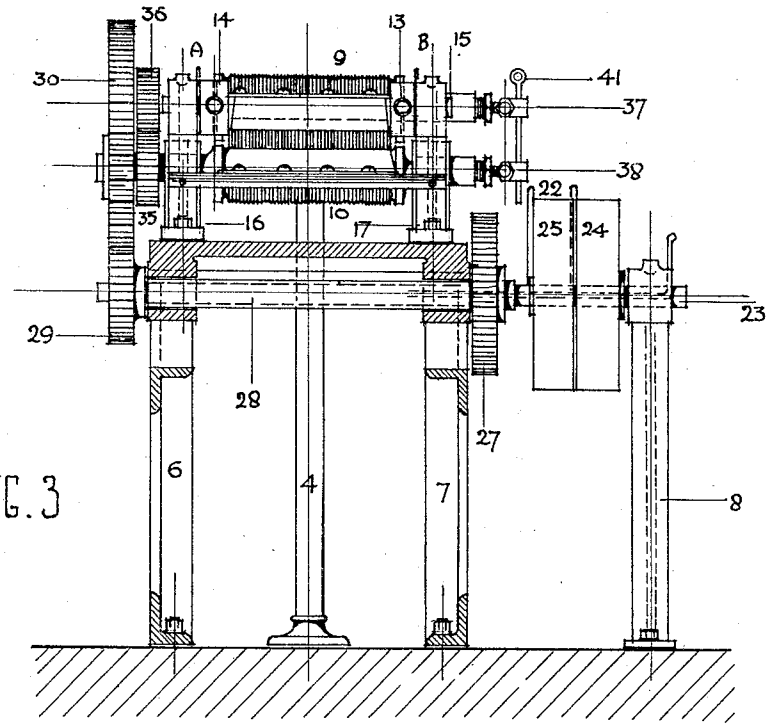


FIG. 3

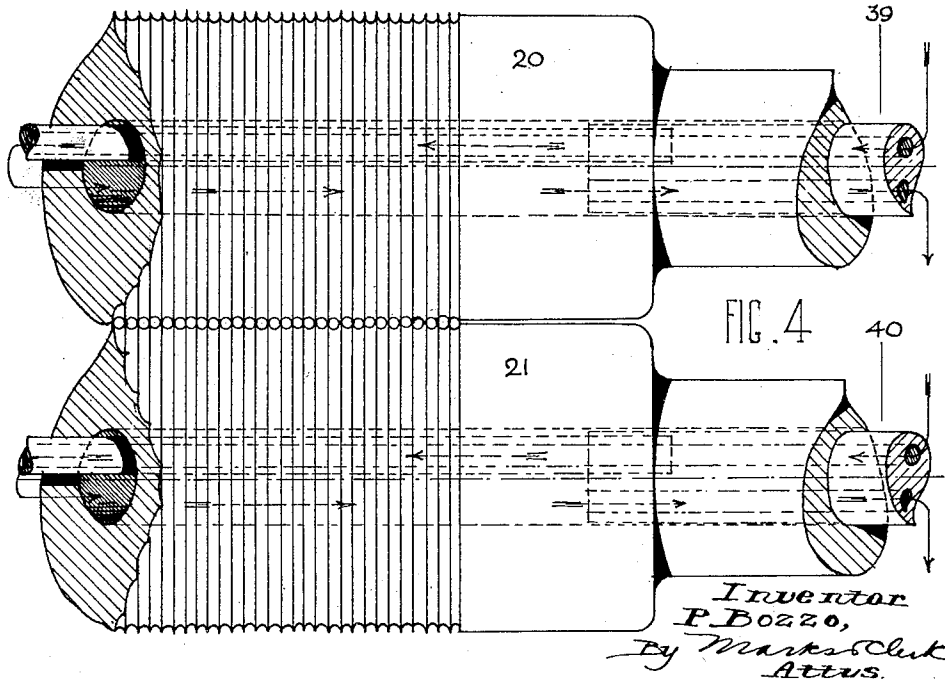


FIG. 4

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3 SHEETS—SHEET 3.

