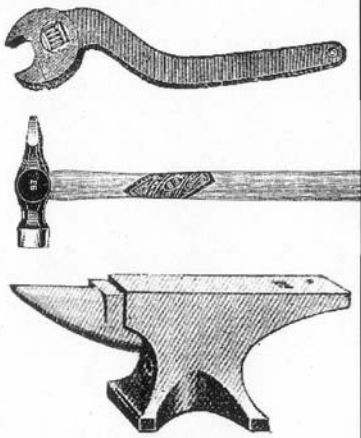


SALVAGE
42
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TTTG Inc.

THE TRADITIONAL TOOLS GROUP (Inc.)

TTTG Newsletter No. 68. December 2002.

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Subscription Renewal Notice.

Cover: Kelso Manufacturing Co. Advertisement.

Australian Hardware. December 1, 1961.

2002-2003 Subscriptions are due.

Subscription Rates :

Sydney \$30. Overseas \$30.

Out of Sydney, Other States and Australian Pensioners \$22.50.

Postal Address.

The Secretary TTTG (Inc.)

P.O. Box 240 Grosvenor Place

Sydney N.S.W.1220.

Enquires: Mike Williams

02 9144 6356

Bob Crosbie

r.crosbie@bigpond.com

tttg.org.au

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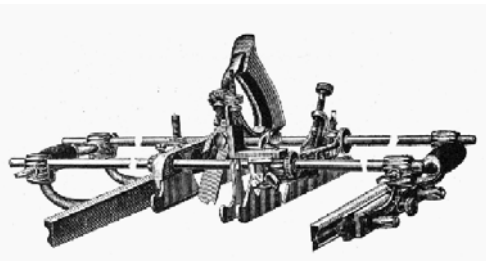
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<http://www.hansbrunnertools.gil.com.au>



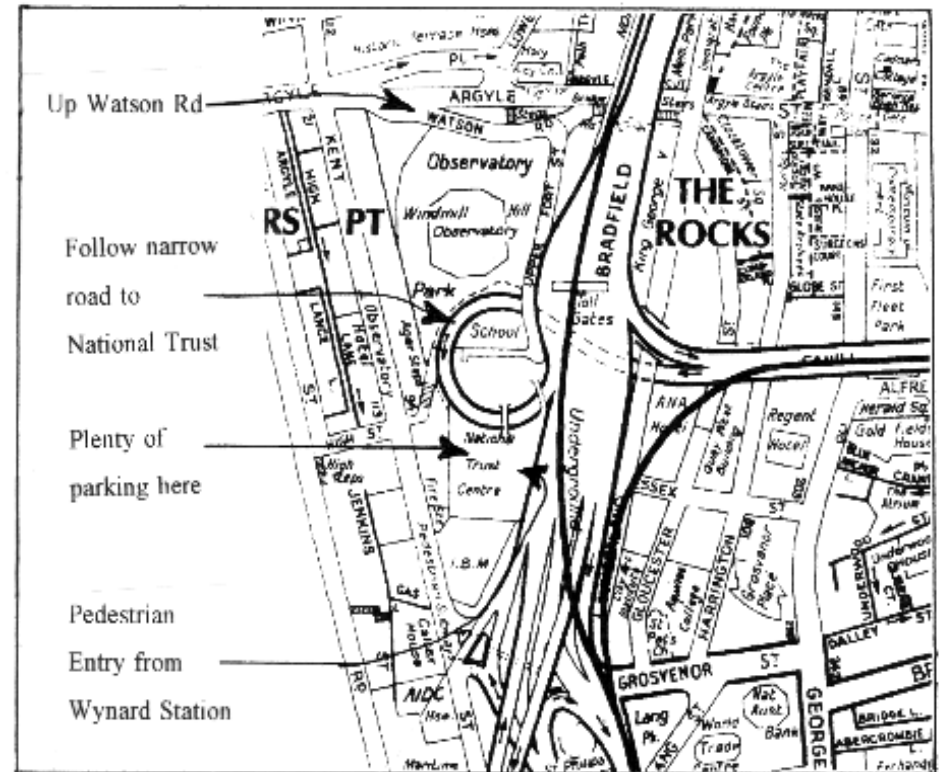
Hans Brunner Tool Auctions

Email: hbrunner@gil.com.au

Phone: (07) 3281 0280

Next Meeting
National Trust Centre,
Observatory Hill.

Tuesday 10th December 2002
Annie Wyatt Room
Commencing at 7:00pm



PROGRAMME

1. AUSTRALIAN INNOVATION- POST WORLD WAR II GADGETS. WE HAVE ALL SEEN GADGETS WITH "MADE IN AUSTRALIA" AND "PAT. APPLIED FOR" THIS IS YOUR CHANCE TO FIND OUT MORE ABOUT THESE AUSTRALIAN MYSTERY TOOLS. MEMBERS ARE INVITED TO BRING ALONG SUCH GADGETS FOR DISCUSSION.
2. FRED'S WOTSIT
3. OUR FUN AUCTION.
4. SUPPER BY MARIO DATO.

Next Meeting.

Time: Tuesday Evening **10th December 2002**
Location: **National Trust Centre.** Annie Wyatt Room.
Observatory Hill. The Rocks. Commencing at **7:15 pm.**
Topic: **Australian Innovation.**
Post World War 2 Gadgets.

