1751

THE HISTORY OF THE PLANER

1916

THE CINCINNATI PLANER CO.
CINCINNATI, OHIO

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THE history of the planer, its beginning and development into the machine tool of today, is a subject which has heretofore been shrouded in mystery.

¶ The purpose of this booklet is to clear away some of the fog, and to trace the history of the planer, step by step, from the crudity of its early design to the highly developed machine of today.

¶ The planer was the product of many men, and in its development no single man stands out clearly, as Mandslay, for example, in the development of the lathe. The invention of the metal planer has been claimed in England on behalf of Spring of Aberdeen, James Fox, George Rennie, Matthew Murray, Joseph Clement and Richard Roberts.

¶ In the United States the planer was in use so early that it may also have been invented independently in this country, though without doubt later than in England.

¶ What follows will trace the history of various early types in the logical order of their progress shown in construction.

CINCINNATI PLANER CO.
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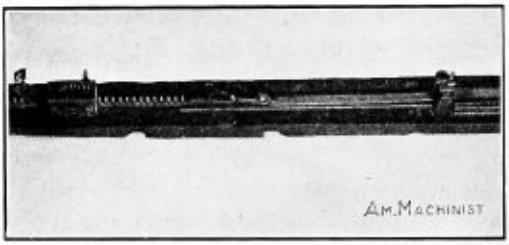
1829

The Crudest Design Was This Old Hand Planer



Although the old French planer which is shown on page 4 dates back to the year 1751 we must commence this history with the model shown above, if we are to carry out the policy of tracing the history of the planer in the order of its development in design.

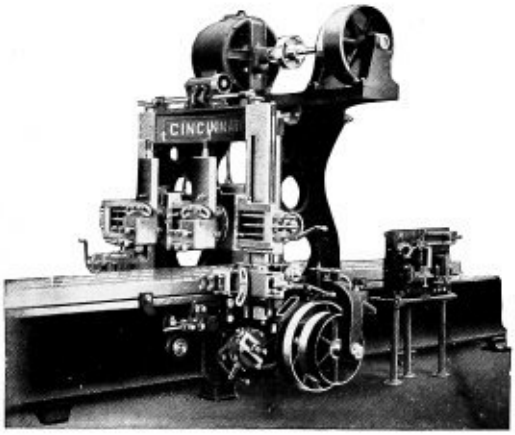
The picture shows what is probably the crudest example of planer principle in existence; a hand-planing machine arranged on a beam of wood as a base. It consists essentially of a rack and pinion.

To one end of the rack is attached a clamp, and the piece to be planed is drawn through a set of guides, to which is attached the planing tool.

This planer is on exhibition at the German Museum of Industry and Technology in Munich.

1915

The Cincinnati Electric Variable Speed Planer



Can you imagine a greater contrast than is evidenced by these two machines; the crude model at the left and this last word in modern planer construction—the Cincinnati Electric Variable Speed Planer?

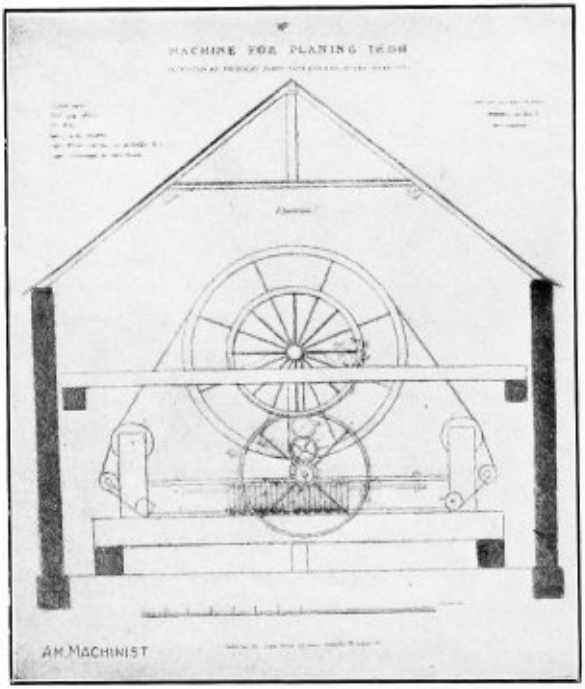
Compare the feature of Variable Speed Drive to the old hand operated machine which, at best, could do no more than make a feeble attempt at scraping.

Think of the wonderful progress made in planer development, with Cincinnati Planer standing at the head of modern planer design and construction.

The Cincinnati Electric Variable Speed Planer gives you ten cutting speeds; the proper speed for the work on hand. You get these speeds instantly, while the machine is in motion.

1751

An Old French Planer

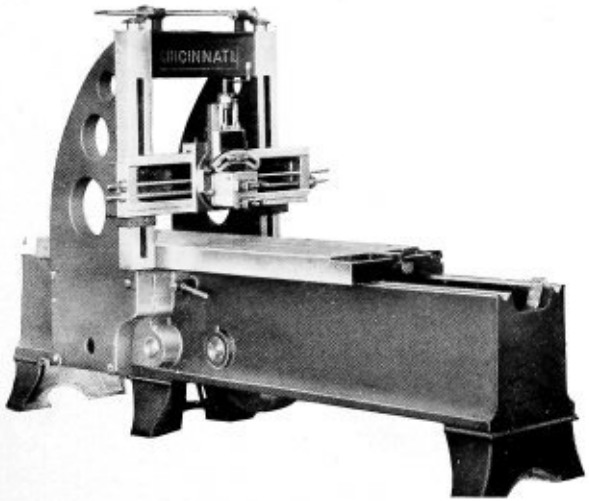


Although dated 78 years ahead of the hand planer shown on page 2 this planing machine, invented by Nicholas Forq, a French clock maker, is a considerable number of steps in advance as regards principle of design. Unfortunately the illustration lacks the carriage carrying the planing tool. The machine was used for planing the pump barrels used in the Marly waterworks to supply the fountains at Versailles.

