THE SACO-LOWELL BULLETIN

MAY 1928

One of the spinning departments at the Pacific Mills at Lawrence

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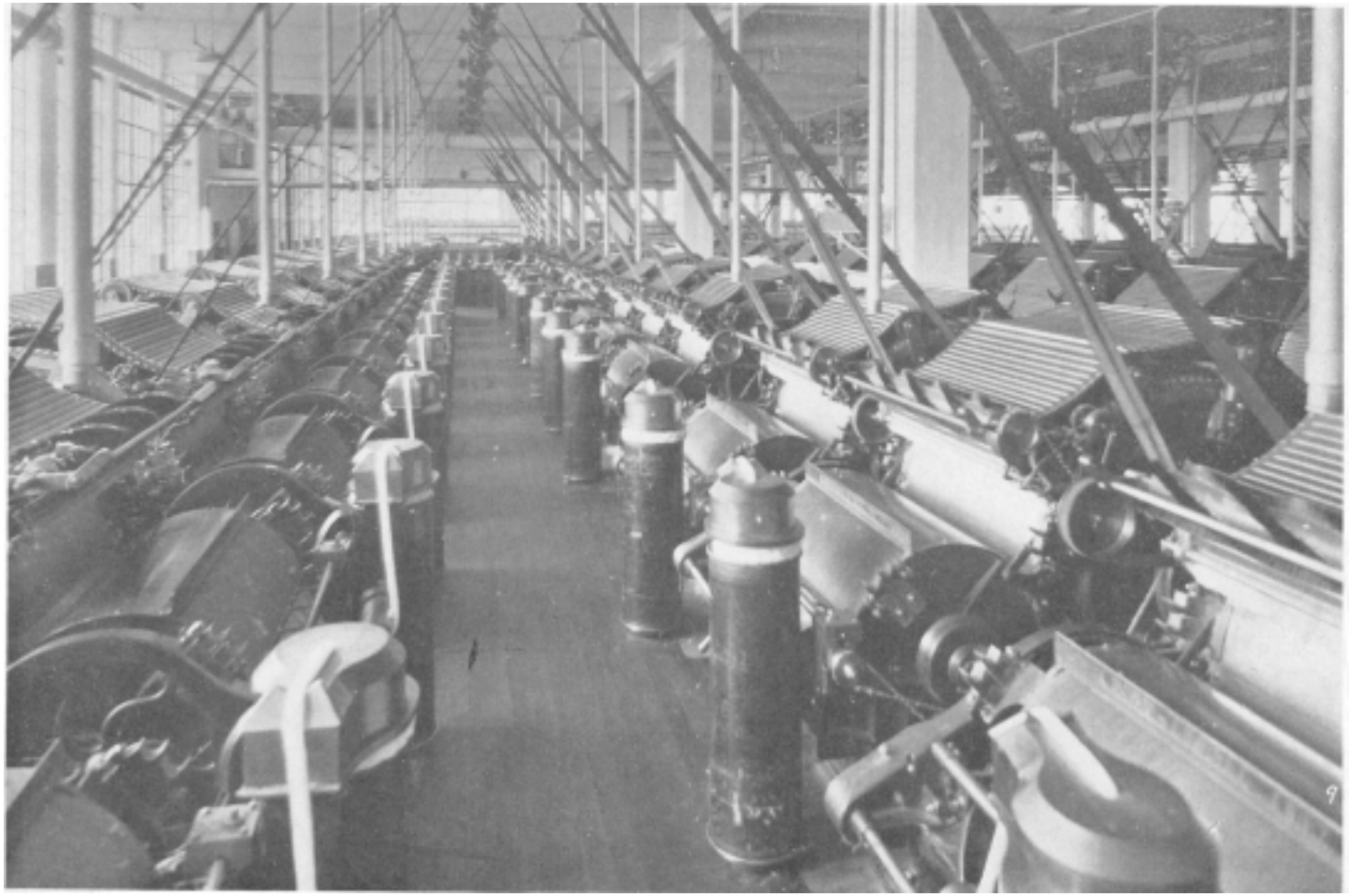

Saco-Lowell carding machines to the number of 50,000 have been manufactured for the textile industry. We look for a substantial increase in this production, for more and more mill executives are finding that "light carding pays".