Three well-known Australian tool innovations from the post war years are the Frazer Saw Sharpener, the RUFA square and KWIK RIP Fibro cutters. There are many more examples of Australian inventiveness. Some like Victa are remembered, others like The Little Digger forgotten. Tonight we will see a wide selection of local gadgets, tools and devices. Often the local maker "went one better" than an overseas manufacturer. For example Starrett made a device to allow mechanists to sharpen twist drills "on the 59", the best general-purpose angle. A Sydney based engineer patented an adjustable gauge to check any angle so that twist drills could be ground "off hand" with accuracy to suit any type of metal. Innovation at its best is manifested in the ETECO Hacksaw Jig. Marvel at a device that turns a hacksaw and vice into a Milling Machine.

With Christmas around the corner the auction will provide great presents.



Right on the 59°

Previous Meeting.

8th October 2002

Making and Repairing Tools

Members were encouraged to bring home-made tools and to share their own experiences. This they did and no one was shy in voicing an opinion. Ideas, sources of materials, successes and failures were shared. The auction that followed was perhaps the best one so far. Where do we find such treasures and how can we let them go so cheaply? The TTTG Committee intends to follow up this evening with "a hands on" workshop on metal working and tool making early in 2003.

PLEASE REMEMBER:

2002/2003 SUBSCRIPTIONS ARE NOW DUE.

Advertisements.

RATES.

All **WANTED** and **FOR SALE** advertisements **are free.**
Quarter Page \$10 per issue. \$50 per annum.
Half Page \$15 per issue. \$80 per annum.
Full Page \$20 per issue. \$100 per annum.
First placement is free.

WANTED

- Any planes made by Jas. McLaren Melbourne, even a photo.
Spiers or Mathieson Thumb, Chariot, and any Gunmetal Planes
Phone Jim Black. Phone 0351 825561.

-Anything relating to Alex. Mathieson and Sons.
Phone John McDonald. 02 6288 6142. PO Box 13 Duffy A.C.T. 2611.

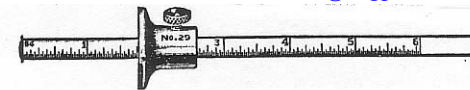
- 720 Stanley chisel (marked so) in 1 1/4 width (VG condition)
Stanley block plane #140, a screw for side.
peterrevans@optushome.com.au

-Wrenches and spanners marked "Connolly", "Connolly Sydney",
"Connolly - Southern Cross", "Dingo", "Gyrex", "Zircalloy"
Uncommon Australian made Spanners & Wrenches, Shifters etc .
Trade Catalogues from Australian Stores, prefer to swap for others.
George Radion. 03 9557 1178 email: radion@iprimus.com.au

-Shaper/Planer tools and tooling, any condition.
Micrometers, complete or parts, all types, cash paid.
John Bates. Phone Business Hours 02 9931 1467, After Hours 02 9859 5094.
urban systems @ big pond.com

-Blacksmiths Post and Bench Drills, hand or power, any condition, up to 1940.
Buffalo, Champion, Silver, Globe, Dawn, Goodall Pratt, Union.
Rick Mitchell. Phone 4751 4762 or 4751 9797.

-Starrett Scratch Gauge No 29.
Woodworker Annuals. Numbers 48, 49, 52, 53, 54, 56. & pre 1940.
Bob Crosbie. Phone 02 9869 7487, r.crosbie@bigpond.com



Library News.

Rick Mitchell

Periodicals Received.

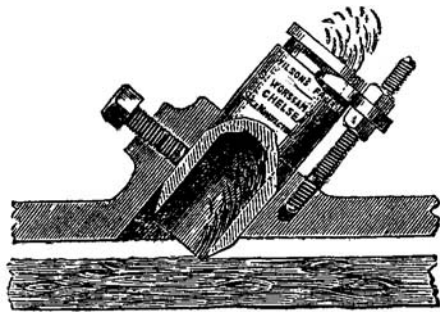
- Hand Tool Preservation Society of Western Australia. (HTPSWA). Newsletter.
- Hand Tool Preservation Association of Australia Inc. (HTPAA). Tool Chest/Sharp Edge Vol.14 No. 22. Issue 64, May 2002.
- TATHS. Tools and Trades History Society. Newsletter 78 Autumn 2002. Journal Vol. 13.

Directory.

- The Traditional Tools Group Inc. (TTTG)
Mike Williams. The Secretary TTTG
P.O. Box 240 Grosvenor Place. Sydney N.S.W.1220.
Enquires: Mike Williams phone 02 9144 6356
Bob Crosbie e-mail : r.crosbie@bigpond.com
tttpg.org.au
- Tools and Trades History Society. (TATHS)
Membership Secretary: Jane Rees.
Barrow Mead Cottage. Rush Hill, Bath. United Kingdom.
BA2 2QP 01225 837031 (Office hours only).
- Hand Tool Preservation Association Australia. Inc.(HTPAA).
P.O.Box 1163 Carlton. Victoria. 3053.
- Hand Tool Preservation Society of Western Australia. (HTPSWA).
8 Belham Street, Bayswater. Western Australia

What is it?

The mystery tool illustrated in News 67 is described below.



Wilson's Patent Cylindrical Gouge. The Mechanics Magazine. July 1, 1864

Editor's Notes.

What is TTTG Doing?

TTTG is well known as being pretty informal and laid-back.

