

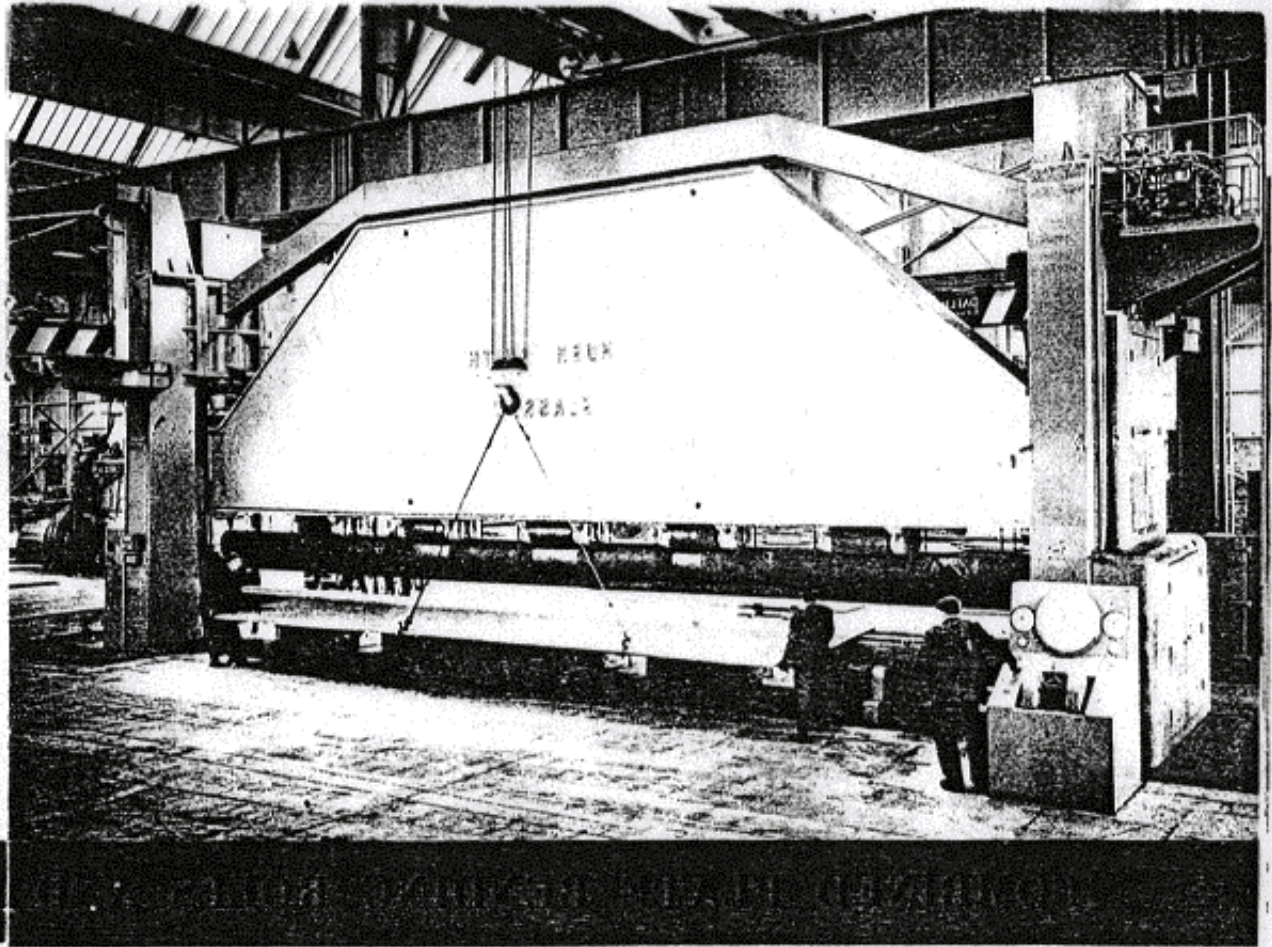
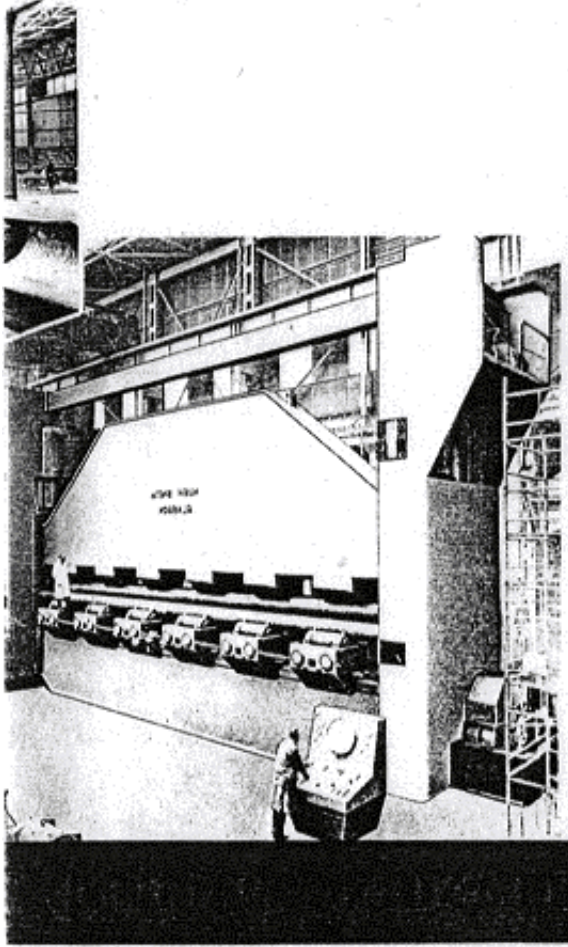
Plate Bending

Tecnologia de Estaleiros Navais

Plate bending

- One curvature (cylindrical & conical shells)
 - Mechanical
 - Very good quality
 - Thermal
 - Poor quality
 - Difficult to avoid a 2nd curvature
- Two curvatures
 - Mix procedure
 - Thermal procedure
 - Mechanical procedure