THE SACO-LOWELL BULLETIN

Issued monthly in the interests of efficient mill operation by the

SACO-LOWELL SHOPS

147 MILK STREET

BOSTON

CHARLOTTE GREENVILLE ATLANTA

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Light Carding and Its Relation to Breaking Strength

THE revolving flat card is undoubtedly the most efficient single piece of equipment in the cotton mill. When you compare the picker lap as it is fed to the card with the sliver as it is delivered from the doffer, there is no question of the supreme efficiency of this machine. How it combs and straightens the cotton, removing the shorter fibres, dust, seeds, and motes, needs no elaboration here. But we do wish to call attention to recent findings in regard to speed of operation.

We seldom think of the card as purely and simply an evener. But, when you stop to think it over, that is essentially what the revolving flat card is,—a large evener, a far more efficient and reliable evener in every sense of the word than any other machine in the mill.

It is customary to weigh the lap behind the card in pounds, and its intermediate lengths in ounces. However, we weigh the sliver it produces in grains, of which there are 437.5 to the ounce. Thought of in this way, the evening ability of the card is brought before us in a new light and with greater emphasis.

The quality of the yarn to be spun and the economic functioning of subsequent processes, depends directly upon the evenness of the card sliver, not only can for can, but inch for inch. To a great extent, this evenness depends upon the rate the cotton is fed to the cylinder. If fed lightly, the cylinder picks up only a very thin sheet of cotton at every turn, building this up, layer upon layer, and forming a very even sheet of stock upon the doffer. A heavy feed, on the other hand, lays the stock thicker and more rapidly upon the cylinder. This is bound to continue the unevenness of the lap onto the sheet of cotton on the doffer, to some degree. At the same time it does not give the licker-in sufficient time to work upon the stock. The natural conclusion is, therefore, that the slower the doffer speed, with the resulting decrease in speed of the feed rolls, the evener will be the sliver. The obvious limitation is, of course, the weakening of the fibres from being worked upon for too long a period.

Through years of experience and experimenting, the standard speed of about 165 revolutions per minute has been set up for the cylinder. The doffer speeds, however, in different mills range all the way from 5 to 15 turns per minute and sometimes more. For such a comparatively low speed this is too great a varia-

tion. Since the speed of the doffer controls the production, it is always a great temptation to speed it up to the limit. High doffer speeds increase production, to be sure, but they do not allow the card to operate at its greatest efficiency. The sliver produced is not of the best possible quality. Subsequent processes run less smoothly and economically and the breaking strength of the yarn is reduced. It is, in truth, robbing Peter to pay Paul.

From the constant contact with hundreds of mills, we are impressed with the fact that a majority run their doffers at an excessive speed for the sake of increased production. Every mill man realizes these facts, but it has not been until lately that any actual proof in cold figures has been available to induce him to reduce these speeds. During the last year, however, a number of mills have carried on tests to determine the best doffer speed, not with an eye towards production, but to find out what speeds give the best work throughout subsequent operations. The results of these tests, some of which we print below, need no elaboration. They speak for themselves.

SUMMARY OF ARKWRIGHT TEST NO. 7

(Reprinted through the courtesy of The Arkwrights, Inc.)

"Comparison of breaking strength and ends down per 1,000 spindles per hour from yarn made with a card producing 8, 12, and 16 pounds per hour, using the same weight lap and same weight sliver and same cotton. Also take account of various weights of waste made under each system."

Three tests were made. Middling 7/8 to 1-inch American cotton was used. The opening equipment consisted of two vertical openers in tandem, one breaker lapper (two-blade beater), one finisher (three-blade Kirschner beater). A 13-ounce lap was produced. A draft of 100 was used on the cards, and a 54-grain card sliver produced, with a 60-grain finished drawing sliver. The draft, twist and hank of slubber, intermediate, and roving frame were:

	Draft	Twist Per Inch	Hank Produced
Slubber	4.00	.84	.60
Intermediate	5.10	2.37	1.54
Roving Frame	6.00	3.74	4.60

The results of the test comparing the three carding productions are given in the following table:

Carding—	16 Pounds Per Hour	12 Pounds Per Hour	8 Pounds Per Hour
Ounces flat strippings, 11-hour basis	71	49	50
Ounces cyl. strippings, 11-hour basis	21	13	13
Ounces flyings, 11-hour basis	19	15	17
Grains speeder waste per spindle	2	1.10	1.05
Grains clearer waste	302	227	111
Average size, 300 samples	26.07s	25.50s	25.18s
Draft	12.00	12.00	12.00
Twist per inch	23.28	23.28	23.28
Average temperature	82 degrees	77 degrees	81 degrees
Ends down per hour per 1,000 spindles	60	59	24
Ends down per 11 hours 120-spindle side	79	78	32
Grains waste per spindle	8.67	6.80	4.15
Average breaking strength (lbs.)	60	69	70.43

Variations	In Weight	In Break
16-pound process	4.50 grains	20 pounds
12-pound process	6.00 grains	19 pounds
8-pound process	5.50 grains	16 pounds

Three tests were made in well-known Texas mills and were read before the Texas Textile Association meeting held last Fall.