The Committee doesn't waste time on formalities and procedures much preferring to get on with the task in hand. If any member wants to take another direction, then that member can join the Committee. You want a job on Committee then a position will be created. Subject of course to the Annual General Election. So far no one has been voted out of office!

As for criticism the Committee is open to ideas. For example at the last Committee meeting our Web Master pointed out that he had received a few emails complaining about the Editors allowing typographical errors to appear in News. The Editor was quick to reply that he was a poor speller and bad typist and that only by having a proof-reader could print quality be improved. He then asked Darcy for some examples and before anyone realised the Web Master now also has the job of TTTG proof-reader.

Which brings me to the topic of the TTTG Web Page. This is going well with lots of hits and positive comments. The web page is still in its infancy but it is making its presence felt.

The Illustrated Guide to Australian Tool Manufacturers (see Web News) should prove to be popular. In say a years time we should have details and images of most Australian made tools and machines posted on the site.

TTTG is encouraging Henry Black to arrange another Tool Sale in 2003. There are other tool sales in Australia, but Henrys' remains the premier sale. That said the TTTG auctions at the General Meetings are doing fairly well. Where else could you find such bargains. TTTG can also sell on your behalf.

The November Workshop was a great success. We welcome the new members. Other workshops are planned for 2003. Some will be at Wood Works while others will be more "hands on" in a workshop setting. Tell us what you want. See "Events" for more details.

Almost forgot to remind you that you will be receiving two letters from TTTG this month. One contains this newsletter, the other contains your free reprint of an early Carter leaflet. You can order extra leaflets, just great for Christmas.

We may be laid-back but things are happening.

Events.

2003 Saw Sharpening Workshop.

When: 8.30am to 1.30 pm Sunday 16th February 2003.

Where: A High School Workshop in Sydney.

This is a hands-on activity in a fully equipped workshop.
Each person will have his or her own bench space and vice.

You will:

- make a saw vice .
- make a wooden saw jointer .
- joint your saw using the jointer you have made.
- use a saw file to shape the teeth .
- use a saw set to set the teeth.
- sharpen the teeth using a saw file.
- dress the sides of the teeth with a file or oilstone.

Please note: all necessary tools will be available.

saw files can be purchased at a discount rate.
a limited number of saw sets will be on sale.

Maximum number of participants is 15.

Please bring your saws for sharpening.

For a learning exercise rip crosscut saws with 4-6 tpi are most appropriate.

If you are looking to buy a saw set, look for the following brands – Eclipse, Stanley 42 range, Disston 24. Second hand is the best choice.

Cost: \$15 for financial TTTG members or \$30 for non members.

Join TTTG and enrol for the Workshop and pay only \$40.

Please note this workshop is a members' only workshop.

If you are not a current member of TTTG, you will need to join in order to attend the workshop.

Special Offer.

Join TTTG and enrol for the Workshop and pay only \$40.

Expressions of interest are called for. Enrol early to avoid disappointment.
Please complete the Sign –up Form. See TTTG Web Site for email addresses.

Information Received.

Stewart “Yankee” Spiral Ratchet Screwdriver.

G E Stewart Rochdale NSW.

The Editor saw one of these at a market sale recently.

This allowed a close examination. This is a very well made tool.

Has anyone seen other Stewart tools?

For more details see Thomas Directory.

Making Metal Planes.

Michael Doherty has started an electronic book on making metal planes.

Lots of good material has already been posted. If you are interested contact Mick on <mickdoherty@ozemail.com.au> for details.

Information Wanted.

BISHOP Gouges.

I recently acquired four substantial (tanged) gouges - 2 1/2" down to 1 1/4" - marked BISHOP in large letters followed by a Fleur de Lys device. The name is preceeded by an even larger 'S' which I suspect is to indicate Sheffield. Does anyone have some history about this maker?

Regards Fred. PS. I will be at the next meeting with the gouges.

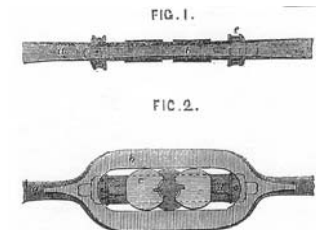
Ozitool Mail.

How To Join.

Please follow this link and login to mc2:

http://mc2.vicnet.net.au/forum_login.cgi?gid=412&mid=7772&fid=401&reply2forum=1

News 69. Find out what this is.



Pemuvar Plough planes.

Around the years 1951-1954 Parry & Sons and Tyzack London retailed a metal plough plane named PEMUVAR.

Only six advertisements for Pemuvar appeared in the Woodworker.

Parry & Sons included the plane in advertisements in the Woodworker dated June, April and November 1951 and in March 1954.

Tyzack London included the plane in advertisements in the Woodworker dated April and June 1953.

The plane came in a box and had "8 plow irons, 1/8" – 9/16".

This is the standard set of irons supplied with a standard beech plough.

The Pemuvar is not a combination plane but a metal plough plane.



Special offer of PLOW PLANES
Best quality Plow Planes. Adjustable.
Complete with 8 cutters, range $\frac{1}{8}$ " to $\frac{9}{16}$ "

Price **40/-**
POST PAID
**SPECIAL
FREE GIFT
with every plane**

The Woodworker's pocket book,
cramped with information essen-
tial to the woodworker ★

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The Traditional Tools Group Inc.

