Machinery and Appliances.

IMPROVED SHUTTLE BOX SWELL.

Messrs. Henry Livesey, Limited,
Loom-makers, Blackburn.

The almost perfect power-loom of to-day, when contrasted with the hand-loom which it has superseded, or with itself as first introduced to the world by its inventor, the Rev. Dr. Cartwright, is a machine to excite our admiration. It so completely, harmoniously, and perfectly performs all the movements that were formerly the work of the hand-loom weaver, and, withal, does it so untiringly, that it justly extorts a large amount of praise from even indifferent observers. Still the fact that efforts are being continuously put forth to improve it shews that when its various movements, and the mechanism by which they are accomplished, come to be examined, there is room for further progress.

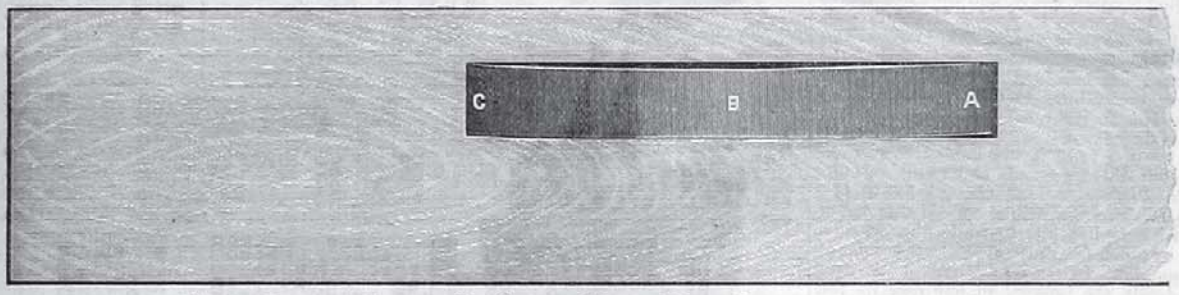


Fig. 1.—Improved Shuttle Box Swell.—Messrs. Henry Livesey, Ltd., Blackburn.

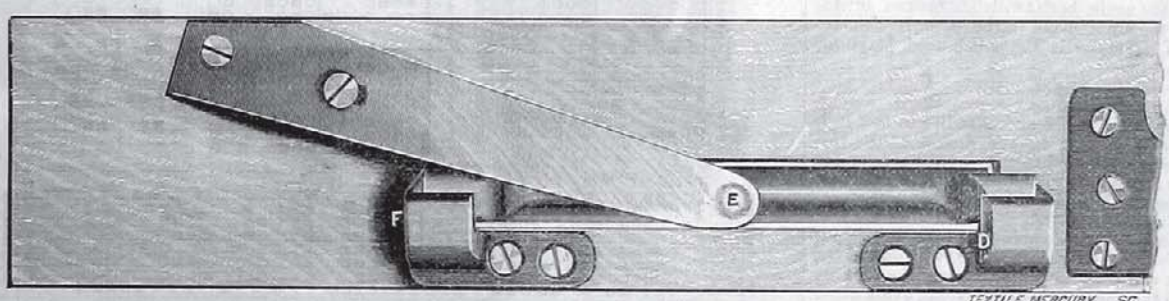


Fig. 2.—Back View.

One of the points that has often struck us as affording this room is the picking mechanism; what is wanted being a simple, easy, and accurate method of regulating its force. At present this seems to be almost entirely absent. The projection of the shuttle through the warp absorbs too much power, and this is destructively wasted in the excessive wear and tear of shuttles, pickers, picking bands, and picking stick collars; also in fly spindles, check straps, and oil for lubrication. The inordinate amount of power spent in propelling the shuttle is seen in the rapidity and distance of its flight when it accidentally gets deflected from its proper course and in the injuries it inflicts when a weaver happens to become its target. With the old hand-loom weaver there was really no such waste of power; if his shuttle flew out it rarely went beyond the end of his slay. But with the power-loom, instead of endeavouring to control the force delivering the shuttle, there have been invented all sorts of ingenious contrivances to prevent its rebounding back into the shed when it has entered the box, such as the check strap and the shuttle-box swell, with their numerous modifications. The object of both of these is to retain the shuttle when it once enters the box, and in combination they do it with fair success. But they are only palliations of defects: with an accurate picking motion they would not be needed; the hand-loom weaver had, we believe, neither check-strap nor swell; he graduated the force applied to the projection of the shuttle to the requirement, securing his object also with a minimum of wear and tear. This in the power-loom is an improvement much wanted, and which still affords a good field for the display of the skill of the inventor.