A report on 22s warp yarn, made from Middling cotton, full inch staple:

Doffer Speed R.P.M.	Per Cent Waste at Cards	Breaking Strength
9	7.1	82
10.3	6.4	80
12.1	5.6	78
13.3	5.4	74

The waste taken out at the cards included fly and strippings. The total waste was considerably higher with the faster speeded doffer, and the appearance of the yarn was better with the low doffer speed.

A report on yarn, made from 7/8 to 15/16-inch Middling cotton, was as follows:

No. of Yarn	Doffer Speed R.P.M.	Breaking Strength
20.16s	10.16	76.25
20.53s	11.16	71.33
20.49s	12.16	70.98

A report on 1 1/16" staple, slightly under strict low middling cotton. The breaking strength figures are reduced to pounds break per grain because of varying yarn numbers.

Doffer Speed R.P.M.	Pounds Break Per Grain
6	1.93
7	1.98
9.50	1.94
11.75	1.91

Our serviceman, Mr. Comer, has recently been in Texas, and during his trip there he visited a mill using very low grade cotton. They had been obliged to card quite heavy, due to the fact that they are short of cards, so Mr. Comer suggested they cut the doffer speed from 13 to 9, and if necessary, run their cards overtime to balance up the rest of their equipment.

Mr. Comer's suggestion was carried out with the result that the yarn from the slow carding broke 10 lbs. over standard, whereas the breaking on the regular card was 4 lbs. under standard. In other words, slow carding gave them an increase of 14 lbs. of break on 12s yarn.

It Can't Be Done

One of our customers recently wrote us as follows:—

I have been trying to build up my old spinning frames so that they would equal my new ones. I have put new spindles, rings, guide boards, and new stands, in fact all new improvements, except steel rollers, and I still lack about 7 pounds in breakage strength to make old frames equal new ones. I have about come to the conclusion that I will have to change steel rollers to bring this up.

This is an excellent example of what some mill men are trying to do. But it cannot be done. Old frames cannot be made to equal new ones; they may be improved to some extent, but that is all. In the case cited above, the mill will have paid nearly enough to have bought new frames; and when they are through, they will still have old frames which can never equal new ones in production or quality of work. They will have spent a great deal of money with no increase in their capital account.

Twelve Points in Purchasing Machinery

IN contemplating the purchase of new machinery, there are certain fundamental points which should always be kept in mind. These points we have listed later in the form of twelve general questions which apply as much to the purchase of any manufacturing equipment as to textile machinery. For the immediate purpose, however, we are interested only in cotton mill equipment.

When the purchase of new machinery is to be made, altogether too many mill executives start out with the question, "How much does it cost?" or "Can we get by with second-hand equipment?" These, all too often, overshadow the questions as to amount and quality of production, and power and labor required. The matter of maintenance and depreciation is often side-tracked altogether.

Many mill executives freely admit that they are not interested in the mechanical side of the equipment as long as it runs all right and turns out the goods. Telling them that this and that part is equipped with ball bearings, that such and such parts have recently been changed from cast iron to steel, that this rail is ground to fine limits, or that bushing is of bronze, only bores them.

In the last analysis, price should not be the first consideration. Performance rightly should be, and, at the same time

the mechanical side should not be overlooked. If, a few years after installation, power consumption starts to rise, repair parts are frequently needed and require much fitting, card settings do not seem to stay set, spinning frames begin to vibrate and will not stay level, and maintenance cost rises higher and higher, then this same executive becomes intensely interested in the mechanical side of the equipment. He begins to realize that the second-hand machinery which "looked" in such good condition, and was bought so cheaply, was, after all, a costly investment. It is then too late.

Purchase cotton mill equipment only after a thorough consideration of the following twelve questions. You will then assure yourself of equipment that will enable you to meet competition not only this year, but the next, and the next.

1. Will the equipment consistently produce a product that is in every respect up to or above the standard quality?

2. Will it give maximum production at a minimum labor cost?

3. Is the equipment economical on floor space; in other words, by its installation, can you get a maximum production per square foot of factory floor space?