2003 Saw Sharpening Workshop.

8.30am to 1.30 pm

Sunday 16th February 2003.

Sign-upForm.

Name:
Address:
Email:
Phone:
<i>Workshop Fee: TTTG members \$15, Non-members \$30</i>
<input type="checkbox"/> Yes, I am a member of TTTG. Fee \$15
<input type="checkbox"/> I am not a member of TTTG. Fee \$30
<input type="checkbox"/> I wish to join TTTG. Fee (membership & workshop) \$40_
<input type="checkbox"/> I cannot make the workshop, but wish to join TTTG. Fee, \$30
I want to pay by:
<input type="checkbox"/> Cheque <input type="checkbox"/> Money Order <input type="checkbox"/> Cash

You will receive confirmation of registration with further details.



Send a completed copy of this Sign-up form to:

The Traditional Tools Group Inc

PO Box 240 Grosvenor Place

Sydney NSW 1220

News 69

The Lewin Combination Plane.

Practical Hints.

Tools for working sheet copper.

Classic Australian made tools.

And more!

Web News.

The Illustrated Guide to Australian Tool Manufacturers.

The web site is being enhanced to include a guide to information on manufacturers of all types of tools; hand, machine and power tools.

The guide will cover all trades.

This covers an enormous range of manufactures, so the page is developing over time. We look forward to contributions from TTTG members.

Have a look on the web site, and make sure you check through your collection/accumulation for any material on our tool makers.

If you can contribute personal remembrances, so much the better.

Bring your Australian tool material to the December meeting, and increase our understanding of our tool makers.

Darcy Hourd
Webmaster

TTTG Publications.

Within a few days of Newsletter 68, TTTG members will receive a bonus mailout. This is a Reprint of an undated Carter Tools colour Leaflet and is the first of a projected series of TTTG publications.

Work is currently in hand on two publications timetabled for early 2003.

These are:

- A compilation of TTTG articles by John Daniels.
(Title to be announced in News 69).
- A series of Extracts from an early Anthony Hordens Catalogue.

Other publications are planned.

Any members who have suitable material should contact the Editor.

Financial TTTG members will receive one copy of each publication free.

Additional copies will be printed for sale to non members.

TTTG members receive 10% discount on additional copies purchased.

Eventually "The Illustrated Guide to Australian Tool Manufacturers" will be offered in printed form.

Due to the cost of colour illustrations and the anticipated demand the Committee intends to seek a joint publisher.

Mitor Mitre Trimmers.

From the late 1940s to the late 1950s Mitor Ltd. (Vaughan Road. Harpenden. Herts.) made and retailed two Mitre Trimmers.

Mitor Ltd promoted these machines in the Woodworker in 1949, 1950, 1951, 1953, 1956, 1957 and 1958.

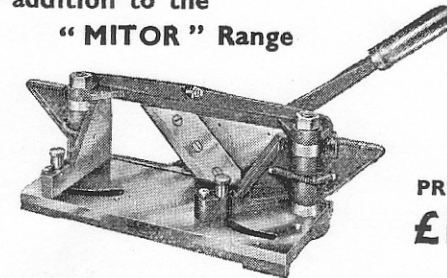
The two Mitor Mitre Trimmers are;

301. Mitre and Shaving Machine.

302. "an inexpensive mitre machine within the reach of all".

Mitor Ltd also made two metal Plough Planes in 1950.

A new addition to the
"MITOR" Range



PRICE
£12

MITRE & SHAVING MACHINE No. 301

Adjustment provides for cutting positions at all angles from 45° to 90° in both directions and a positive location is provided at both 45° and 90°.
Cutters made from Tungsten

Steel manufactured by Samuel Osborn & Co. Ltd. of Sheffield.

Shaves wood up to 3" square.

Double geared action ensures easy operation



**VAUGHAN ROAD,
HARPENDEN, HERTS.**

Phone : HARPENDEN 3895

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Ironmongers, Builders' Merchants

Mitor "Plough planes that please."

In 1950 Mitor Ltd. (Vaughan Road. Harpenden. Herts.) made and retailed two metal plough planes.

Only three advertisements for Mitor planes appeared in the Woodworker.

These were in the January, March and October 1950 issues.


The No. 88 had 6 cutters, 1/8" - 7/16".

The No. 95 had 7 cutters 1/8" - 1/2".

The 95 is a Plough and Bullnose Plough plane with

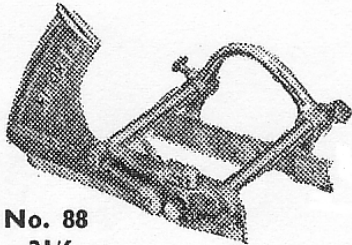
"Spare tools stored in neat rubber holder in handle pat applied for."

Mitor also made two Mitre Trimmers from at least 1949-1958.



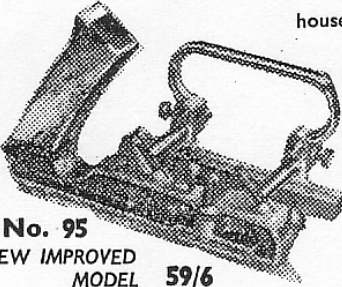
PLOUGH PLANES THAT PLEASE

Complete with 6 Tools,
sizes $\frac{1}{8}$ " - $\frac{7}{16}$ ".
Gunmetal, chrome finish :
specially strengthened
fence mounted on steel
pillars : easily operated
depth stop.



