

root to top. The middle portion of the stem contains the soundest and purest fiber, since the root end becomes ripe first and the top end is more or less branched. In preparing fiber for the very best quality of yarns, the flax is cut into three, the top and root being cut off and a comparatively long and pure "middle" left. Flax intended for cutting is "stacked" or pieced out in large pieces and straightened by one or two blows on the hackle. The cutter consists of two standards or gables of cast iron supporting the two ends of the cutter shaft, the four pairs of holding rollers, and the gearing. The cutter blade of the best make consists of three discs of steel, each about $\frac{1}{2}$ in. thick and 20 in. to 22 in. diameter, placed closely side by side and keyed on a shaft supported by gables and carrying the driving pulley keyed on one end. From the other end of this shaft a retarded train of gearing drives the bottom holding rollers, which are of cast iron 1 1/2 in. to 1 3/4 in. diameter and 2 in. broad in face, with vertical or circumferential grooves or flutes of 1 in. pitch. The bottom roller has two flutes with a groove between them, and the top roller correspondingly two grooves and one flute in the centre. Each pair of bottom rollers is keyed on a shaft at any required distance from the cutter, the ends of the shaft being supported by blocks or brasses set in the gables. The top or pressing rollers are free to move up and down in slides. Pressure is applied to them by means of links, levers, and weights, the total pressure on the rollers at each side being frequently over 1 1/2 tons. The "nip" or point of contact of the retaining rollers should be in the same horizontal plane with the axis of the cutter, and in a vertical plane falling about 1 in. within the periphery of the cutter blade. These retaining rollers are set one on each side of the cutter, and at a distance of about 3 in. from it. Upon the rim of each plate composing the blade are projecting teeth of diamond-shaped section, and placed at distances of about 3 in. apart. It is most important that these teeth should be the proper shape and bluntness, that they may not shear or cut the fiber, but give a good broken end. In practice the knife should make about 600 revolutions per minute, giving a surface speed on periphery of 3,400 feet per minute. The speed of the feed or retaining rollers is usually 1 1/2 to 2 1/2 revolutions, giving a surface speed of 6 to 10 feet per minute. The pieces of flax are passed horizontally between the two pairs of holding rollers in such a position that they may be drawn in contact with the revolving cutter and cut at the required point. A skillful boy should cut about 8 cwt. per day. The cut flax is then separated into pieces of suitable size for the hackling machine, the pieces being merely crossed "tupple" fashion so that they may be easily lifted.

(To be continued.)

Ernest Rolph, of Sprout & Rolph, architects for Lever Bros., of Sunlight Soap fame, has let the following contracts, amounting to over \$140,000. Carpenter work, W. & J. Clarke, Toronto; masonry, Cannon & Sons, Toronto, steel structural work, about \$50,000, Hamilton Bridge Co., Hamilton, roofing, Forbes Roofing Co., Toronto; galvanized iron work, Douglas Bros., Toronto, soap machinery and soap pans, Jno Inglis & Sons, Toronto, Heine boilers will be used.

THE ECONOMY OF USING TURBINES AT FULL GATE.*

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The following memorandum is given as an example of the several advantages accomplished by the use of water wheels at full gate. The use of the steam engine as auxiliary to water wheels gave an easy means of making the test by the indicator cards, showing the value of the use of the water at full head on one pair of wheels, rather than dividing it between two pair.

The Monadnock Mills have two pair 54 inches, Humphrey horizontal wheels under 20 foot head, and giving, at full capacity, sufficient power to operate the mills. As auxiliary power a 24 by 48-inch Brown engine is used and this supplies enough power to keep water level with top of dam; thus giving full head to water wheels. Both pair of the water wheels and the engine are belted on to the same main shaft and the engine does the regulating when used, the gates of wheels being hoisted just enough to keep the water level with top of dam. June 9, 1899, with both pair of wheels in use the indicator showed engine 120-horse power. With one pair of wheels in use the indicator showed engine 83 1/2. Showing a gain by using all the water on one pair of wheels of 36 1/2-horse power. This shows a gain of 30 per cent. in power required by steam and a consequent better use of the water. I submit the foregoing as being an example of actual use and which may be of value to some member of the association in putting in wheels, where used with auxiliary steam power, and is also submitted at the request of the Board of Government for a practical paper on a practical subject, and I trust it may be so considered and that it may encourage other members to relate similar occurrences that come up from time to time.

SOUTH AFRICA, ITS PEOPLE AND TRADE.

CAUSES OF THE BOER WAR.

ARTICLE II.

In our article last month, a brief sketch was given of the beginning and rise of the European communities in South Africa. The history was brought down to the annexation and retrocession of the Transvaal. As there exists a great deal of misconception about the causes of the present war, we shall endeavor to review the main facts.

What led to the annexation of the Transvaal? It was not lust of gold, for only small alluvial diggings had been found as yet, and the great gold reefs of Johannesburg were then as little dreamt of as the Klondyke of Canada. It was because the Republic was bankrupt, the Boers in many districts having refused to pay any more taxes, the country reduced to a state of anarchy by the incapacity of its administrators, by fac-

*Read before the Cotton Manufacturers' Association.

*The Government £1 notes or "blue backs" then sold at a shilling, or say five cents on the dollar; while the salaries of the civil servants were three months in arrears.

[These papers have been issued in pamphlet form, containing a glossary of Cape Dutch and Kafir words and phrases in common use. Biggar, Samuel & Co. 62 Church Street, Toronto. Forty pages. 10 cents.]