4. Is it of sufficiently rugged and rigid construction to withstand year in and year out hard service? Is the weight correctly distributed so that the greatest strains and wear fall upon the heaviest parts? (It is the correct distribution of weight and rigidity which keep card settings from varying, and spinning and roving frames from getting out of level, a fault which increases the strain and wear in every part.)

5. Is the power consumption as low as possible, in both starting and running? What parts run on ball bearings, and what on plain?

6. How often is oiling necessary and how much need be used? What facilities are made for easy access in oiling, and how is oil prevented from getting on the work?

7. Are the gears that receive the hardest wear of hardened steel? Are all fast running gears cut instead of cast? Is excessive vibration and noise eliminated by judicious use of spiral cut gears?

8. Are all parts made from the best material for the purpose? What parts are cold rolled steel, cast iron, bronze, case hardened steel, die-cast steel, etc.

9. Is the equipment easy to clean?

10. Are all parts machined to close limits, so that parts are interchangeable and repair parts can be applied with a minimum of fitting?

11. Is the engineering service of its maker capable of recommending the best and most economical layout for your particular needs?

12. Is the manufacturer of the equipment a long-established, reputable firm which you know will stand behind its product and give you the service you require?

Only when these questions are satisfactorily answered, can you judge if you are getting the most for every dollar invested.

200,000 Saco-Lowell Spindles

The photograph on the cover of this Bulletin shows a portion of one of the spinning departments of the Pacific Mills of Lawrence, Mass. This mill, which is one of the largest in the world, has in operation over half a million spindles, about 200,000 of which are Saco-Lowell. In the last two years they have equipped 13,000 of these spindles with the Saco-Lowell Long Draft system.

Power Tests

WE recently received from an anti-friction bearing company, a number of tests made at representative mills upon spinning frames equipped with their ball bearings. These tests are very interesting and complete.

We would be glad to send these tests to anyone who would care to receive them. Below is reprinted a brief summary of two of these tests:—

SUMMARY

Savings per frame		*Investment* (Cost of Ball Bearings)	
Yearly saving in Power.....	$63.00	7 Bearings for Cylinder Shaft.....	$56.50
Yearly saving in Oil.....	2.69		
Yearly saving in Labor.....	2.19		
Total savings per frame.....	$67.88		

Annual Return on Investment

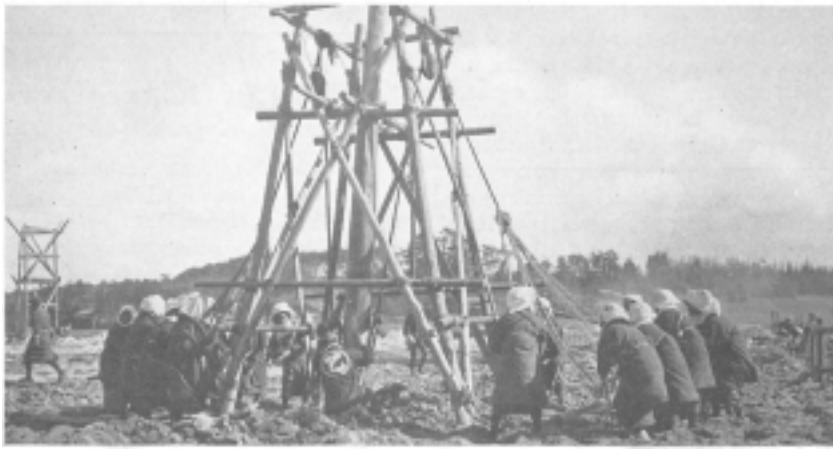
$\frac{67.88}{56.50}$ = 120% Annual Return

SUMMARY

Savings per frame		*Investment* (Cost of Ball Bearings)	
Yearly saving in Power.....	$60.00	7 Bearings for Cylinder Shaft.....	$56.50
Yearly saving in Oil.....	8.26		
Yearly saving in Labor.....	6.81		
Total savings per frame.....	$75.07		

Annual Return on Investment

$\frac{75.07}{56.50}$ = 133% Annual Return



Tamping ground for pier foundations of a Japanese mill—Aichi Orimono Mill, Nagoya, Japan

From Field and Shop

Saco-Lowell Shops, Charlotte, N. C.