Bending Machine



Shipyard Roll Press

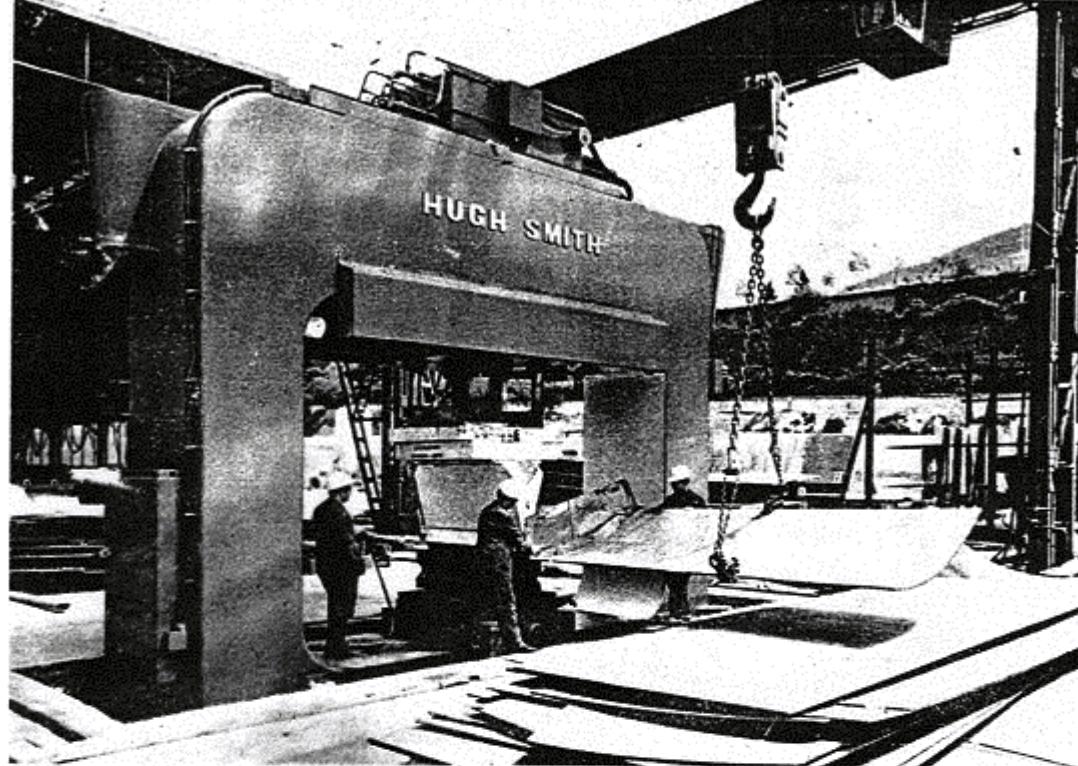
- For Rolling Hull Plates, Bilge Turns, Shear Strakes and Derrick Posts, also Flanging bulkhead corrugations and knuckle plates
- Sizes from 600 Tonne to 3000 Tonne capacity or more with lengths up to 21 meters
- Deflection compensation for top and bottom beams
- Infinitely adjustable bottom roller centres
- Offset bottom roll adjustments for minimum end flat
- Top roller end pre-load to minimise droop
- Top beam angling capability for conical rolling
- DNC control system
- Currently 65 MACHINES supplied worldwide
-



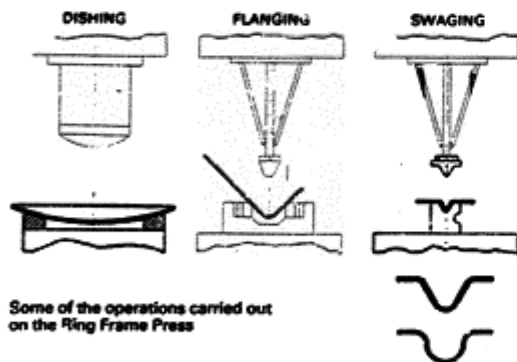
Roller and Bender

http://www.hughsmith.co.uk/shipyard_roll_press.htm





The HUGH SMITH RING FRAME PRESS



Some of the operations carried out on the Ring Frame Press

The press is designed for plate forming on a flow line basis and its accuracy is ensured by the rigidity of the heavy unit construction ring frame. Hydraulic operation gives precise control and enables full power to be applied at any point of the stroke and for as long as required.

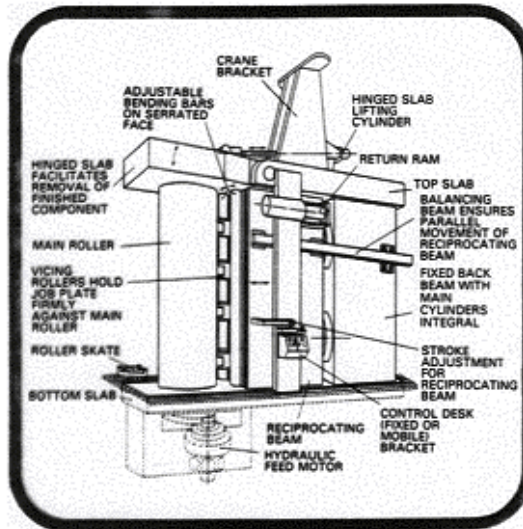
The ram and table have a motorised traverse within the portal opening and this, along with the 360° rotary adjustment, allows the tools to be positioned exactly and the full width of the plate to be worked progressively. The range of work carried out includes plate flanging, forming and shaping to the widest variety of forms, and if required we can arrange the press to operate in conjunction with overhead or gantry cranes to facilitate plate handling and increase production rates.

Force Range: 300 tonnes up to 2,000 tonnes
Distance between columns: up to 6m. (20ft)

The photograph shows a Hugh Smith 1,000 tonne Ring Frame Press in service at the Hellenic Shipyards Co. at Korinthia, Greece.



HUGH SMITH (GLASGOW) LTD.
Hamiltonhill Road, GLASGOW, N.2, U.K.



Top hinged slab.
 In process measuring available.
 Conical forming, without plate skidding.
 Automatic plate feed.
 Less floor space required.