Whilst waiting the advent of the genius who has to accomplish the above, the manufacturer must do the best he can with the palliatives now in use—the check-strap and the swell. Of the former nothing but a good word can be spoken: of the latter hardly a good one can be uttered. As commonly in use, it is defective in form and action, and of the wear and tear of shuttles, it may fairly be charged with more than 50 per cent. of the whole amount. In the fast reed loom it is inserted in a slot in the shuttle-box back, and is pivoted on a pin which passes through it at one end. Against its opposite extremity, a projection from the stop-rod presses and holds it in position. A spiral spring, almost always a clumsy and uncertain appliance to introduce into a machine, keeps this to its duty, or should do so. As the stop-rod is attached to the slay bottom, and has two or more bearings which are out of sight of the weaver, they rarely get oiled, and consequently it does not move easily, and to that extent obstructs the entrance of the shuttle to the box, the latter having to bring with it the force necessary to effect admittance. In fast-reed looms, which require the shuttle to traverse the shed more quickly, and to arrive at its destination in the opposite box sooner than does the loose reed loom, there is a correspondingly greater necessity for the picking action to be quicker and stronger, and to commence earlier. In a fast-reed loom a great and unfair task has been put upon the shuttle. It is compelled to carry the constant burden of operating the stop-rod catch—lifting it over the frog every pick—in order to prevent the contingency of a smash in the warp, in the event of itself being trapped in the warp shed. Under the circumstances, we need not wonder at the wear and tear of box-wood that takes place, and the heavy annual bill for shuttles that manufacturers have to meet. Let us for a moment look carefully at the picking process, and follow the course of the shuttle, and we shall see how this arises. The shuttle being properly boxed, the loom is started, and the shuttle is projected through the shed to the opposite box. Entering this, which is sufficiently wide at the opening to receive the shuttle easily, it immediately meets with an obstruction in the shape of the swell, which bulges out from the back in a curved line. The shuttle travelling in a straight line comes in contact with this obstruction on its shoulder, and is deflected from its straight course, being thrown with its opposite extremity heavily against the box side, as it passes farther in; what with the force of the rebound from the impact against the side just mentioned and that derived from the change in the curve of the swell, it is next thrown with considerable force against the opposite side of the box. It thus receives three blows every time it enters a box, these being repeated immediately on its projection to the opposite side, though in this case they fall upon the opposite end of the shuttle. The injurious effect of this continuous battering may be imagined when it is stated that a loom making 200 picks per minute, and working ten hours per day, will make a total of 120,000 picks in that time; and in the fast reed loom, owing to its construction and the unfair duty put upon it, the shuttle can hardly avoid receiving daily almost three times that number of blows. From these, in a very large measure, it ought to be free. As might be expected, the injury quickly becomes visible on the four shoulders of the shuttle, and its rapid wear is the consequence. With the defects we have pointed out removed, the life of a shuttle, we have no doubt, would be three times as long as at present. This matter may be commended to the notice of inventors.