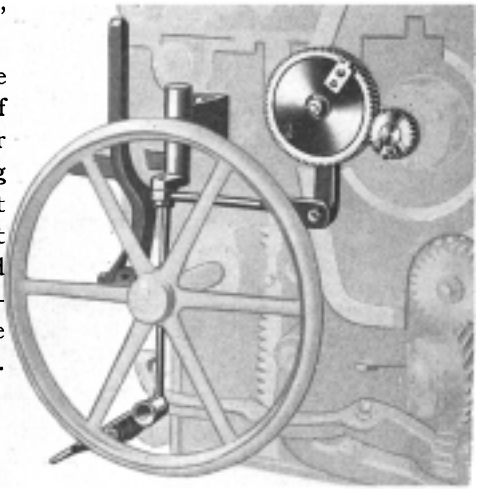
IF your mill is in the South, you will be interested in taking advantage of the service of our shop and supply depot at Charlotte, N. C. Here we maintain, for your convenience, a complete shop for reclothing card flats and licker-ins. It is equipped to do this work efficiently, speedily, and economically.

We also carry in stock here a complete supply of repair parts for our line of equipment. It enables us to save our Southern customers much time by filling repair orders direct from our office at Charlotte. This shop and supply depot eliminates a vast amount of freight and handling charges and speeds up our deliveries. We trust that you will not hesitate to take advantage of the services offered.

A New Positive Knock-Off for Pickers

The illustration at the right shows a new knock-off that we have recently developed. It is now standard equipment on all new Saco-Lowell Pickers. The great advantage of this knock-off over previous designs is that it is both instantaneous and positive in operation.

It is operated by a spur gear positively driven by the bottom calender roll. Meshed with this is a second gear fastened to a fulcrum which is in turn connected with the knock-off lever. In one gear there is an extra long tooth and in the other there is a space between two teeth to match it. The gears run together in ordinary mesh until the space and long tooth come together, whereupon the gear on the fulcrum is forced out-



The Saco-Lowell Differential Knock-Off

A European Customer Writes

Since the introduction of our High Speed Twister, we have installed a great many of these machines in European mills. In all cases, the owners and managers are very enthusiastic about the increased production made possible by the high speed spindle and ring on these Twisters.

We are reprinting below a translation of a letter from one of our foreign customers. It is a good example of the results these twisters are giving.

February 24, 1928.

Saco-Lowell Shops
147 Milk Street, Boston, Mass.

Gentlemen:

We pass on to you the result which we have obtained on your high speed twisters after having had them in use for more than a year.

The first of these machines, with 3½ inch and 5 inch diameter rings, has been running since the end of 1925. We have discovered that, in actual operation, the speed of the work which we attain with these rings is noticeably higher than that which we can attain with other machines and rings. Although we grease the rings of other machines, we feel that the better results obtained with your machines are due to their particular method of grease-arrangement.

The increase in production from your machines varies between 30 and 40 per cent, and we feel that we showed you that we were satisfied with them when we sent you a larger follow-order on September 16, 1927.

These new machines have arrived and have been working since the middle of December, 1927, quite up to our expectations.

Very truly yours,

Your Letters Appreciated

In England, a century and a half ago, James Hargreaves was using a spinning wheel. His little daughter, Jenny, was playing nearby and upset his spinning wheel. To Hargreaves' surprise, the spindle continued turning in this vertical position. This gave him the idea for his "Jenny," a contrivance consisting of several upright spindles all of which could spin at once. Thus the textile industry went forward.

The Saco-Lowell Shops have many engineers giving all their time to development work. They're always making progress, but it occurs to us that some of the men in the field must have some suggestions that will lead to something radically new.

Write in to us, if you see something in this magazine that you find either true or not true, according to your experience. Give us your experiences, anyway. Your letters will receive careful consideration and we shall be glad to publish facts that will benefit others. If you have records of extra good performance of Saco-Lowell machines, tell us about them. These columns are for news. Let's have it.

—*Editor.*

(*Continued from preceding page*)

ward, transmitting this motion to the knock-off lever, thus stopping the machine. The teeth never quite come out of mesh, so there is no chance of the adjustment changing. The entire motion is accomplished in a space of 3/8″ of surface movement of the 9″ roll, so that the maximum error is less than this amount.

This device can be easily applied to any existing pickers of our make, either model 5 or 90 patent, with no drilling except two 5/16″ top holes in the gear shield to support the bracket. This knock-off assures such uniformity of length of lap, and the cost of applying it is so small, we strongly recommend its installation in all cases.

The

SACO-LOWELL

Organization

offers valuable experience to its customers. Specializing in machine operation, the members of this organization have had an unlimited variety of mill problems to face. On the strength of their accomplishment, the Saco-Lowell Shops have grown, developing many products that are now standard in the industry.

We offer a complete line of cotton spinning machinery, each unit of which is a standard in its field.

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