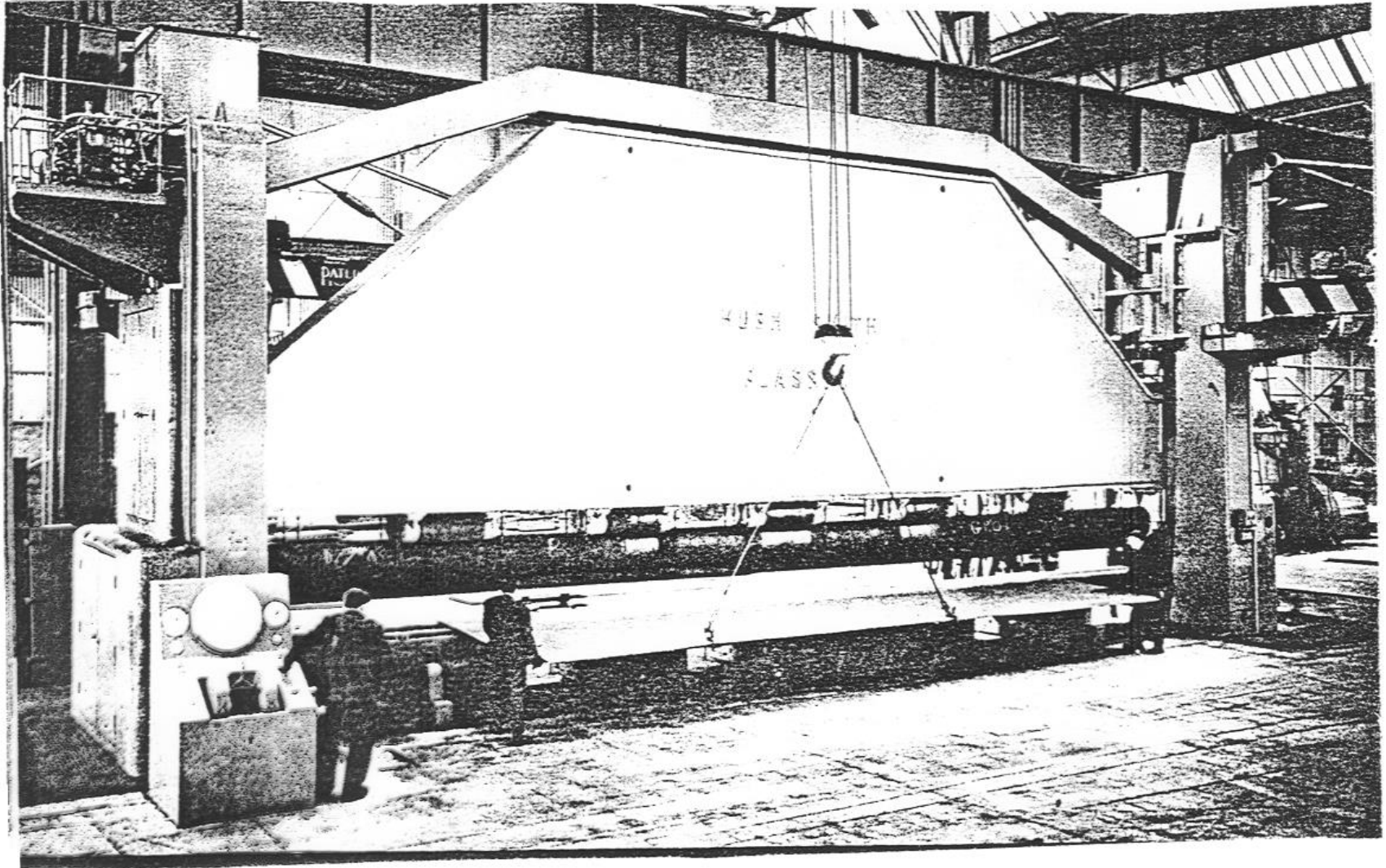
Plates handled vertically.
 Local areas of high yield easily catered for.
 Adjustable bending bar centres.
 Template can be applied at point of bending.
 Ease of adjusting bending bar centres.

Balancing beam correction.
 Ease of plate entry and removal.
 Nose bar for flanging work.
 Direct acting hydraulics.
 Interchangeable rollers.
 No need to support long plates by crane.
 Guided moving beam.

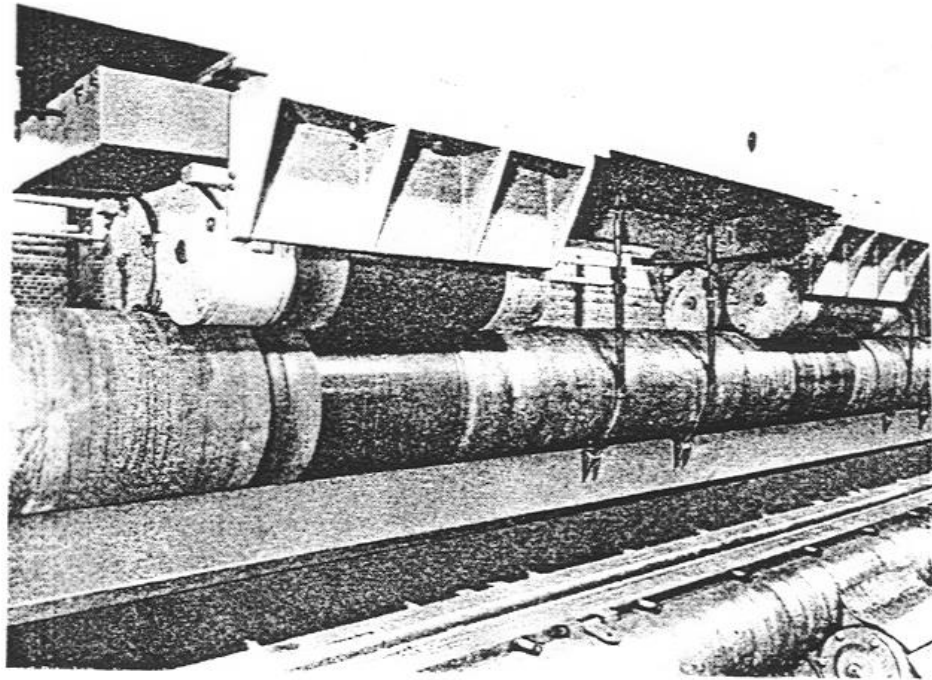
Manifold mounted block hydraulics.
 Automatic overload protection.
 Correction of overbending is easy.
 Hot working can be carried out.
 Interlocked safety system.
 Nominal installation costs.
 Excavations for foundations are minimal.
 Scale is not rolled into plate.

Shown Left:
 Hinged Slab (hydraulically operated) shown in the up position
 for removal of completed drums.