In operation the cutter was carried backward and forward between two large parallel iron bars extended horizontally through the cylinder. Either the tool or the pump barrel must have been given a rotative feed, the action therefore being equivalent to planing on centers.

1915

The New Cincinnati 24-inch Planer



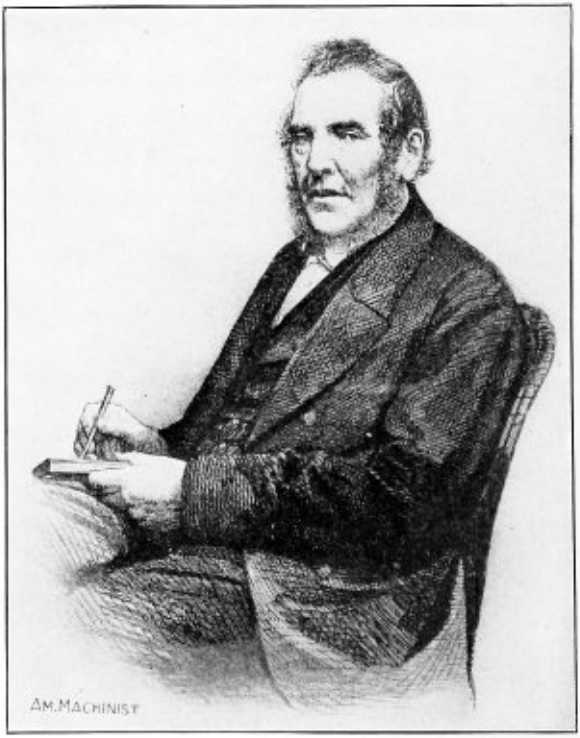
Glance at the opposite page and then look back again at the picture of this "New Cincinnati."

Quite some difference!

In the New Cincinnati 24-inch Planer is embodied every worth while feature calculated to promote simplicity and to ensure a reliable mechanism capable of large production.

All gearing is inside the bed and out of the range of all harm. Then consider these features also. Center leg; bed bored for renewable bearings; housings extended to the bottom of the bed; gear-shaped tumbler and dogs; aluminum driving pulleys, bronze bushed self-oiling loose pulleys and the Patent Tu-Speed Countershaft.

Richard Roberts
Builder of the Roberts' Planer

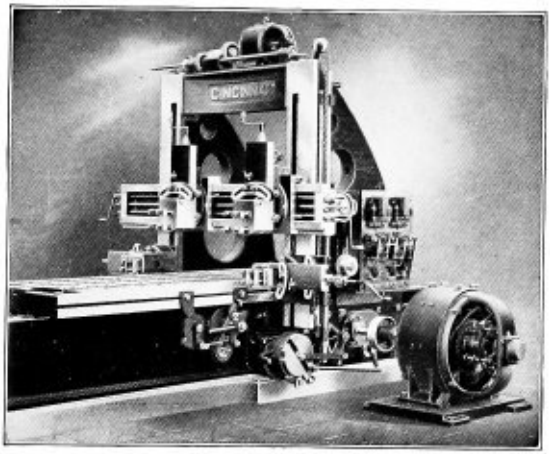


Richard Roberts, whose planer built in 1817 shows the first real trend toward modern design, was born in Wales in 1789.

Few inventors have been more prolific or more versatile. In 1817 he started in business for himself at Manchester and almost immediately built his planer.

Richard Roberts improved nearly everything he touched, or superseded it entirely by something better. His planer, described on page 8, was only one of his works. Other deeds to his credit include the invention of the first successful gas meter, the building of gear-cutting, broaching and slotting machines, the invention of the iron billiard table and numerous other achievements. It is with his influence in planer design, however, that we are most interested.

What Would Richard Roberts Think if He Could See This Planer?



Can't you just picture the hungry eagerness with which this famous inventor would inspect this modern Cincinnati Reversible Motor Driven Planer?

Can't you imagine the wonder reflected in his face as with eager hands and keen eye he would go over every part, comparing the design to his own crude model and standing in wonderment at the advancement shown in every feature? Here are a few of the things he would find—

Motor connected direct to driving shaft, doing away with all shifting belts and overhead driving arrangements.

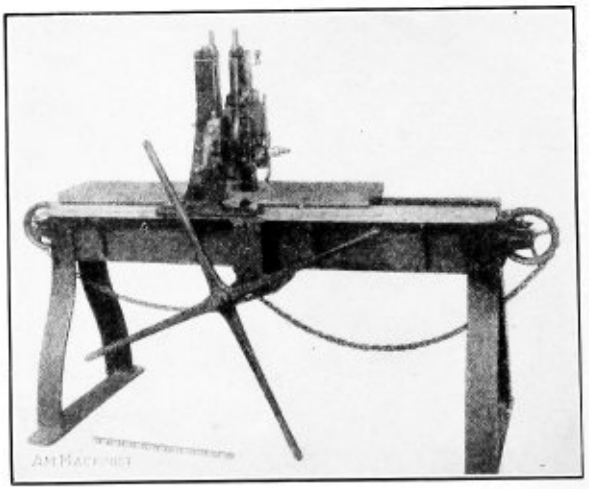
Any cutting speed from 15 to 60 feet, obtained and changed instantly while the machine is in operation.

Any return speed at your disposal, from 50 to 100 feet, thus doing away with speed boxes, cone variators and other variable speed devices.

