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MEANS FOR PRODUCING FLINT RODS

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2 Sheets-Sheet 1

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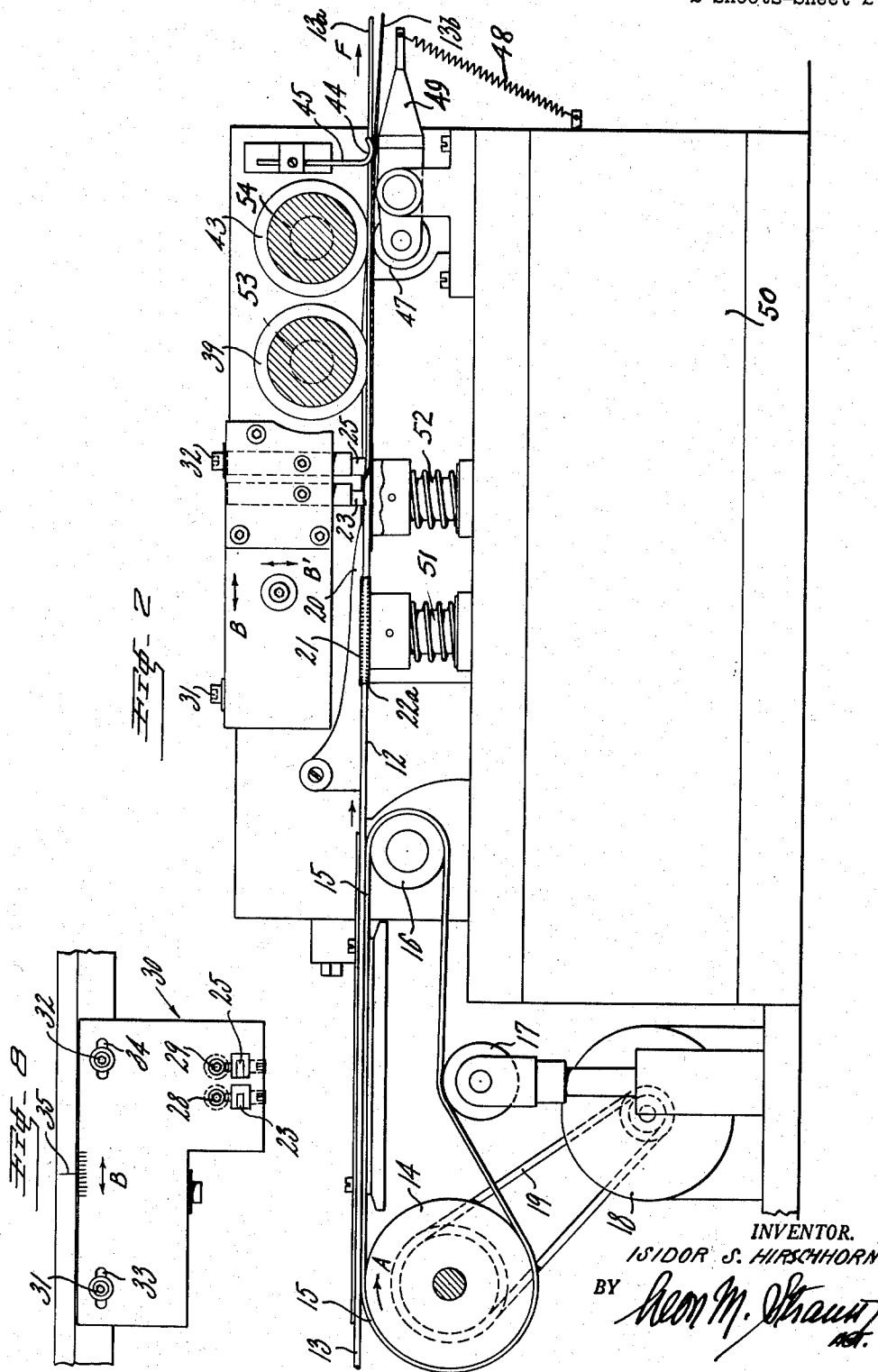
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MEANS FOR PRODUCING FLINT RODS

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This invention relates to the manufacture of flints in rod formation.