Shipyard Bending Machine

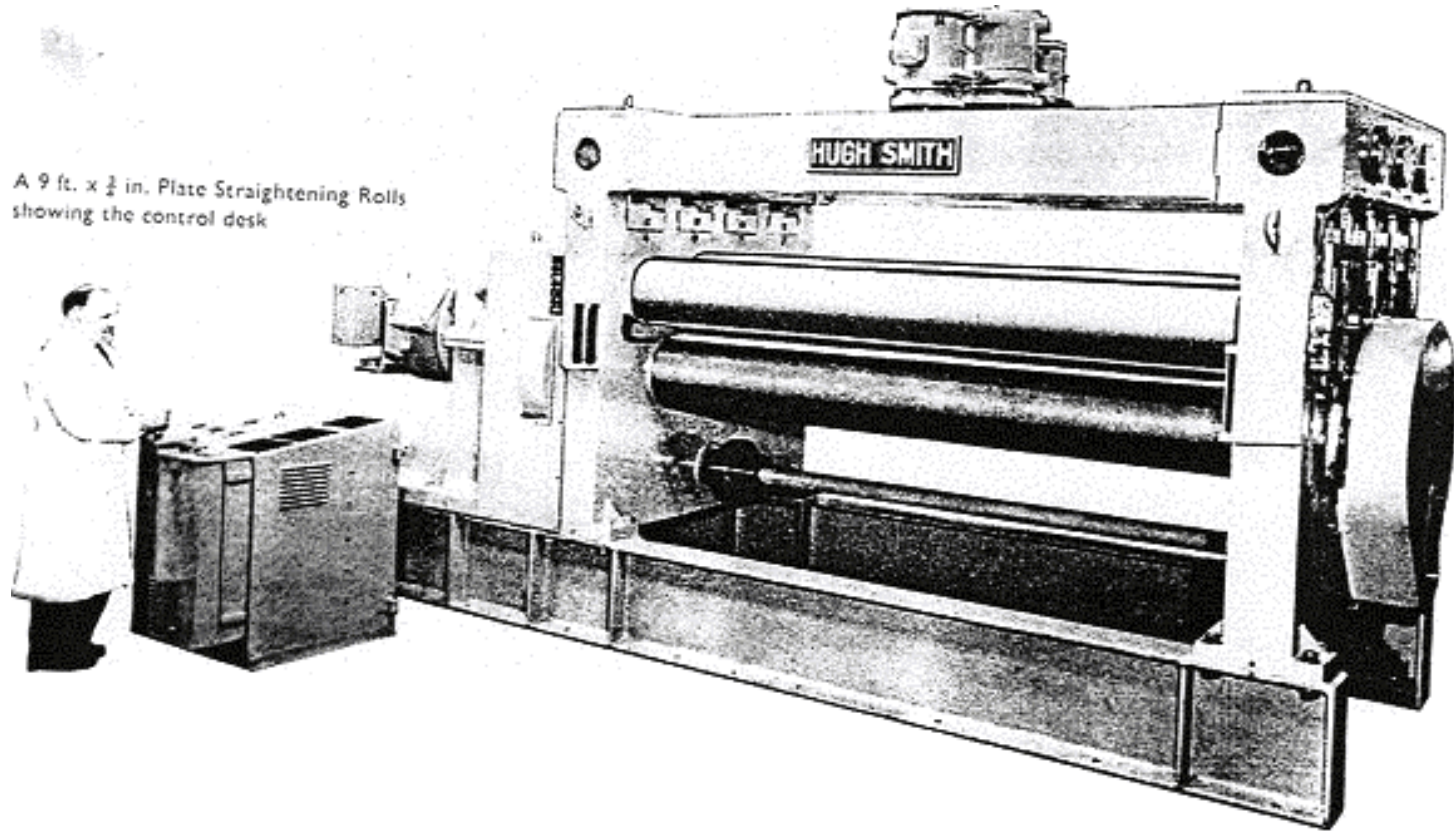


Detail of Bending Machine

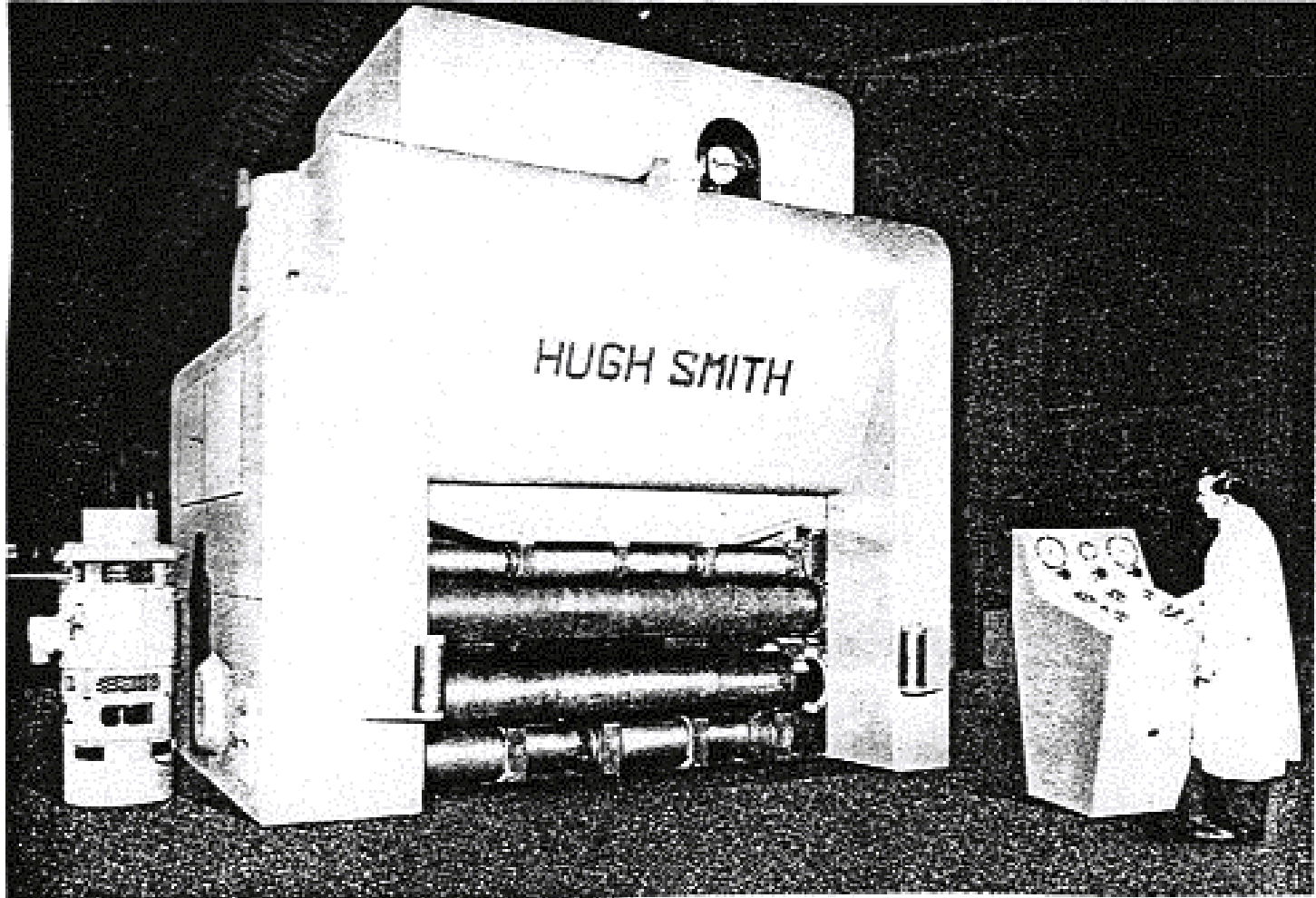


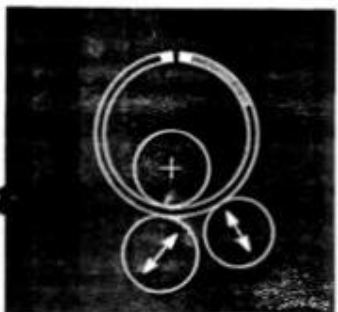
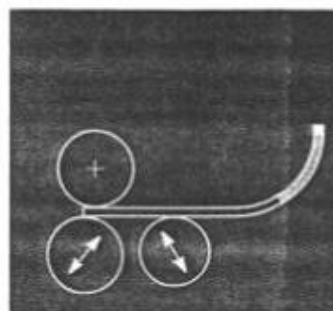