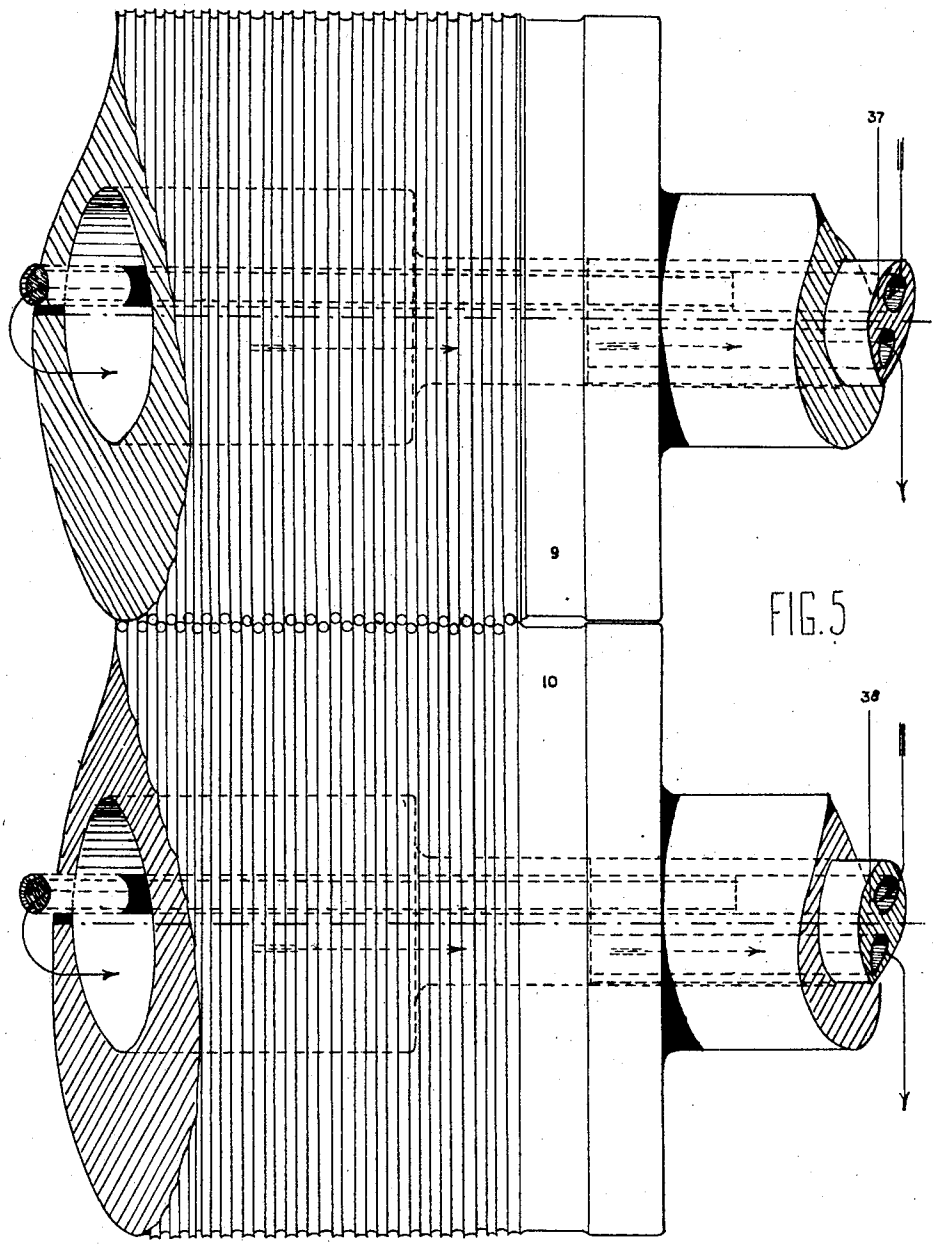


FIG. 5

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UNITED STATES PATENT OFFICE.

PEDRO BOZZO, OF BUENOS AIRES, ARGENTINA.