1817

Roberts' Planer

Note That Modern Planer Design is Beginning to Show



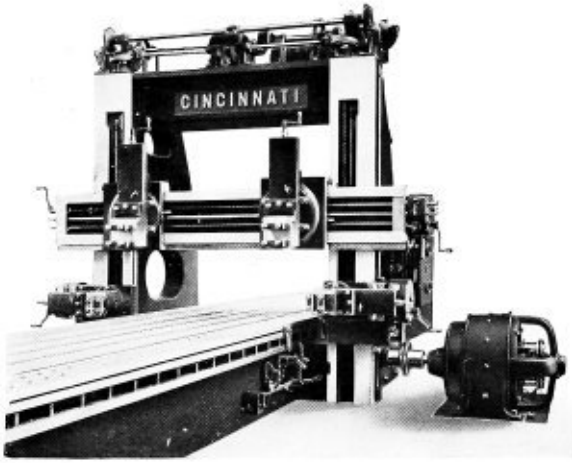
As far as is known this model, now in the South Kensington Museum in London, is the earliest planer now in existence.

The chisel and file marks on the bed and ways indicate that it was itself made without the use of a planer. It had vertical and horizontal feeds, an angular adjustment and separate tool feed for the head, and a hinged clamp for the tool.

The table, which was hand operated through a chain drive, was 52 inches long by 11 inches wide.

1915

The Cincinnati Reversible Motor Driven Planer



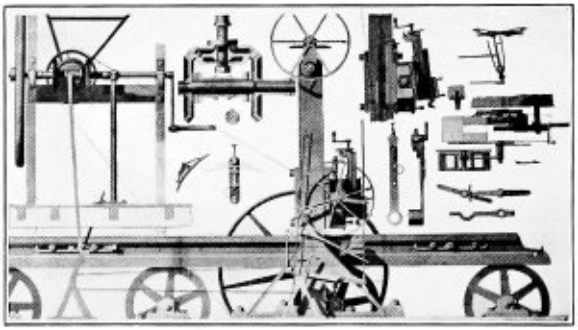
Not much in common with the old-timer illustrated on page 8. A century of improvement makes a big difference in the design.

Here is a machine that stands in a class by itself in handling the strenuous work of today with speed and economy.

Ten selective cutting speeds from 25 to 60 feet per minute and return speeds from 50 to 100 feet. All changes made while the machine is in operation. No belts—no pulleys—no trouble-making features.

1820

Now Comes Clement's "Great Planer"



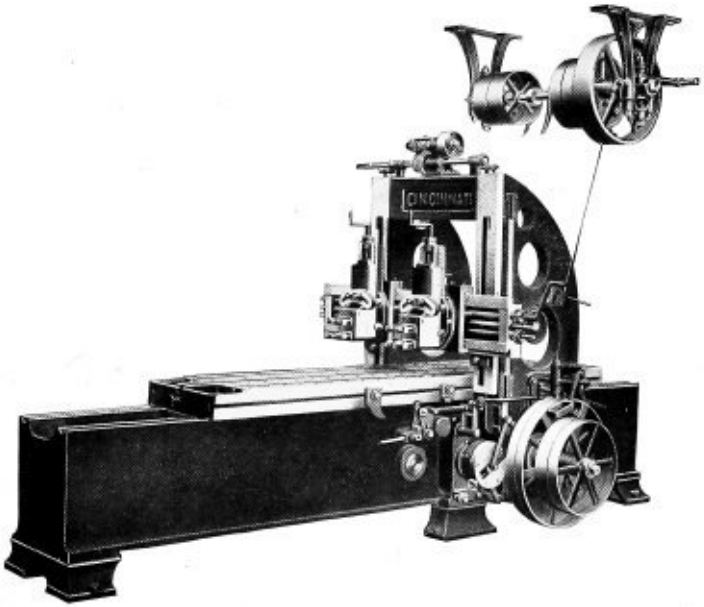
Around the year 1820, probably a few years later, Clement built his "great planer;" a remarkable machine from both a mechancial and financial standpoint.

In this planer two cutting tools were used, one for the forward and one for the return stroke. The bed ran on rollers, mounted on a concrete foundation, which were said to have been so true that "if you put a piece of paper under one of the rollers it would stop all the rest." It was fitted with centers and was used for planing circular, spiral and conical work as well as flat work. Work 6 feet square was taken. It was hand driven.

For more than 10 years after it was built it was the only one of its size, and ran for many years night and day on jobbing work, its earnings forming Clement's principal income. It is said that his charge for planing was 18 shillings, or $4.32 per sq. foot, which amounted to about $100 a day with two shifts. On this basis he must have machined an average of about 11 sq. ft. in 12 hours.

1915

Jump Across 95 Years to the Tu-Speed Planer



Some difference between this and Clement's hand operated "great planer."

The Cincinnati TU-SPEED Planer gives two cutting speeds and a constant return.

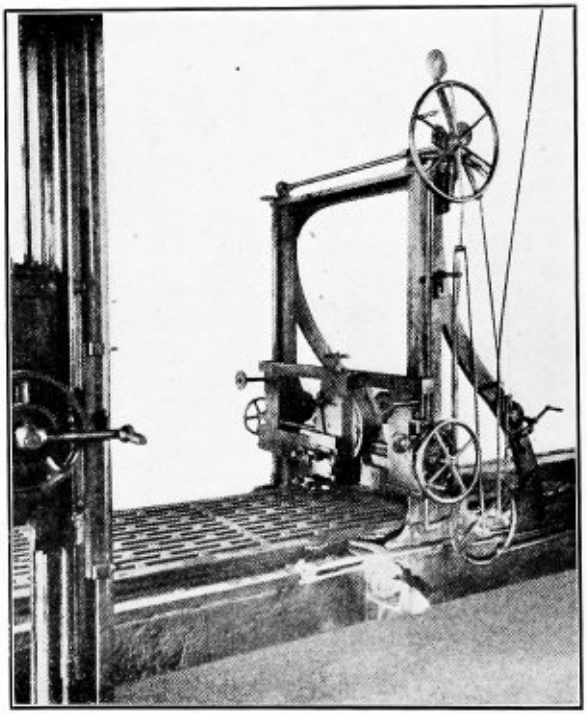
You get a speed for roughing and a speed for finishing; the most economical speed for each class of work.