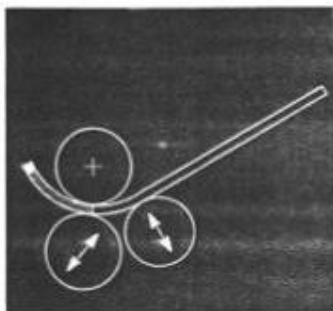
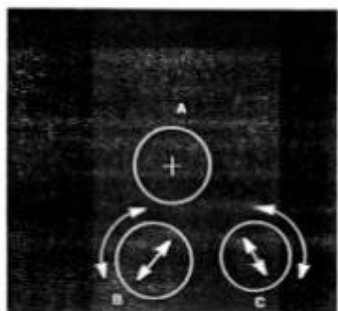
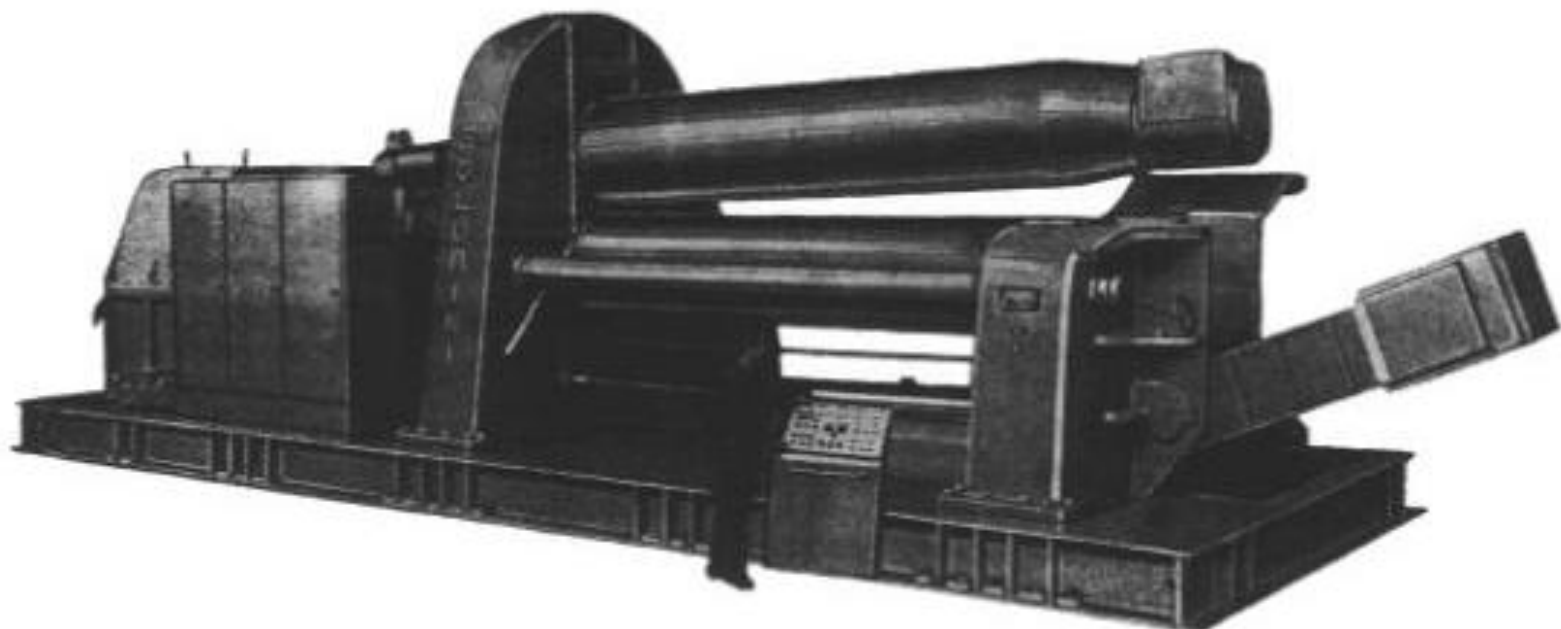
A close-up of top supporting rollers showing variable camber gear with top flanging bar and bottom vee-blocks in position on rollers.