It will be seen that our remarks so far have mainly had reference to the swell as it is found in the fast reed loom. In the loose reed loom the case is not so bad. In the first place, the shuttle is relieved from the duty of protecting

the warp, the loose reed doing all that is required in that respect. All that the swell is, therefore, expected to do is to co-operate with the check-strap in preventing the shuttle from rebounding from the box. The swell, however, is of the same construction, is placed in the same position, and, in relation to the shuttle, has the same function. But having in this case no connection with a stop rod, it is easier in its movement. Still, the same results follow the entrance of the shuttle: it gets battered as in the previous case, and the quicker speed at which the loose reed runs, and the consequently greater number of picks it makes, probably counterbalances any gain from the point just named. In both looms, therefore, practically the same evils exist, and require much the same class of remedies. As, however, these are not yet forthcoming, our previous observation holds good also in this instance, namely, that the best must be made of what there is and such improvements as may be effected in them. In relation to the loose reed loom, we are glad to say that the subject has received some attention already, and that an improved construction of the swell is being made by Messrs. Henry Livesey, Limited, loom makers, Blackburn. The following is a description:—Fig. 1 illustrates a front view, from which it will be seen there is no apparent difference. Fig. 2 shews a back view from which at a casual glance not much more change appears to have been made. There is, however, an important one. It will be seen that the pin which retains the old swell in position has disappeared; that two stops, D, F have been attached to the board, one at each end of the swell; and that a projection has been cast upon the swell in the middle of its length. The usual plate spring which acted upon one end of the swell has been shortened, and has had a cavity sunk upon its loose extremity E to receive the head of the projection just named. The stops mentioned prevent the swell from coming out, whilst the pressure of the spring acting upon the projection keeps it in its working position.

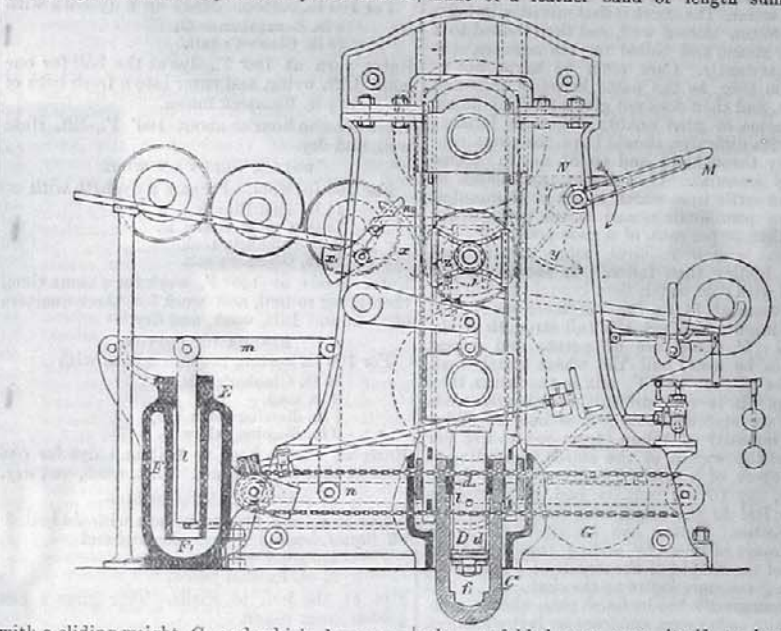
Let us now look at it in action, which will probably reveal its merits as an improvement upon the old form. In Fig. 1 the swell is lettered A, B, and C. In the ordinary construction the point C was its only pivot. As the shuttle enters the box the swell still turns upon this point, but only for a moment as immediately upon its reaching the point B, the whole swell moves backward in line until the shuttle has completely entered, when it is lightly yet securely held. Thus this movement upon its centre is an entirely new one, which will be found to greatly ease the admission of the shuttle, diminishing the violence of the battering it receives. Equally important is the next change calling for notice, the capability of the swell moving backward at the point C. In the old arrangement the difficulty has been to get the shuttle well home, owing to the swell being fixed at this position by its retaining pin. A great deal of force was required to effect this, and an equally great amount was needed to release it. With this improvement it enters easily and is discharged easily. This, it will be obvious, will tend not only to diminish the great wear and tear, but what is more important still, will so far ease and steady the running of the shuttle during its work that the warp will suffer a great deal less from the friction with it caused by its irregular flight, whilst the weft cops, so often knocked off the shuttle peg and broken from the severity of the concussion, will now have far easier times, and under the new conditions such a thing as a "necked" cop should hardly ever be known. A great diminution of waste ought to result.