It is well known to cast flint metal in tubular containers and to open these tubular containers thereafter in order to obtain access to the flint rod enveloped by the tubular container. Many disadvantages were observed when tubular containers were used which had overlapping walls which contributed to a flint rod formation which was not round and sometimes unsuitable for use in pocket and other lighters.

Attempts have also been made to cast flint rods in seamless tubular containers. However, difficulties arose in removing the envelope forming tubular container from the core forming the flint rod proper.

The present invention has, therefore, as one of its objects to provide means facilitating a speedy removal of seamless envelopes from cast flint rods without damaging or otherwise affecting the same in regard to the surface diameter and shape.

It is another object of the present invention to provide means affording the adjustment of tools acting on the enveloped cast flint rod relative to the thickness of the tubular container in order to achieve a speedy and frictionless separation of the seamless tubular container from the flint rod material.

It is still another object of the present invention to provide means conducive to positively directing and guiding the tubular container enclosing the flint rod toward cutting, spreading and separating tools, whereby the flint rod will be completely removed from its container which latter is deviated from the flint rod in substantially flat condition.

The above and other objects of the invention will become further apparent from the following detailed description, reference being made to the accompanying drawings showing a preferred embodiment of the invention.

In the drawings:

Fig. 1 is a top plan view of a machine for separating cast flint rods from their envelopes;

Fig. 2 is a side elevational view of the machine shown in Fig. 1;

Figs. 3 to 7 illustrate various separation stages in the manufacture of flint rods shown in section, the sections being taken along lines 3—3, 4—4, 5—5, 6—6 and 7—7, respectively, of Fig. 1;

Fig. 8 is a top plan view of a detail of the machine seen in Fig. 1.

While there is shown and described herein certain specific structure embodying the invention, it will be manifest to those skilled in the art that various modifications and rearrangements of the parts may be made without departing from the scope of the invention, and that the same is not limited to the particular form herein shown and described, except in so far as indicated by the appended claims.

Referring now more in greater detail to the machine

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of Figs. 1 and 2, there is shown a machine 10 having a bed 11 with a central guide slot 12 along which a length 13 of flint rod enclosed in its seamless envelope may be advanced by means of a friction belt 15 driven by wheel 14 over which it is trained to run from the latter below guideway or slot 12 over wheel 16 back to wheel 14 and a tension wheel 17. Wheel 14 is driven by means of a transmission belt 19 from motor 18, whereby wheel 14 is rotating in the direction of arrow A.

On the machine and forwardly of bed 11 is arranged a guide finger 20 swivelly supported at 20a which depresses the enveloped flint rod 13 into the guideway 12, while said rod is impelled through belt 15. Laterally of guideway 12 there are positioned a pair of first driving rollers 21, 22 which have suitably shaped or knurled peripheral faces 21a, 22a, whereby said rollers 21, 22 push the enveloped flint rod 13 against a knife 23 placed in the path of said rod. Knife or slitting tool 23 has a forward knife edge 24 which extends in the direction opposite to that of the movement of said enveloped flint rod 13. Further, provided directly behind knife 23 is a plow 25 provided with downwardly directed spreading round edges 26, 27.

It will be observed from Fig. 8 that slitting tool 23 and plow 25 are held in position by a clamping carriage 30 which is equipped with suitable screw adjustment means 28 and 29 to permit height adjustment of slitting tool or cutter 23 and plow 25, respectively, relative to the enveloped flint rod 13 as indicated by arrows B.

Carriage 30 is further adjustable in lengthwise direction to the guideway 12 by means of suitable adjustment screws 31 and 32 which engage elongated slots 33, 34, respectively, in order to facilitate lengthwise adjustment of carriage 30 relative to a marking 35 in the direction of arrows B. A second pair of drive wheels 36, 37 is arranged in order to positively grip enveloped flint rod 13 laterally and exteriorly when the same is pushed by wheels 21, 22 and held by guide finger 20 during movement against slitting knife edge 24 and plow 25.