Horizontal bender



Horizontal Bender

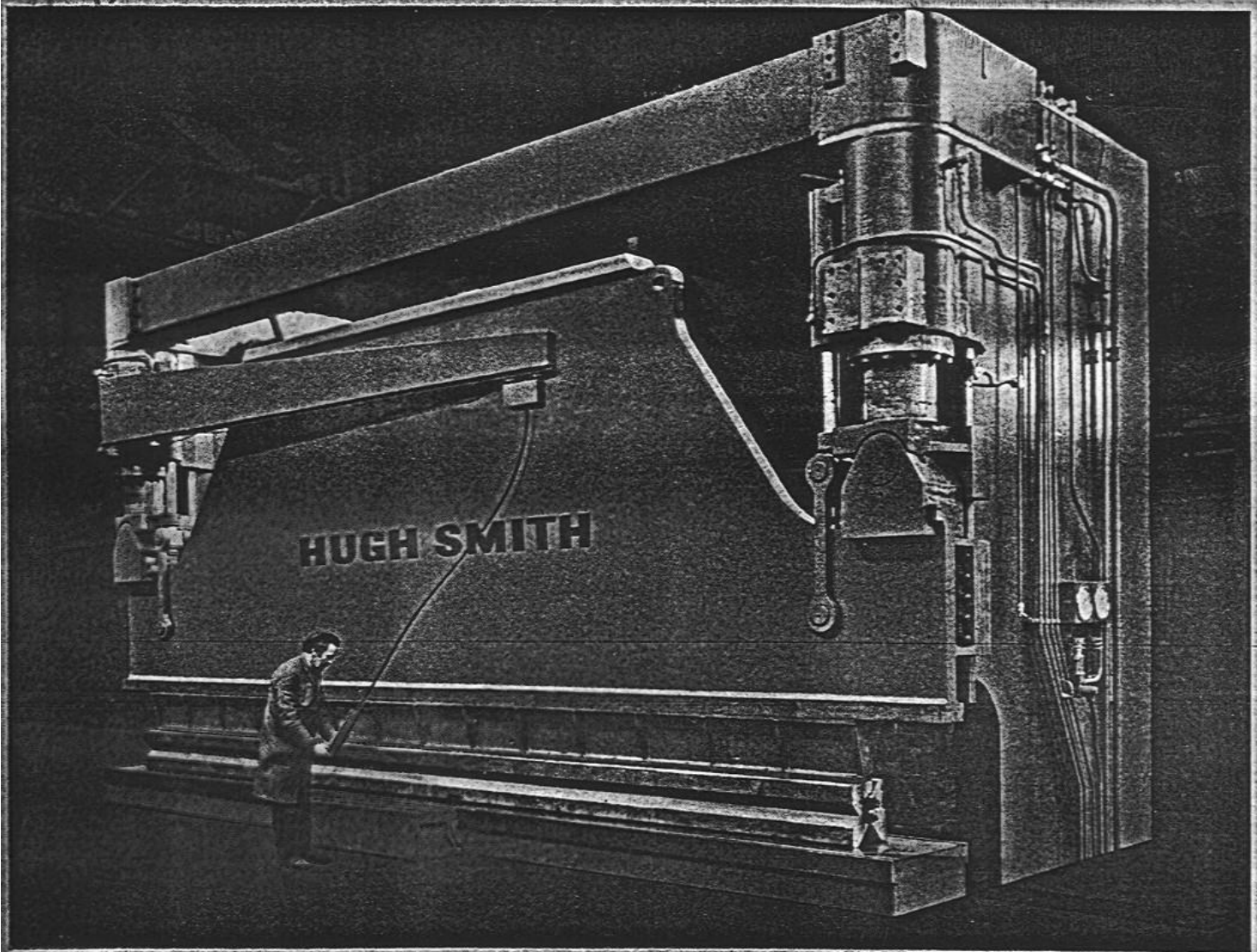




● Per particolari esigenze d'impiego (es.: spessori sottili) questo tipo di macchina così come gli altri da noi costruiti può essere fornito con il rullo superiore motorizzato.

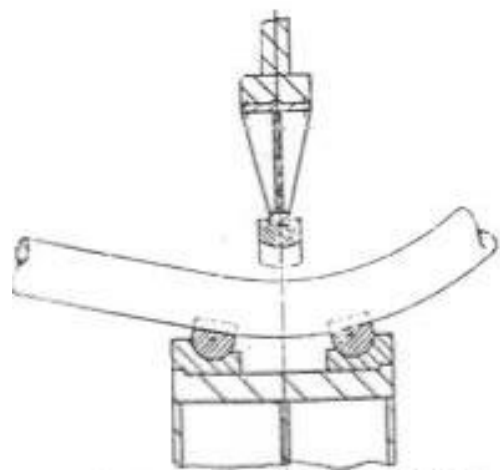
● Pour des exigences d'emploi particulières (ex.: faibles épaisseurs) ce type de machine ainsi que les autres que nous fabriquons, peut être livré avec rouleau supérieur motorisé.

● For special requirements (i.e.: thin thickness) this machine as well as all machines built by us, can be supplied with driven top roll.



HUGH SMITH UNIVERSAL SHIPBUILDING PRESSES

for repair shops and the smaller shipbuilding yards



ROUND BAR OR PIPE CURVING

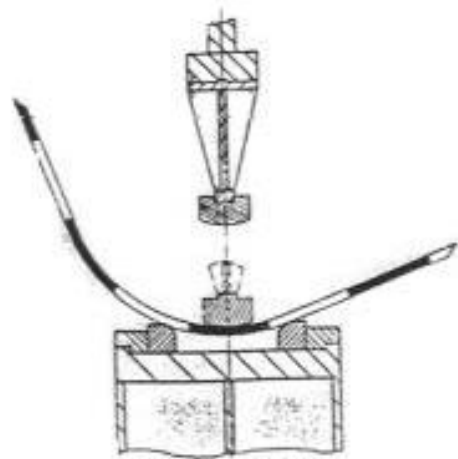


PLATE CURVING

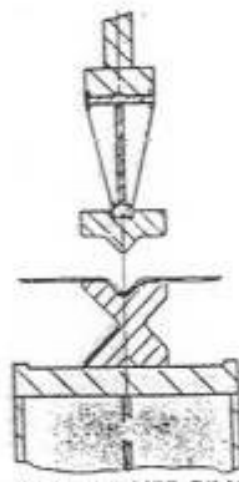


PLATE SWEDGING

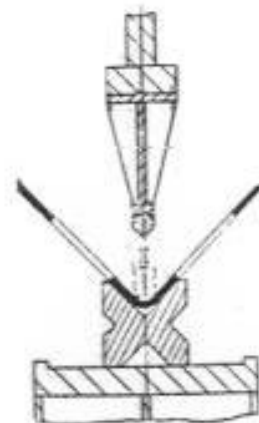
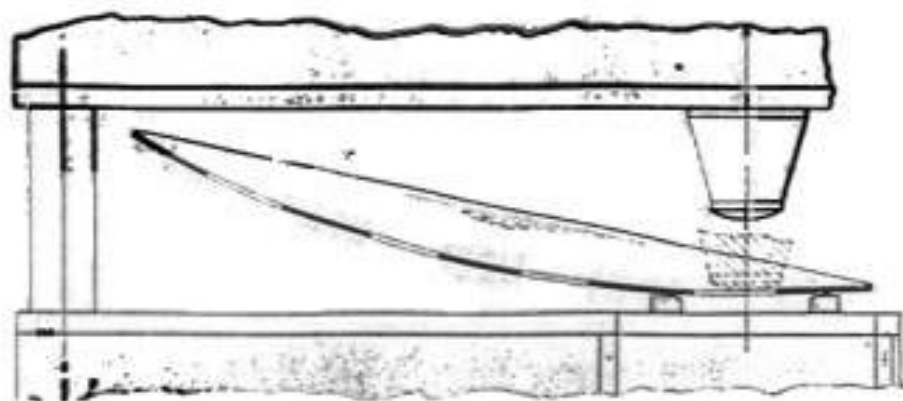
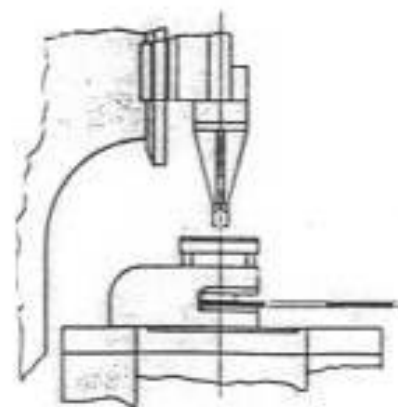