Change of speed is accomplished instantly while the machine is running.

You do not need to be impressed with the value of these features.

Modern Planer design finds Cincinnati Planers leading for efficiency and improvements.

One of the First Planers Ever Built in This Country



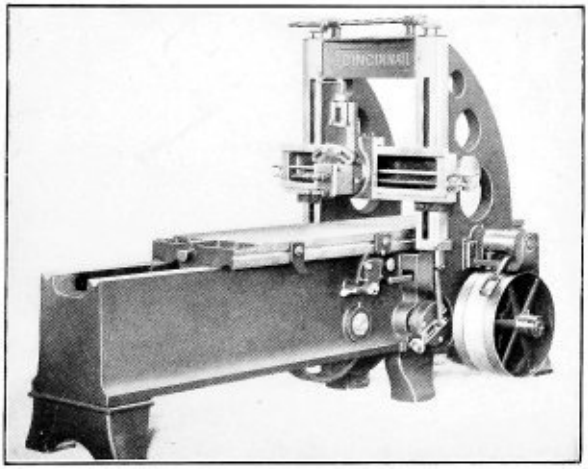
The *exact* date of the building of this planer can not be fixed, but it was probably in the early "thirties."

The machine was built in the shop started by Ira and Ziba Gay, two machinists of considerable repute from Nashua, N. H. The planer had cast-iron ways bolted to granite sills.

The picture shows the tool-lifting device; an arrangement for lifting the tool on the back stroke. The lever in front of the tool slide inclined to the left and having a horizontal handle on it has, at its other end, an eccentric. A rope passes over the grooved pulleys at the sides of the crosshead. The middle of the rope is attached to the lever referred to, one end is attached to the feed-wheel and the other end supports a weight. As the bed reverses the lever is pulled over, and the eccentric lifts the tool; at the next reversal the feed-wheel moves, allowing the weight to pull the lever over, and the eccentric moves the tool to cutting position again.

One of the Latest Planers Built in This Country

The "New Cincinnati 24-inch Planer"



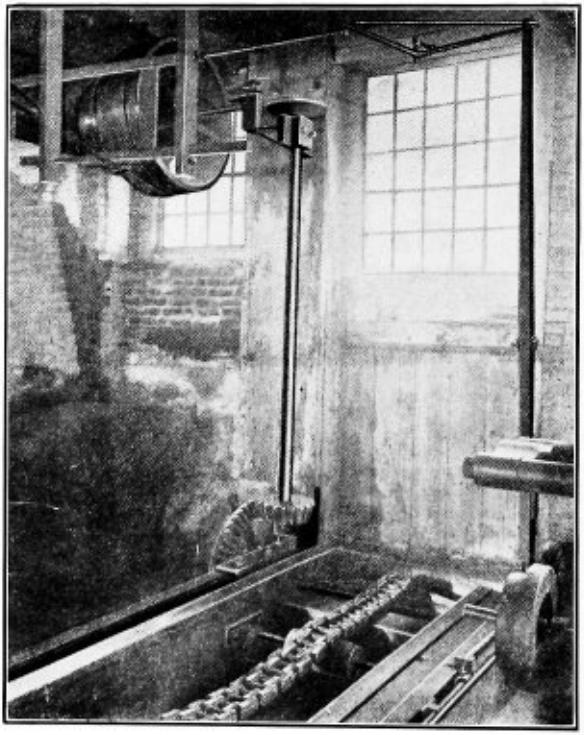
The increased stability received from placing additional legs near the middle of the bed goes to make remarkable production records.

Housing extended to the bottom of the bed which is bored for renewable bearings.

A new shifting device eliminates all linkages, toggles and ball joints—cylinder with cam slots makes all movements circular and positive.

The new planer is equipped with the Patent Tu-Speed Countershaft and Quick Reverse Aluminum Pulleys.

Look at This Interesting Old Chain Drive

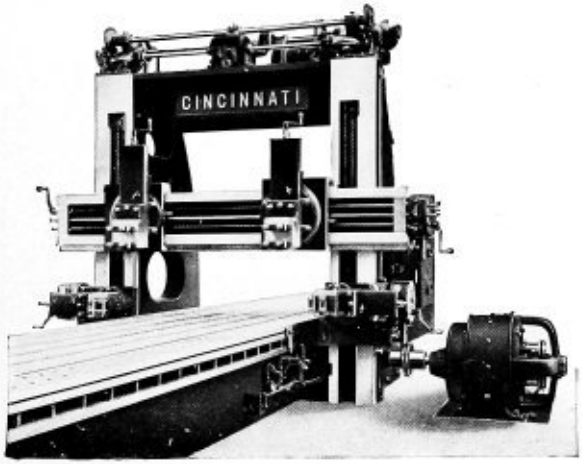


The planer on which it was used dated back to the "early thirties," and is illustrated and described on page 12.

The picture above shows the driving pulleys connecting with the chain sprocket through a vertical shaft and bevel gears. As may be seen the two-belt drive was used, the return being at a higher speed.