No. 88
31/6

7 tools supplied— $\frac{1}{8}$ "— $\frac{1}{2}$ ". Spare tools:
housed in neat rubber holder in handle
(patent applied for).
High-grade gunmetal, finished in
chrome ; screw adjustment depth-
gauge ; extra cutting position
for bull-nose work ; fine screw
adjustment of tool ; dual fence
positions.



No. 95
NEW IMPROVED
MODEL 59/6

Obtainable from Ironmongers and Tool Merchants.
If any difficulty write to manufacturers :—

MITOR LIMITED, HARPENDEN, HERTS. Tel. : HARPENDEN 3895

The Illustrated Guide to Australian Tool Manufacturers,

On the TTTG Web Page.

This web page provides a guide to information on manufacturers of all types of tools, covering all trades, and including machine and hand tools. This covers an enormous range of tools, so the page is developing over time. TTTG looks forward to readers contributing material to build a source for those interested in Australian tools.

The page design:

1. A listing of known manufacturers.
2. Links to sources available on the web.
3. References to materials such as catalogues, books, patent information, company reports, archives.
4. Photos of tools and boxes, scans of catalogue entries, instruction materials and advertisements.
5. Historical information.

Many of the people stopping by this page will have *some* information on manufacturers listed, and some not yet "discovered". For example, some idea of when the business operated is of great assistance. The Guide is not limited to the dead and buried manufacturers, but is intended to include contemporary manufacturers.

General sources.

-T Semmens, Australian Planemakers 2nd edition provides good coverage of planemaking up to present day. Available from TTTG or the author.

-R Thomas (ed) Directory of Australian Tool Manufacturers,

HTPAA 2001. A listing of hand tool manufacturers. This is the first version of a work-in-progress, and an essential reference.

-TTTG Newsletter has many articles on Australian tool manufacturers, and extracts will be added over time.

-Tool Chest, the journal of the Hand Tool Preservation Association of Australia (HTPAA) has many relevant articles. Those articles will be referenced below, many back issues are available.

TTTG members are requested to report any sighting of Australian made tools, machines, power tools or trade devices.

Correspondence.

Peter Evans communicated via email, At North Rocks today I picked up an ETECO Drill Gauge made by the Efficiency Tool & Engineering Co. 154a Albion St Surry Hills - in the box with the instructions. It cost 15/6. No date evidence anywhere, on the tool there is REG. No. 13828/44. The last digits may refer to the year, probably a registered design number. This is not in Thomas, are you familiar with the item? In good nick, probably a testament to its usefulness! I also saw, but did not buy a Tension Wrench (there were two at \$40 - Gordon) by Ritch, again not in Thomas. I should probably take my camera to photograph Oz tools I do not want to buy.

The editor forwarded this to Rod Thomas who, as always, replied promptly.

Bob,
Thanks for the additional information, I will add it to the Data Base in due course. Peter is correct, the /44 would indicate the year the application for "Registered Design" was made. I agree also, we should all have cameras available or at least pencil and paper to record these occasional sightings.

Editors comment.

The ETECO Drill Gauge will be on display at the next General Meeting. It is the one I allude to in Next Event. Maybe not as well made as Starretts' but I could find drawer space for an ETECO Drill Gauge in my Tool Box.

Rod Thomas has great knowledge of Australian made hand tools and is always willing to share his expertise. Any information received by the Editor is immediately passed on to Rod. I look forward to many more years of sharing information from TTTG members with Rod.

FOR SALE.

2 Copies only of DANKS Catalogue. Reprint by HTPAA. August 2002. \$15 each. At the General Meeting. Sorry no mail orders taken. If you missed out by not being a HTPAA member this is your only chance to get a copy, this catalogue is well worth adding to your library. The modest profit goes to TTTG. It all helps!

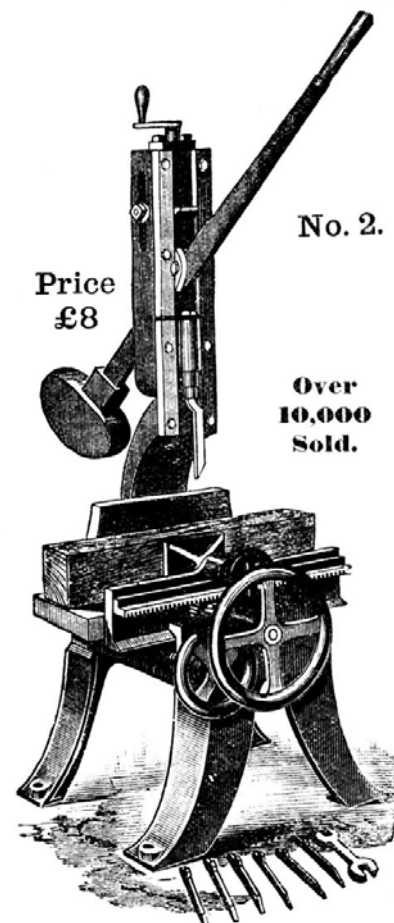
EMAIL THE EDITOR ON r.crosbie@bigpond.com

WILSON BROS., VICTORIA MACHINE WORKS, VICTORIA ROAD, LEEDS.

Patent No. 2504.