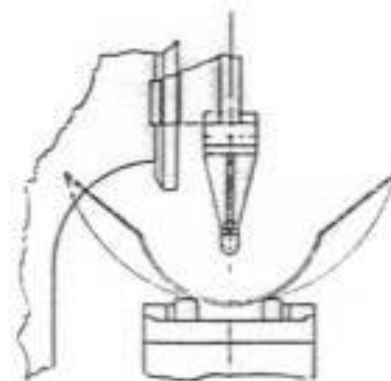
PLATE FLANGING



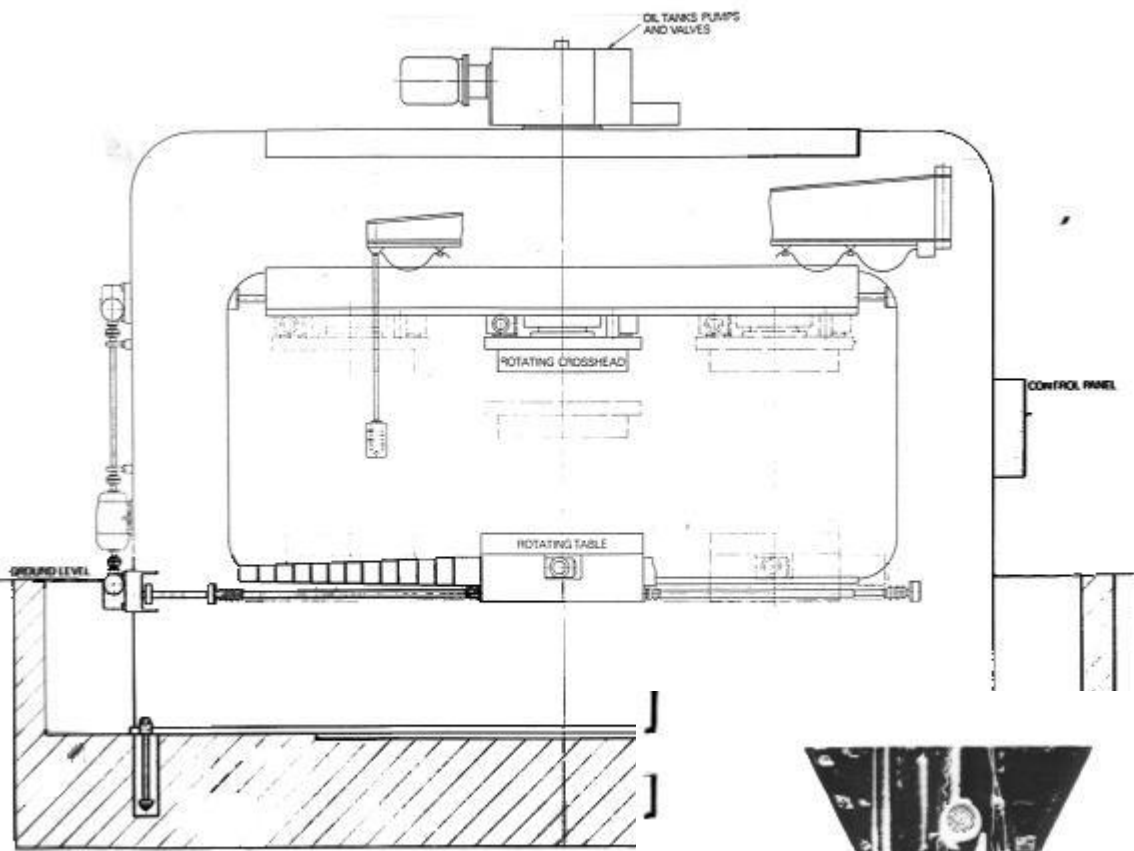
DOUBLE CURVATURE WORK



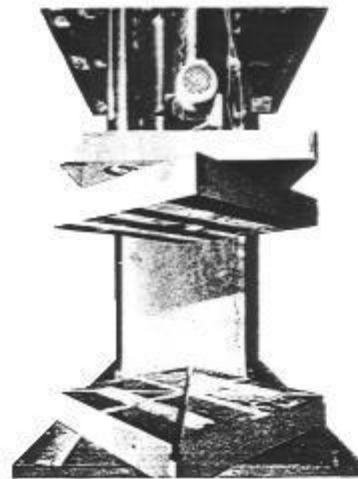
**FORMING SERIES OF NOTCHES
(WITH SPECIAL TOOLS)**