The driving chain is about six inches wide over all, made up of alternate narrow and wide links. It is made of $\frac{7}{8}$ x $1\frac{3}{4}$-inch iron with one-inch pins riveted over on each side.

Look at This Direct Connected Motor Drive



The difference is startling in the extreme. It is an evidence of modern progress, as brought out by the *Cincinnati Reversible Motor Planer.*

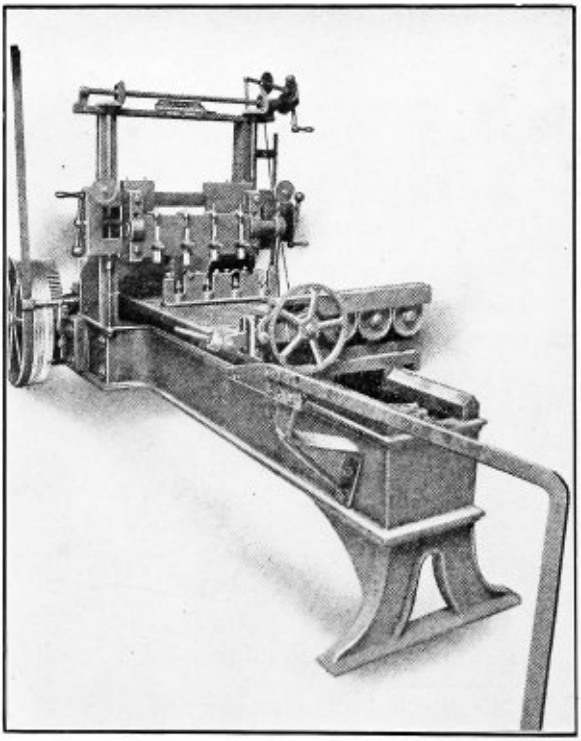
Ten cutting speeds are yours, running from 25 to 60 feet per minute, and return speeds of from 50 to 100 feet per minute. All changes can be made while the machine is in operation. No belts, no pulleys, no noise din, no power wasted, no slip.

The motor is direct connected to the driving shaft. No broken belts.

This is the modern idea in planer construction, raised to the *nth power.* You do not have to compare Cincinnati Planers to old-time models, however, to be impressed with their value. Just compare them with the ordinary planer of today.

1844

A Heavy Tool for Date and Size



The name plate, Gay Silver & Co., North Chelmsford, Mass., 1844, fixes its age exactly.

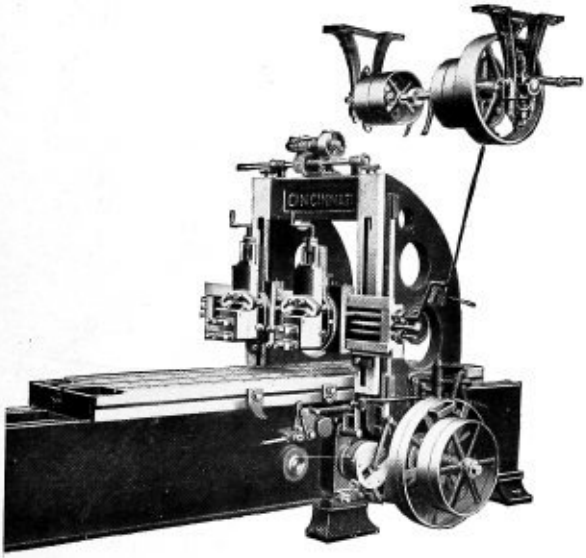
Table is 27 inches by 8 feet and is driven by means of a chain.

This tool formerly had a lifting device for the tools, the same as the stone bed planer described on page 12, but subsequently the single head was replaced by a wide casting carrying four tool posts. This arrangement is used for fluting textile rolls and is considered more satisfactory than milling, both as regards quality and quantity of work produced, the device for fluting the rolls is automatic in action, the spacing being accomplished by the pawl lever sliding up the inclined flat iron track on the return stroke of the planer.

1915

A Logical Modern Step in Planer Advancement

The Cincinnati Tu-Speed Planer



With this machine in operation two speeds are acquired—

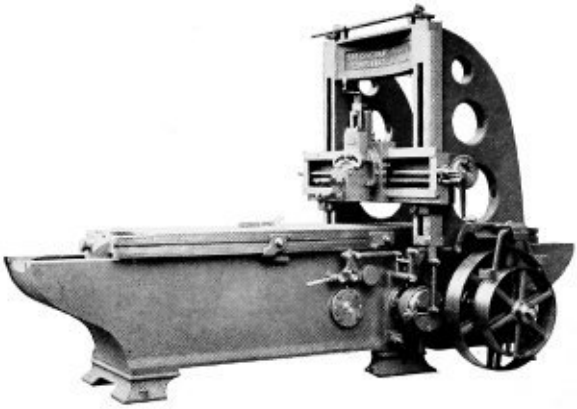
The right speed for roughing.

The right speed for finishing.

Two cutting speeds to the table and a constant return. The changing from one to the other is accomplished instantly while the machine is running.

In the history of the planer the *Cincinnati Tu-Speed Planer* stands out as one of the latest and biggest improvements.

The First Planer Built by This Company



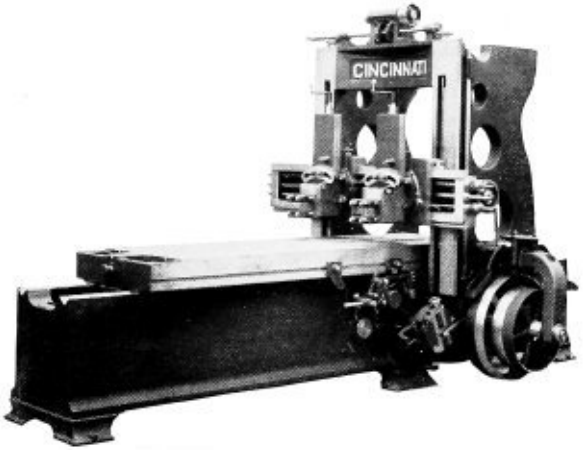
Commencing on this page we shall now trace the history of the planer as influenced by the developments of design shown in the various types made in our own works.