CENTRE MOTION, MORTISING, BORING, AND TENON MACHINE.

Complete with Chisels, Drifters, and Screw Keys,
Boring Apparatus, and Auger, £1 10s. extra.
Tenoning Tool, £2 extra. Weight 3cwt. 2qrs.



The old principle—lever working off side—entirely dispensed with. The lever in this Machine being directly over its work, makes it more powerful and easier to work.

When you buy have no other but the Centre Motion with Direct Action. Always in Stock. Delivery at once.

COMPLETE CATALOGUE FREE.

Hand Operated Mortising Machines.

The editor has purchased a hand operated Boring and Mortising machine. The machine is the "Star" made by Alex. Mathieson. A set of chisels and drifts came with the machine. On Ozitool I posted a request for information. Nigel Lampert and John McDonald posted replies. This led to further correspondence. It will be no surprise to those who know John to learn that he has a Mathieson Star Boring and Mortising machine, complete with chisels, drifts and augers. Both have helped in compiling this information.

Makers of Mortising Machines. United Kingdom.

Nigel did some quick research and has drawn up the following list.

-1899 listed makers

F.W. Reynolds, London
W.B. Haigh Ltd., Oldham
C.H. Matthews, Wolverhampton

-1905 listed makers

Joseph Green & Nephew, Leeds
F.W. Reynolds, London
W.B. Haigh Ltd., Oldham

-1914 listed makers

Wilson Bros. Leeds
F.W. Reynolds, London

-1938 listed makers

Wilson Bros. Leeds
Wylie, Matthew & Co. Ltd., Glasgow

-1952

Electric mortising machines

By 1952 no hand machines listed but some would still have been around.

"This is of course not at all exhaustive but possibly reveals something of the picture" is Nigel's cautious qualification.

Tapers.

Tapers varied but some tapers fit machines by different makers.

Mathieson's taper, judging by my Star, is a true Morse taper and fits another Mortising Machine I have, no makers plate. Other chisels I have, including American ones, do not seem to be standard tapers but they may be some old series of tapers (I haven't checked out the old texts).

Numbers.

My Star and its Chisels are stamped with the number 2783. Another chisel, which fits the Star, is marked D4, other chisels that fit the Star are not marked with any number.

John McDonald's chisels are marked Mathieson, mine only have the number 2783.

Help Wanted.

If you have a Mortising machine please send me details of marks etc.

With more information I might be able to write a further article!

Correspondence.

Not only does Horacio find time to travel from the Gong to our meetings but he often emails material to the Editor.

Stanley Sales Pitch

I recently acquired an old book titled *Home Carpenter's Practical Guide* (c.1953) which features illustration on use of a jack plane. On closer inspection, I recognised the character as the one featured on the famous Stanley brochure – *Hints on using a STANLEY PLANE* (see below). Just an interesting piece of trivia which is worth sharing, if only to suggest that **Stanley Works** relied on live characters for their propaganda effort. HR



EMAIL THE EDITOR ON r.crosbie@bigpond.com

Most definitely Australian made.

Is this plough plane another foreign order, or is it a prototype that was never patented or is it just another “backyard manufactured” tool made by some Aussie battler?

We see many examples of user-made tools with a close resemblance to some commercially manufactured example. Occasionally we come across something a little unique, perhaps not unique in its purpose, but certainly in its design and construction. Lets forget about the commercially manufactured ploughs and look at the example in the photographs with fresh eyes.

This plane, no doubt, was the brainchild of a person with an appreciation of good design and an understanding of metal fabrication. This is evidenced in the use of overlaying (laminating) of rectangles to build up the body thickness and the use of oblique and vertical parallel lines to please the eye without sacrificing utility. The overall design is simple and basic, with function and assembly the main concern. There are no unnecessary embellishments, rather the line and balance of the tool is enough to gain user acceptance. In other words, the tool looks the part and conveys that it can do the job.

The plane feels good to hold, feels positive on the job and delivers a good result. One can only admire the makers of such tools, whether they wear white shirts, blue collars or worn out black singlets, they have all played an important role in our trades past.

Photo 1. All parts hand shaped. Winged screw and lever screw and depth stop turned on a lathe and hand finished.

Photo 2. Shows depth stop bracket, hand shaped.

Bob Crosbie spoke about a similar problem with cast iron plane bodies which, following the removal of their ‘skin’, tended to grow or otherwise lose their flatness after grinding or filing. Again residual stresses are involved.

The two offending bits of stuff in the steel are austenite retained after quenching and untempered martensite. A real life case demonstrates the effect of this instability. This involved a rarely used set of blocks only 2 years old that had been returned to the maker for certification. It was found that each block was short by many times the tolerance for its class, and in nearly direct proportion to the size of the block. The error range was from 0.000 034 for a 0.05-inch piece to 0.000 596 for the 3-inch block.

So mechanical changes occur in response to the release of internal stresses set up in the body of the steel during hardening. It is also known that these stresses, which vary from point to point in the mass of metal, cause corresponding strains and as these gradually die out with time the dimensions of the steel alter accordingly. Furthermore slow constitutional changes also take place in the metal and these too are most probably accompanied by dimensional change.

Put simply then, it is wrong to assume that ‘gauge blocks is gauge blocks’. However perfectly made no set may be assumed to stay that way forever – even if they have never been used! Indeed, the instability of steel blocks prompted a move to more stable carbide and ceramic materials when the utmost in precision is needed. With regular calibration, the steel block is still OK for workshop and general inspection.