As can be further seen from Fig. 3 the flint rod proper 13a has the seamless envelope 13b, the latter being slit by the sharp knife or cutter edge 24. Thereafter the envelope 13b is spread open by means of the rounded jaws 26 and 27, whereby the slit ends 13c and 13d of the envelope are outwardly moved in accordance with the arrows C.

Subsequent to such spreading of the envelope 13b the latter is then subjected to the action of a pair of spreading rollers 38, 39, whereby the conical ends 40, 41 thereof spread the aforesaid ends 13c, 13d in the direction of arrows D, as more clearly seen in Fig. 5. In the subsequent stage of separation of envelope 13b from the flint rod proper 13a, the envelope 13b is progressively then exposed to flattening rollers 42, 43, whereby the flint rod 13a is substantially but not completely separated from envelope 13b.

The freed flint rod 13a is then guided past a separation finger 45 having a curved forward shoe 44 which pushes envelope 13b away from freed flint rod 13a in the direction of arrow E while flint rod 13a is further moved in the direction of arrow F.

As indicated in Fig. 1 the spreading and flattening rollers 38, 39 and 42, 43 are driven through a suitable gearing 46.

Likewise the pairs of rollers 21, 22 and 36, 37 are driven by a motor (not shown) which is also operatively connected to gearing 46. This motor is accommodated in housing 50.

As can be further seen from Figs. 1 and 2 the pairs of rollers 21, 22 and 36, 37 extend on substantially vertical shafts 51, 52 whereas the pair of conically shaped rollers

38, 39 and flattening rollers 42, 43 are carried by horizontally extending shafts 53, 54.

Against the pair of flattening rollers 42, 43 abuts a roller 47 which is biased by spring means 48, which extends between a lever 49 and a fixed attachment on housing 50.

It will be further noted that instead of single flint rods enclosed in seamless containers or envelopes 13b a plurality of such enveloped alloyed rods may be fed simultaneously in juxtaposition through such a machine having rows of slitting tools and plows and that such rods may be automatically fed from a hopper onto guide ways 12 of bed 11 of the machine.

Generally the flint rods contained in the envelopes have a length of about 5 to 15 inches and the thickness of the envelope 13b is about .005 to .0010 of one inch, whereas the outer diameter of the finished and separated flint rod may range between 0.075 to 0.250 of one inch.

The flint rod 13a when discharged from the machine is distinguished from the conventional rods heretofore obtained, by its perfectly round cross section (Fig. 7) so that the flint rod may be readily and better controlled in regard to its effective diameter, as compared with flint rods which are cast in tubular containers closed through overlapping ends which always produce undesirable ridges or flashes on the finished flint rod.

It is further to be noted that the process and apparatus made in accordance with the present invention may also be used in the production of welding rods and similar alloyed products and that the seamless tubular container may consist of steel, stainless steel or copper tubing.

From the foregoing disclosure it may be readily realized that there has been provided in accordance with the aforesaid invention a substantially automatic process for the production of flint and like alloyed rods which during their manufacture are first cast or otherwise enveloped in a tubular, seamless container, which is then fed along a linear path during which said tubular container is forced against cutting means to slit said container which is subsequently gradually opened up until the opened container is flattened relative to the freed flint rod, from which the flattened container is finally diverted.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. A machine for separating the envelope from a flint rod cast in said envelope; comprising a horizontally extending housing, means for feeding and guiding said envelope with said flint rod in a linear path along said housing, a slitting tool, a plow positioned rearwardly of said slitting tool, a support for said slitting tool and said plow arranged along said path and above said housing, first roller means placed along said path and gripping said envelope exteriorly and laterally thereof to force said envelope against said slitting tool and thereafter to said plow, respective second roller means along said path for contacting the slitted ends of said envelope and bending same away from said rod and flattening said envelope, and means for separating said rod from said flattened envelope, said first roller means having axes extending perpendicular to said housing, said second roller means having axes directed parallel with respect to said housing.