The interesting picture shown above illustrates the first planer we ever manufactured—the original machine out of which our present designs have grown.

Note the rounded ends of the bed and the position of the leg, placed some distance from the end, causing an undesirable overhanging. The bed bearings of this old machine were fastened to the side of the bed and projected in through a core hole without any further fastening, except the flange on the outside of the bearing.

Also note the housing construction. The old style housing was fastened to the top of the bed, giving a bearing of only about 6 inches in width. This, of course, was before the days of high-speed planing, and, as explained in the opposite column,(?) later day practices showed this method of securing the housings to be inadequate.

The Same Machine as We Build It Today

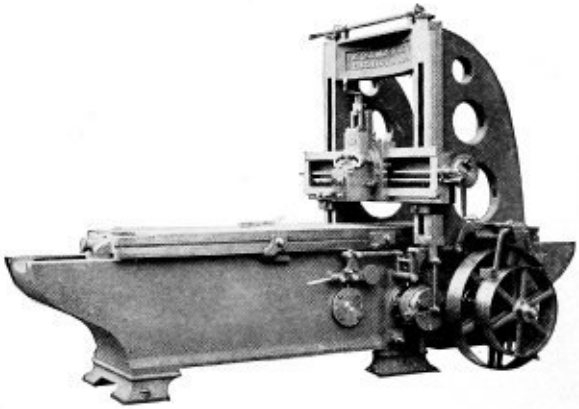


Look at the difference. One machine is an interesting antique; the other is an example of the latest type of modern development.

Instead of the rounded ends, shown in our first design, the ends of the bed have been made square. The leg has been placed at the extreme end, thus doing away with the overhang encountered in the old model. The bed bearings of our present machine show radical improvement. The bed is bored to receive the shaft bearings which are driven into place, thus eliminating the weak construction of bolting the bearing to the side of the bed.

As regards the housing construction the housings are carried to the bottom of the bed, and secured to the sides by bolts and dowels. They are further locked to the bed by tongues or keys. These are placed at the front and back of the housings, thus eliminating any possible chance of springing the housing under cut.

More Interesting Facts About Our First Planer



This original machine, the first we ever built, had straight gibs. The vertical slide was without ball bearings.

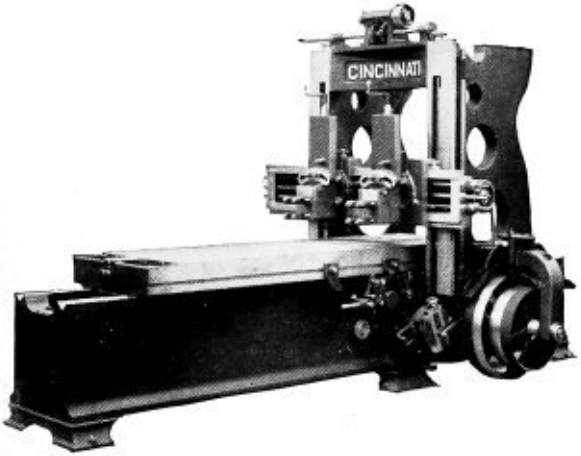
The action of the table dogs and tumbler was a sliding action. The cam had a flat lateral motion.

The belts were narrow, as compared to modern design, and the driving pulley fastened to the pulley shaft was the old-fashioned cast-iron pulley.

The elevating device operated by engaging and disengaging the gears by throwing the gears in mesh while running. Despite the best of care the result was often serious breakage.

Read the opposite page very carefully and see what radical progress has been made in the design.

Here's the Same Machine as We Build It Today



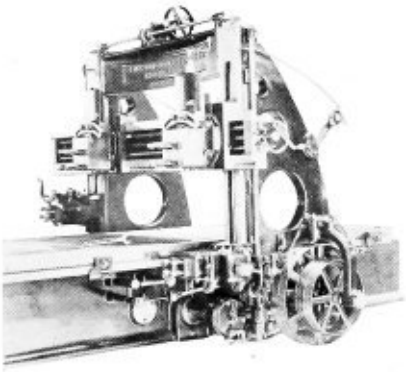
Instead of straight gibs, taper gibs have been provided and the vertical slide is provided with ball bearings to facilitate easy handling.

The table dogs and tumbler have been altered so as to provide a rolling action, and the cam has been changed to circular.

The belts are wider, and the driving pulley, formerly of cast iron, has been changed to a pulley made of aluminum alloy. This is one of the most effective changes made in the driving mechanism because it has eliminated the greater part of the inertia caused by the heavy cast-iron pulley. By actual test the aluminum pulley has increased production anywhere from 10 to 15 percent.

Today this machine is regularly equipped with our Patent Power Elevating Device, which is operated through friction clutches, to raise and lower the rail. Danger of breakages is eliminated.

Here is the First Large Size Planer We Built



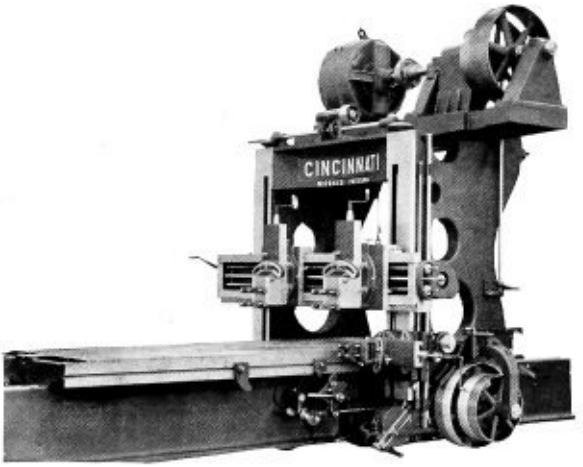
When you come to compare this old style machine with our present day model, you can not fail to notice the extreme difference in simplicity between the two.