A MEASURE OF OUR PROGRESS.

Measurement is the comparison of an unknown dimension to a known standard. Good measuring instruments were a key to high-volume production. Without known standards, parts could not be built accurately enough to be interchangeable. Each assembly had to be hand fitted together.

Today, measuring tools are essentials for most machining operations from initial part layout to final inspection. Gauge blocks occupy (or did) the keystone position in the precision structure that assures the dimensional conformity and interchange ability of parts that flow into the mass assembly of tools, machines and other products that are part of our daily existence. So as you screw nut onto bolt, give a thought to Carl and the ‘mystery’ of the Jo-block.

JO-BLOCKS: A REPRISE.
THE 'MYSTERY' OF THE JO BLOCKS.

3

Wringing:

The phenomenon of the 'wringing' together of polished surfaces has been the subject of a great deal of scientific study over the years. The atmospheric pressure theory was demolished simply by conducting wringing experiments in a vacuum. Wringing is now generally accepted as due to molecular attraction between a thin film of liquid between the gauges and the gauges themselves. This is borne out by the fact that gauges that are chemically 'clean' exhibit no marked tendency to wring.

To wring well blocks must be free from 'fuzz' or burrs which project above the true plane. The quality of the surface also governs gauge characteristics such as the ability of the blocks to wring together, their resistance to wear, and the accuracy of length measurement by mechanical or light wave (interferometric) methods.

Stability:

As to the blocks being 'stable' under changes in temperature this is most definitely not the case. Each and every block will expand and contract with changes in temperature and the amount of movement can be calculated according to the coefficient of linear expansion for the material of which the particular Jo block is made. For steel blocks the rate is around 11.0×10^{-6} per °C. So a 5°C rise above the standardisation temperature would see a 1-inch block measure 1.000 055 inches. Nevertheless, provided that all the tools and materials involved in measurement are of steel and are also at the same ambient temperature thermal expansion presents little difficulty to the use of 'Jo-blocks' in the workshop.

Hardened steel in addition to its well-ordered obedience to the laws of thermal expansion is subject to erratic and entirely unrelated dimensional variations of considerable magnitude. These changes can be either shrinkage or growth and may occur under the following conditions:

- slow progressive change continuing for months or years, which may start immediately after hardening or at any time thereafter;
- an instantaneous and complete change at any time after hardening; and
- a reversal of direction of change at any time after hardening.