MACHINE FOR CUTTING CARDBOARD STRIPS FOR MAKING MATCHES.

1,395,473. Specification of Letters Patent. Patented Nov. 1, 1921.

Application filed March 28, 1921. Serial No. 456,069.

To all whom it may concern:

Be it known that I, PEDRO BOZZO, citizen of the Argentine Republic, and resident of Buenos Aires, Argentine Republic, have invented certain new and useful Improvements in a Machine for Cutting Cardboard Strips for Making Matches, of which the following is a specification.

This invention relates to improvements in the combination of mechanical devices forming a machine adapted to produce in a single operation strips of cardboard or like material finished in such a form as to be suitable for the manufacture of matches.

The object of my invention is to provide a machine of greater efficiency and simpler construction than those known heretofore, since by the use of the machine of my invention the entire cycle of operations necessary for finishing the strips is accomplished by passing the sheets of cardboard or the like once only between the cylinders; that is to say: the sheets are fed between the principal cutting cylinders, and the latter, being provided with special ribs and grooves, divide the sheet into strips which are gradually pressed into the grooves, the cylinders being heated, preferably by steam, so that the plasticity of the strips is increased, permitting them to take the exact form of the grooves or molds into which they are compressed. The natural tendency of the strips being then to adhere to and remain in the grooves, and thus to continue following the rotary movement of the cylinders, I provide certain toothed strips which I call "combs", the teeth of which penetrate into the grooves and remove the strips therefrom, after which they pass between another set of straightening and polishing cylinders provided with similar grooves for that purpose.

In the accompanying drawings, representing a machine embodying the characteristics of my invention in a preferred form:

Figure 1 is a sectional side elevation of the machine;

Fig. 2 is a plan view of the same;

Fig. 3 is a sectional front elevation of the same;

Fig. 4 is a life size fragmentary view of the second pair of cylinders; and

Fig. 5 is a life size view of the first pair of cylinders, shown in section.

With reference to the said drawings, the reference figure 2 indicates the guides for the cardboard; 3 the cardboard ready for cutting; 4 the column which supports the guides 2; 5 the table of the machine; 6 and 7 supports for the table 5; 8 bearings of the shaft 23; 9 and 10 the first cylinders (see Fig. 5) which cut the cardboard in strips; 11 and 12 the combs for disengaging the strips from the grooves of cylinders 9 and 10; 13, 14 and 15, links and shaft forming the bearing for the cylinder 9; 16 and 17 bearings for the first cylinder and the shaft 15; 18 and 19, bent plates which sustain the links 13 and 14 to tighten the cylinder 9 against the cylinder 10 with the screws A and B which have their centers at C and D and open in the direction of the arrow E, while the cylinder 9 is lifted in the direction of the arrow F having its center at 15.

20 and 21 are strip rectifying cylinders, which are pressed together by the handles G and H. 22 is a belt shifter; 23, 24, 25 and 26 are loose and fixed pulleys with their shafts and gearing; 27 a gearing fixed on shaft 28 which receives its movement from the pulley 26; 28 is the shaft for the gearings 27 and 29; 29 the gearing of shaft 28; 30 the gearing placed on the cylinder 10; 31 the intermediate gearing between 30 and 32; 32 the gearing placed on cylinder 21.

Numbers 33 and 34 represent two gearings which unite in movement the cylinders 20 and 21; and 35 and 36 two gearings which unite in movement the cylinders 9 and 10.

Nos. 37, 38, 39 and 40 are the four inlet and outlet T's for heating steam to the cylinders, the direction of flow being indicated by arrows; 41 is a key passing through the T's 37 and 38 to prevent them from turning, and 42 a similar key for the T's 39 and 40.