For example, you will notice that the side head feeding mechanism of the old style is a very complicated arrangement through a series of compound links, racks and segment screws and ratchets.

Continuing the comparison it is plainly evident how this old type machine suffers in such details of construction as the width of the housing face and the thickness through the box, the length of the housing seat, the depth of the rail, bed and table, etc.

In the present-day type these features have all been increased in their proportions throughout, prompted by the ever-increasing demand for higher speed and more powerful planers; which has also suggested to us a change from the single to the double belt drive.

And Here is the Same Machine as Built Today



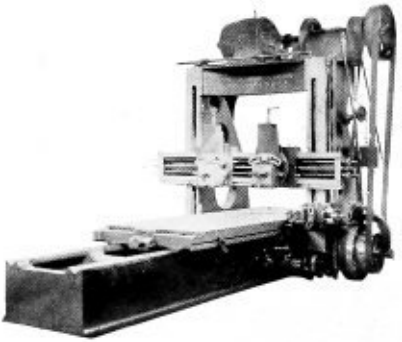
Compare the liberal proportions of this machine to our old model.

Note the matter of superiority in the side head feeding mechanism. In the present type machine this is much simplified. There is only one link from the feed friction to a rack segment, and all variation in feed are obtained by the variable feed gear which is placed on the side head.

This gear is very simple in construction, it being necessary for the operator to only loosen the knurled knob and turn the dial, which is graduated for more or less feed, after which he again fastens the knurled knob. No wrenches are necessary for this operation, as was the case in the old style design.

The pictures show how marked the various changes have been in the design. And increased ability has gone hand in hand with every improvement.

Our Old Style Planer With Single Belt Drive



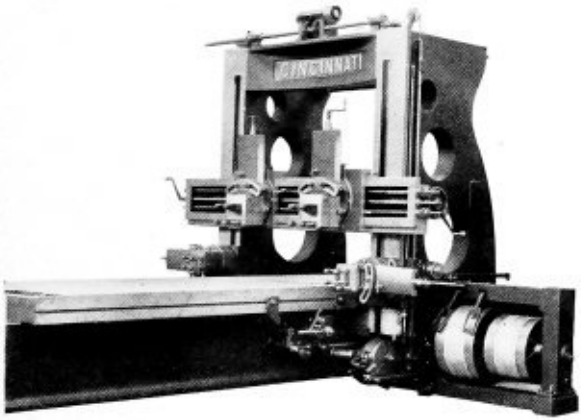
A comparison of the picture shown above and the one on page 25 again shows strongly the marked difference in design between our old and new models.

Old time models are curious relics beside the same machines built today; very much the same as the automobiles of early days are curious exhibits beside the modern motor car.

In the old style planer, illustrated above, we show the single belt drive.

On the opposite page we give our reasons for changing the style drive.

The Way We Build This Machine Today



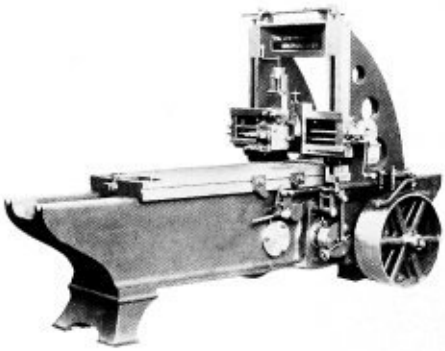
Here you see the double belt for your belt drive; that is, two cutting belts and two return belts, instead of the single belt.

Our principal reasons for making the double belt are as follows:

Two belts of a narrower width will shift very much easier and faster than one wide belt, both having the same pulling power.

In the double belt drive we also get a double gripping surface at the moment of reverse, causing the planer to reverse faster and more accurately than the single belt.

Old Style 24 x 24-inch Heavy Pattern Planer



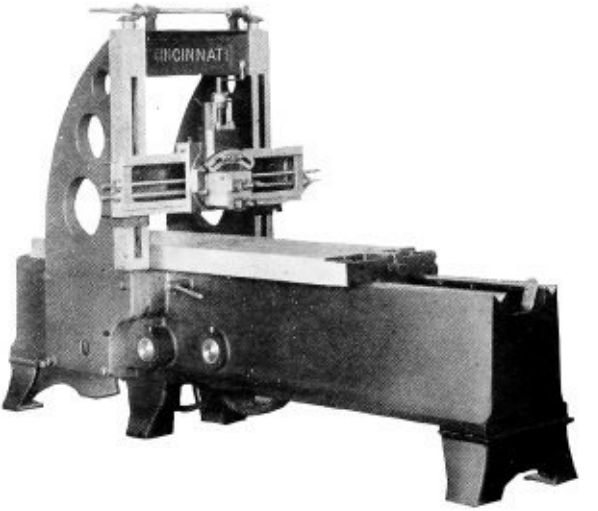
You can see the earmarks of old ideas in design cropping out all over this machine.

Look at the old rounded bed, as shown in this picture, and then compare it to the design of the modern machine as illustrated opposite.

Two of the especially noteworthy improvements found in the development of this machine are covered by the change in the cam design and the elimination of all overhung gears on the outside of the bed.