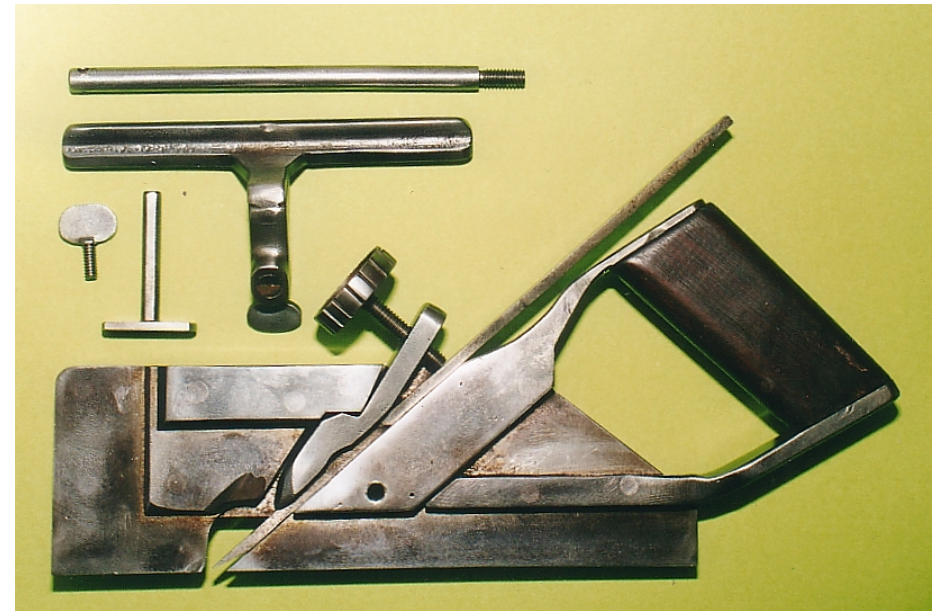


Photo #1

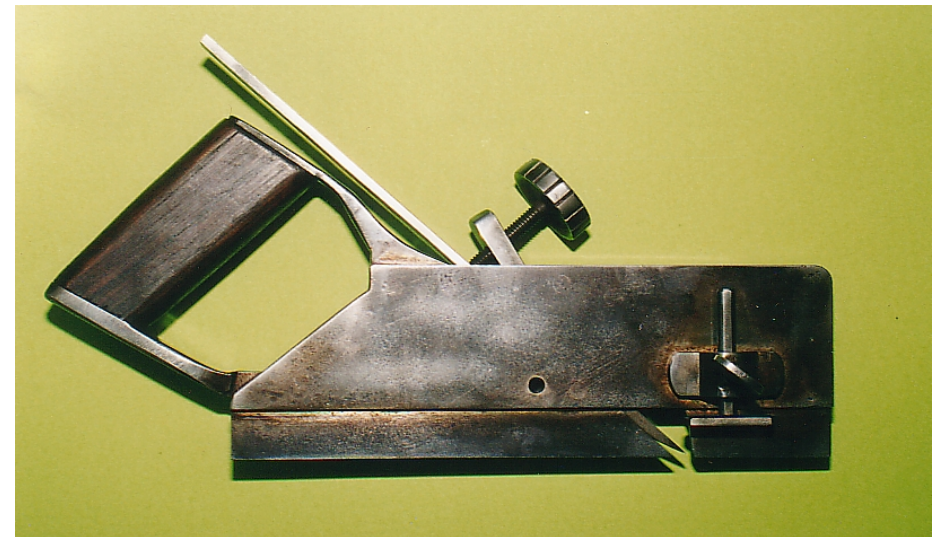


Photo #2

JO-BLOCKS: A REPRISE

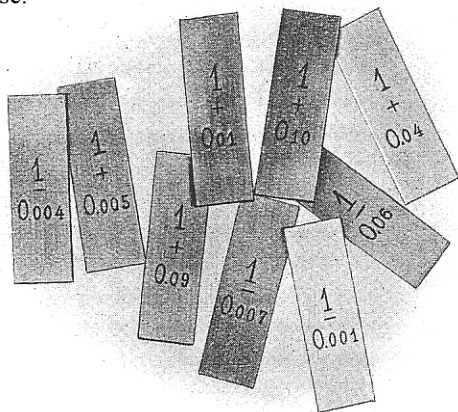
John Bates

Terry Butcher's article on the 'Jo Blocks' touched a chord very near to my heart. The urge to respond was simply too great to resist.

The year was 1894 and Johansson was an armourer inspector at the Carl Gustaf Stad rifle factory in Eskilstuna, Sweden. The Swedish Government had placed an order for new rifles with the Mauser Co of Germany. CEJ was sent to study the manufacture and inspection of these rifles. As in Sweden, the Germans literally used thousands of block gauges to maintain tolerances – and each one had to be made, checked and stored. Every new product meant a whole new set of gauges. But the gauges were not in any way related back to the standard metre in Paris. No one thought it necessary as long as gun parts from that factory were interchangeable with one another.

WHEN IS AN INCH NOT AN INCH?

The importance of a common standard of measurement is highlighted by this story. In 1914 Australia agreed to contribute to the war effort by making small arms (Enfield 303 rifles) at Lithgow, NSW. At the time Britain had two major manufacturers - Birmingham Small Arms (BSA) and the Enfield Armoury. Blueprints for the rifles were sent to Australia and the arms factory was duly built at Lithgow. But the two British factories had just standardised their inch. Previously there were two inches used in British arms - the Birmingham inch and the Enfield inch. The blueprint sent to Australia contained the wrong inch, so our arms and ammunition were not interchangeable with the British built ones. Not a good result for allies fighting side by side. Lack of a common standard had defeated the whole purpose of the exercise.



JO-BLOCKS: A REPRISE.

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MAKING THE FIRST SET.

But back to CEJ - in 1896 Carl was heading home after a virtual two-year residence at the Mauser works in Oberndorf. Perhaps it was the thought of what lay ahead of him when Stad began making the Mauser rifle under licence, or a stroke of pure genius, or both. But on the train to Eskilstuna he developed the theoretical framework and design of a set of combination gauges blocks. His concept was for a set of 102 gauges (metric of course!) consisting of:

49 in steps of 0.01 mm from 1.01 to 1.49 mm;

49 in steps of 0.5 mm from 0.5 to 24.5 mm; and

4 in steps of 25 mm from 25 to 100 mm.

With such a set any dimension from 1 to 201 mm could be made up to the nearest 0.01 mm (0.0004-inch). This would provide some 200,000 sizes by using gauges singly or in combination. Carl even decided on 20°C (68°F) as the standardisation temperature and set the width of the face at 9 mm. Both have been the metric standard ever since.

But Carl was more than a mere theoretician – he had also worked out the method for making the gauges and was eager to try it out. Pressure of work at the factory meant that he had little time to work on his gauges until after 1898. His manager at Stad gave permission for him to have the blocks machined and rough ground in the factory. The finishing process was the final and most important task and Carl kept that strictly to himself. Well almost! You see he had married soon after returning from his stint with Mauser and his wife, Margareta, was interested in his work. Just as well because CEJ commandeered her sewing machine to lap the gauges and used her kitchen pots and stove to normalise or relieve the internal stresses in the gauges! Margareta also helped in more practical ways. She lapped the gauges while he was at work and when the inspector returned home, handed over the gauges for checking and measuring together with her record of the measurements.

The first set of gauges was, of course, for the Stad rifle factory and these were delivered in 1899. Together, Carl and Margareta had turned his idea into a reality. Like most great men he had to endure and overcome rejection born out of ignorance, suspicion, mistrust and the inability of others to see the benefits inherent in his product. Johansson applied for a Swedish patent in 1898 which was initially rejected then finally granted in January 1904. By contrast his British patent application of June 1901 was granted in just two months.

There was also the problem of marketing inch gauges for the American and the British markets. Lack of a common standard at the time meant that not only was the British and American inch different (25.399956 mm Britain and 25.4 mm USA), but so too was the standard temperature for measurements (62°F Britain and 68°F USA). All problems he could well have done without.