The patent has been issued to Mr. Henry Livesey and Mr. Thomas Gill, and the improvement is being made by Messrs. Henry Livesey, Limited, who will be glad to afford any further information that may be desired.

IMPROVED HYDRAULIC CALENDER.

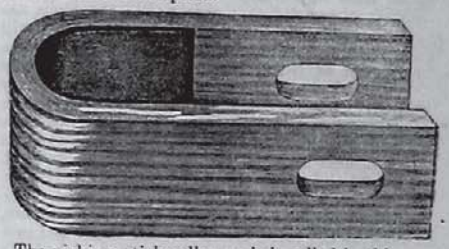
In the hydraulic calender, represented in the accompanying cut, the two rollers are brought together or separated by the following arrangement: The hydraulic press is provided with a double-acting piston *d d d*, which acts directly on the supports of the first roller, whilst the pressing cylinder *C*, which takes it up, is connected with the supports of the second roller and acts upon them. The two pressure-spaces *f* of the pressing cylinder are connected with a pressure chamber *E*, which consists of a space *F* serving as an air-chamber, and a piston-barrel *F* projecting into it. In this is inserted a piston *l*, which can be weighted according to the desired pressure by a lever *m n* with a sliding weight *G*, and which, by means of this lever, stops the action of the forcing-pump when the proper pressure is attained. The parallel movement of the rollers is effected by the transference of any difference of stroke of the one roller-side to the other side of the roller by means of sector gearing or an arrangement of levers. The introduction of the material to be finished between the pressing rollers is effected by the help of a guide *j* arranged between, and provided with teeth, which guide can be moved into the position necessary to receive the stuff by means of the hand lever *M*, furnished with a toothed sector *y*, and acts upon a locking movement *N*, which keeps the guide in its place. This guide at the same time, by means of its gearing with the segment *X* and a connecting piece *W* belonging to the latter, effects a connection between the table *w* and the guide *j*, and hinders the passing in of more than one fold by a catch *X*, whilst the passing of the stuff through the guide is rendered impossible by a catch *Z*, which acts automatically as the guide moves.

The inventor of this machine is Carl Miller, Berlin. Our practical readers will be able to place upon it their own estimate of its value.



A NEW PICKING STICK COLLAR.

Our American cousins are certainly ingenious in several spheres—in one, to wit, namely, the adaptation of wood to uses that are a little apt to excite surprise in people with less versatility of ideas. The celebrated instance of wooden nutmegs is a case in point, but that is a record which we believe has not yet been broken. The subject of this notice, though not absolutely novel perhaps, is in several respects sufficiently so to call for a brief description.



The picking stick collar, as it is called in this country, but the "lug strap" as the Americans prefer to call it, is generally, as is well known, made of a leather band of length sufficient, when unfolded over upon itself, to leave an opening large enough to admit the head of the picking stick. The pendant portion is usually stitched together, and a hole cut through the fold to admit the picking band. When it is considered that a Lancashire loom makes, say, 120,000 picks per day of 10 hours, and that each of these collars, or lug straps, has to send the shuttle through the warp-shed half that number of times, it will be obvious to the inexperienced and untechnical reader that it has an enormous amount of labour to perform, and that the consequent wear and tear must be great, involving a corresponding expense. Every manufacturer knows something of this. Leather is a costly material, and has long shewn a strong tendency to advance, owing to its increasing use and application. In order to obviate at least a portion of this the Woodsocket Shuttle Company has constructed and introduced a picking stick collar made of wood, of which the accompanying cut is an illustration. It is made of well-seasoned hickory, and is guaranteed to out-last any other lug strap in use. So far as we know, this article in wood will be a novelty in this country, and its manufacture might be worth the attention of our shuttle makers and bobbin turners. It is said to have been introduced into some of the largest New England mills, with the most satisfactory experience of its working qualities.