2. A machine for separating the seamless tubular envelope from a flint rod which is cast in said envelope; comprising means displacing said envelope with said flint rod in a linear feed path, a slitting tool, a plow tool provided with downwardly directed side edges and positioned rearwardly of said slitting tool, a support for said slitting tool and said plow and located above said path, means on said support for adjusting the position of said tools relative to each other and to said envelope, whereby the position of said slitting tool is predetermined in accord-

ance with the thickness of said envelope, first roller means placed along and adjacent said path for gripping said envelope laterally and exteriorly thereof to force said envelope against said slitting tool and thereafter against said plow tool to thereby slit the uppermost portion of said envelope open and to subsequently bend the slitted ends of said envelope from above the latter in downward direction by means of said side edges of said plow tool, second roller means positioned adjacent said first roller means and along said path, said second roller means being profiled to facilitate displacing the slitted ends of said envelope away from said rod and to flatten said envelope, and means located in said linear path for diverting said flattened envelope from said flint rod.

3. A machine for separating a tubular container from a flint rod cast therein; comprising guide means directing said container with said flint rod along a linear feed path, a slitting tool, a plow tool positioned rearwardly of said slitting tool and along and above said linear path, a support including height adjustment means for said slitting tool and said plow tool to align said tools relative to the uppermost portion of the surface of said container and clear of said flint rod, first roller means placed adjacent said path and opposite said slitting tool for gripping said container exteriorly and laterally thereof and forcing same against said tools to cut said container along the uppermost generatrix and thereafter to open up said slitted container, second roller means positioned adjacent said plow tool for spreading the slitted ends of said container away from said rod to thereby progressively flatten said container, and means for separating said flattened container from said flint rod.

4. A machine for separating the seamless tubular envelope from a flint rod which is cast in said envelope; comprising a horizontally extending bed provided with linear guide means for displacing said envelope with said flint rod therealong, a slitting tool placed in said guide means, a plow tool provided with downwardly directed side edges for engaging said envelope in astride position with respect to said flint rod and arranged adjacent said slitting tool, a support for said slitting tool and said plow tool, means on said support for adjusting the position of said tools relative to each other and above and exteriorly of said envelope, first roller means adjacent said slitting tool for engaging said envelope laterally and exteriorly thereof and forcing same against said slitting tool and thereafter against said plow tool to thereby slit the upper surface end of said envelope open and to progressively spread the slitted upper ends of said envelope by means of said side edges of said plow tool away from said flint rod, second roller means adjacent said first roller means and profiled to facilitate displacing the slitted ends of said envelope relative to said flint rod to flatten said slitted envelope, and means reaching into said linear guide means for diverting said flattened envelope from said flint rod, the axes of said first roller means being perpendicular to the axes of said second roller means and extending in substantially vertical direction to said bed.

5. A machine for separating a metallic tubular envelope from a flint rod previously cast in said envelope; comprising a horizontally extending guide bed on which said envelope with said flint rod enclosed therein is transported along a linear path, a support arranged adjacent said bed, first means projecting from said support above and lengthwise of said envelope to depress the latter onto said guide bed, pairs of first roller means arranged opposite each other and at either side of said guide bed for engaging said envelope laterally and exteriorly thereof and to feed same lengthwise of said guide bed, second means in the form of a slitting tool arranged on said support and extending perpendicularly to said linear path of said envelope for engagement therewith, third means in the form of a plow tool located on said support and extending therefrom perpendicularly to and into the path of said envelope, said slitting tool and said plow tool being dis-

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posed for adjustability with respect to each other and relative to and in conformity with the thickness of said envelope, so that said slitting tool will slit said envelope along a generatrix thereof located centrally on the outer surface of said envelope, said plow tool being provided with a portion for engaging the walls of said envelope adjacent said slit and with another portion extending astride said flint rod and spreading said slitted walls laterally of said flint rod, second pairs of roller means positioned to extend laterally and from above said flint rod and engageable with said slitted walls of said envelope after the latter have been spread apart by said other plow tool portion, said second roller means including a pair of flattening roller means adapted to engage said slitted and laterally spread walls of said envelope and to finally flatten the same, and fourth means extending into said linear path from thereabove and shaped to deviate said flattened

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envelope from said linear path along which said flint rod is guided.

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