Operation: As seen in Figs. 1 and 2, the cardboard is fed to the machine by the guide 2 and is introduced between the steam heated cylinders 9 and 10 which are grooved and ribbed alternately, the protruding ribs and the bottoms of the corresponding grooves being concaved, so that the ribs of one cylinder enter into grooves of the other, and vice versa, forming between them circular spaces at the point of contact of the two, into which spaces the strips of cardboard cut by the shearing action of the ribs

and grooves are pressed and formed into circular cross section, being afterward removed from the grooves by the action of the teeth of the "comb" plates 11 and 12 adjusted to the grooves. The strips then pass to the second set of cylinders 20 and 21 (Fig. 4) which are steam heated and have a higher peripheral velocity, from which the strips emerge straightened and polished.

It will be understood that the apparatus described represents a preferred embodiment of my invention, which may be modified as regards small details, as frequently occurs in practice, without departing from the spirit of the invention, as set forth in the appended claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States, is:—

1. A machine for cutting cardboard strips or the like for the manufacture of matches, consisting of a frame mounted on standards, a table arranged in continuation of the frame and provided with guides for feeding the sheets of cardboard to the machine, two grooved ribbed cylinders so arranged that alternately ribs of each cylinder extend into the grooves of the other cylinder, said grooves covering the entire surface of the cylinders and each extending entirely around the circumference of its respective cylinder, and "combs" so placed as to extend into the grooves of each cylinder, there being a comb for each cylinder.

2. A machine for cutting strips for the manufacture of matches or the like comprising a frame, a table arranged on said frame and provided with guides for feeding the sheets of cardboard to the machine, two cylinders provided with circumferentially arranged ribs and grooves, the ribs of each cylinder extending into the grooves of the other cylinder, the outer faces of the protruding ribs being convexed, the bottoms of the grooves being oppositely convexed, the ribs contacting with the walls of the grooves to provide shearing edges, combs placed above and below the plane of contact of the two cylinders, the teeth of which combs extend into the grooves of each respective cylinder and said teeth having their ends formed to correspond with the bottoms of the grooves into which they penetrate.

3. In a machine for making match strips or the like, two cylinders provided with grooves and ribs alternately placed and extending entirely around the circumference of the said cylinders, one cylinder being placed so as to face the other cylinder, the ribs of each cylinder entering into the grooves of the opposite cylinder to provide cutting edges having teeth extending into the grooves of each cylinder, and controlling means for adjusting the pressure at the point of contact between the cylinders.

4. In a machine for making match strips and the like, a plurality of superposed rollers each having a series of circumferentially arranged ribs and a series of circumferentially arranged grooves, each groove being arranged between two ribs, the ribs of each roller extending into the grooves of the other roller to provide cutting edges, each rib being also grooved, and means for rotating said rollers.

5. A machine of the kind defined by claim 4 having means for heating the rollers.

6. A machine of the kind defined by claim 4 in which each roller is provided with an interior chamber, and means for introducing a heating fluid into said chambers and for discharging the fluid from said chambers.

7. A machine of the kind defined by claim 4 including a pair of polishing and straightening rollers having grooves alined with the grooves of the first mentioned rollers, and means for rotating said polishing and straightening rollers at a greater speed than the first mentioned rollers.

8. A machine of the kind defined by claim 4 including means to facilitate the feeding of a sheet of material between said rollers, and a pair of straightening and polishing rollers arranged rearwardly of the first mentioned rollers, and means for driving the polishing and straightening rollers at a higher speed than the first mentioned rollers.

9. A machine for making match strips and the like comprising a pair of superposed heated rollers, each provided with a series of circular grooves and a series of circular ribs, the ribs of each roller projecting into the grooves of the other roller, each rib being provided with a circular groove, means to facilitate the feeding of a sheet between said rollers, combs coöperating with said rollers and having teeth which project into said grooves for preventing strips cut by said rollers from adhering to the rollers, a pair of straightening and polishing rollers arranged inwardly of the first mentioned rollers and having grooves alined with the grooves of the first mentioned rollers, means for rotating the first mentioned rollers and means for driving the polishing and straightening rollers at a higher speed than the first mentioned rollers.

Signed at Buenos Aires, Argentine Republic, this 22nd day of February, A. D. 1921.

PEDRO BOZZO.

Witnesses:
BLÁT BOLT,
H. H. GOLIST.