The picture of the machine, as built today, brings out the fact that the large intermediate gear with its mating pinion, usually found on the outside of the housing, has been dispensed with and placed on the inside of the bed, thereby doing away with the overhang and the possible chance of accident to the operator.

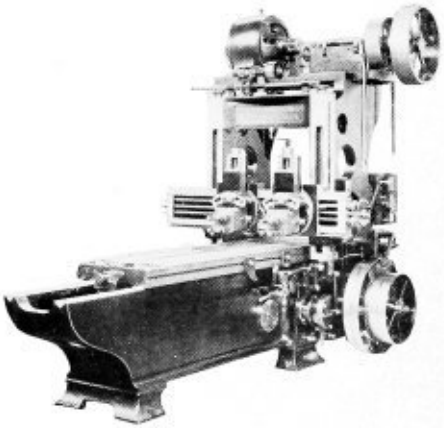
Quite a Difference Today in the Design



The shifting mechanism has been greatly simplified. A barrel-shaped cam, rigidly supported between two bearings, has been substituted for the straight or circular cam.

The cam slots which operate the belt arms are machined into the outside diameter of the cam which receives its reciprocating motion from the table dogs through the link shown passing through the housing cheek. Here, also, a great deal of the linkage has been eliminated, as may be seen by the photographs. The belt arms have been provided with an additional bearing between the fulcrum stud and the loop. This takes care of the downward thrust of the belt, thereby relieving the fulcrum stud from excessive wear.

Now Comes a New Step in the Design

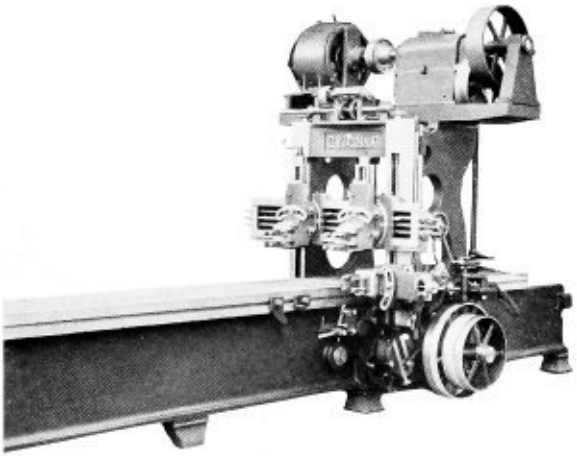


The above picture shows the first planer we ever made arranged with a variable speed transmission giving a constant return. This is in the form of a gear box having a gear transmission very much similar to that of an automobile gear case, except that the speeds were selected by the handles shown at the side of the housings, which operated friction clutches.

Being pioneers in this particular application we used the friction clutch for selecting the speed variations, which afterwards was discarded, owing to the fact that they would not stand up to the shock caused by the frequent reversals.

How we came to change this design, and how we did it, is explained on the opposite page.

The Selective Type Gear Box Transmission

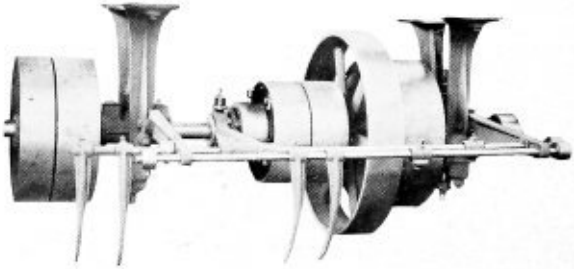


Despite the fact that in our old design we made the friction clutches for selecting the speed variations large and adjustable, we could not find a clutch that would stand up to the service.

This condition led to a redesign in which we decided to eliminate the friction clutch entirely, and we adopted the selective type gear box transmission, as shown above.

This arrangement at once eliminated every undesirable feature found in the first arrangement, and solved the problem. The gear box is bronzed bushed, self-oiling throughout and the shifting mechanism is foolproof and substantial. The entire mechanism does not require any more attention than would an ordinary countershaft.

This Was Our First Tu-Speed Countershaft

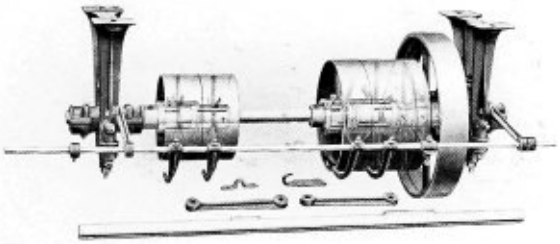


The illustration shows the arrangement—two belts from the line shaft similar to what we now have, except that we included the same idea which was formerly associated with our gear box; that is to say we began with a friction clutch.

We also had two shifting levers, which were more or less trappy, and not at all in line with our present ideas of what constitutes good design.

It takes only a glance to see how greatly the design has been improved. Look at the picture shown opposite, illustrating the modern Tu-Speed Drive.

Here is the Simplified Drive as Made Today



In this new countershaft you will see that we have simplified the drive and made it absolutely foolproof in every respect.

There are no friction clutches or gears used in this arrangement, and one shifter handle takes care of the entire arrangement.

The speeds are selected by an operator's handle at the side of the housing, which shifts the cutting belt from the high to the low speed without affecting the return. Improvement everywhere is found in Cincinnati Planers of today. They are up-to-the-minute tools.

¶ We have now traced the history of the planer from the year 1751 to the present day.

¶ The temptation to continue is strong, for in the design of modern Cincinnati Planers there is so much of interest that might be said, about the rapid power traverse and the reversible motor drive, for example.

¶ Any continuation of the subject, however, would be overstepping the purpose of this booklet.

¶ If you are interested in Cincinnati Planers, and want full particulars, we will be only too glad to send you the proper literature covering the subject.