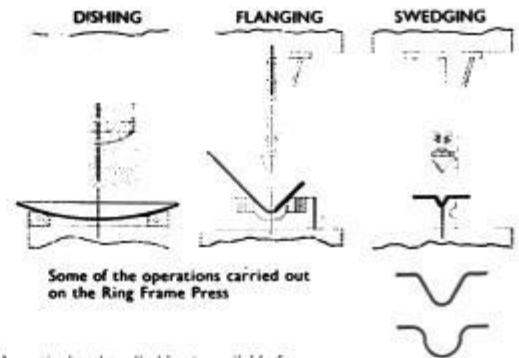
CONICAL WORK



GENERAL ARRANGEMENT OF THE 1,000 TONNE PRESS



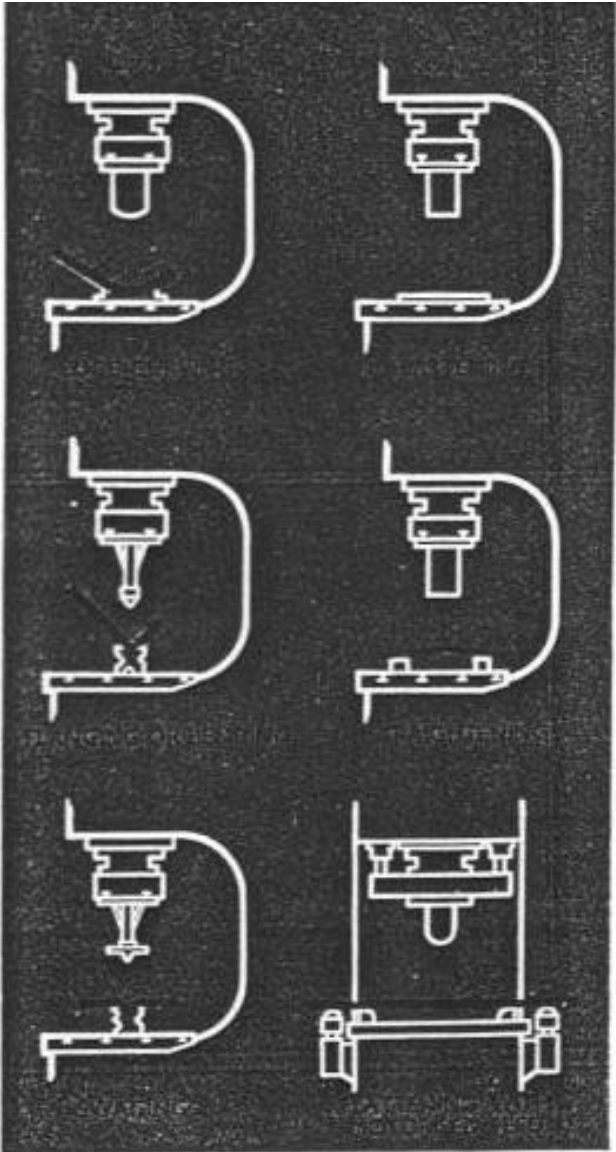
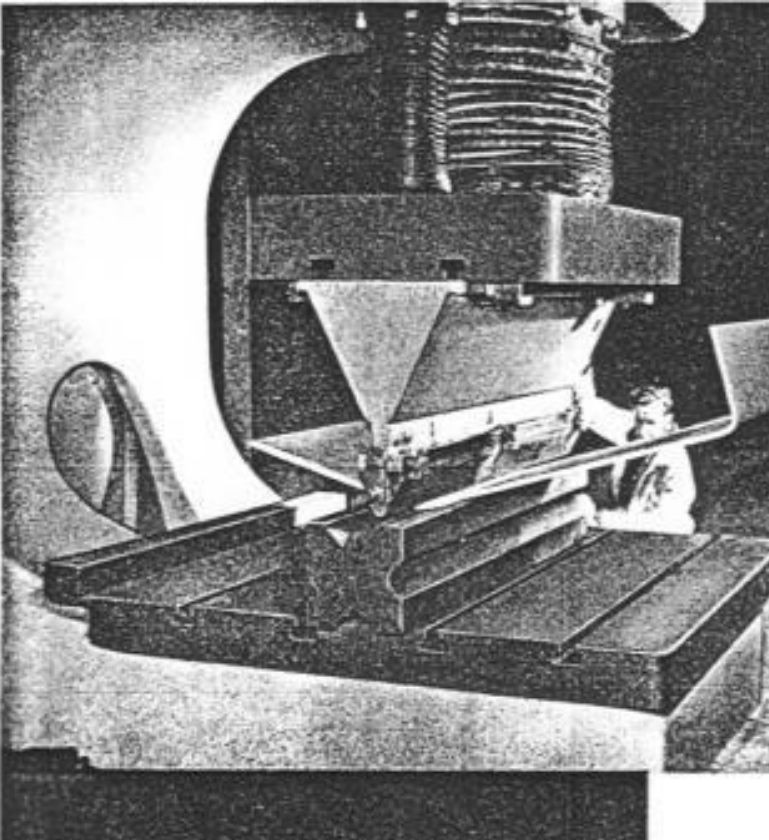
The rotating ram turns through 360°

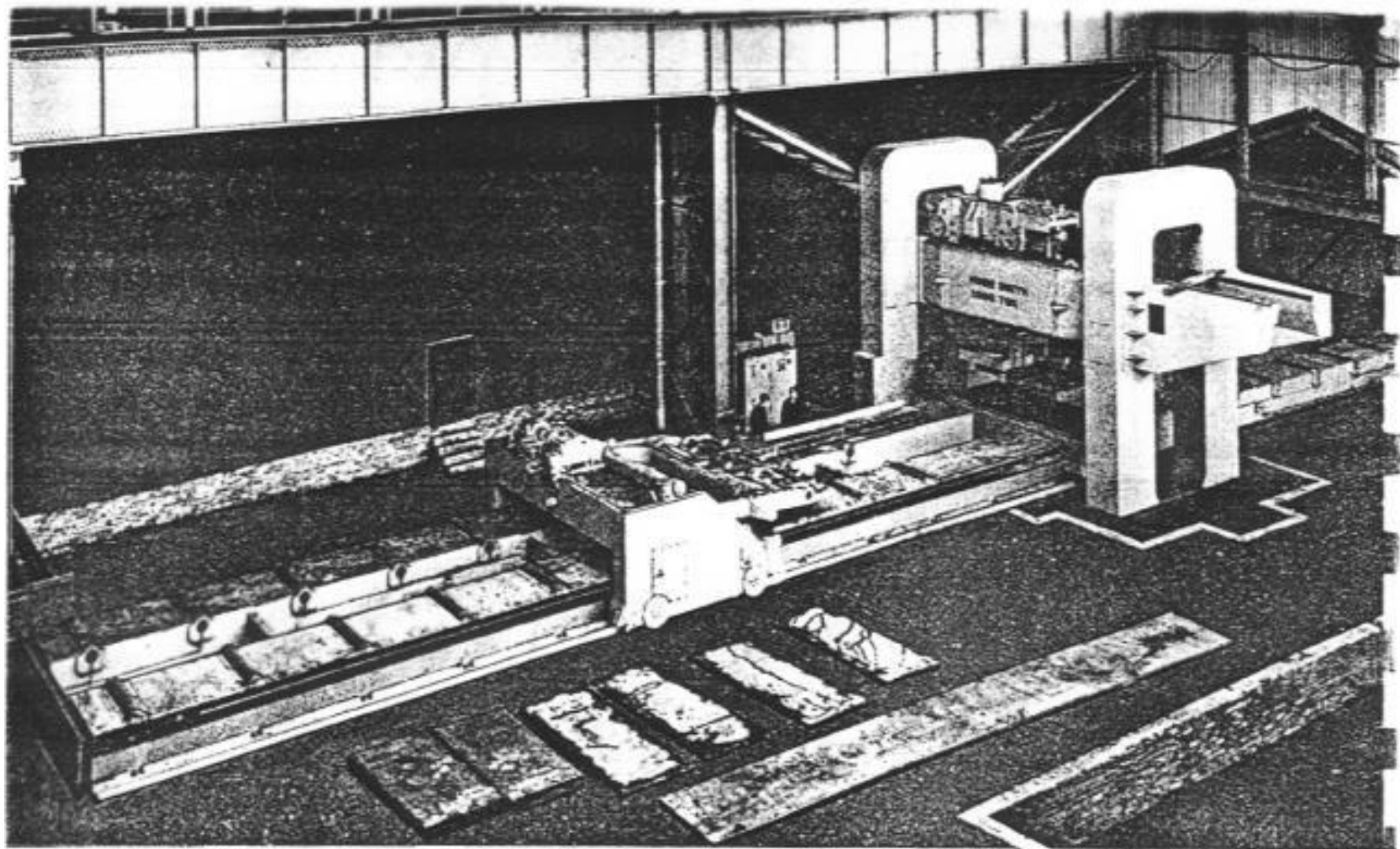


An articulated toolholder is available for use in progressive plate flanging where offset loading can occur



Flanging work in progress
on a 500 ton Gap Press

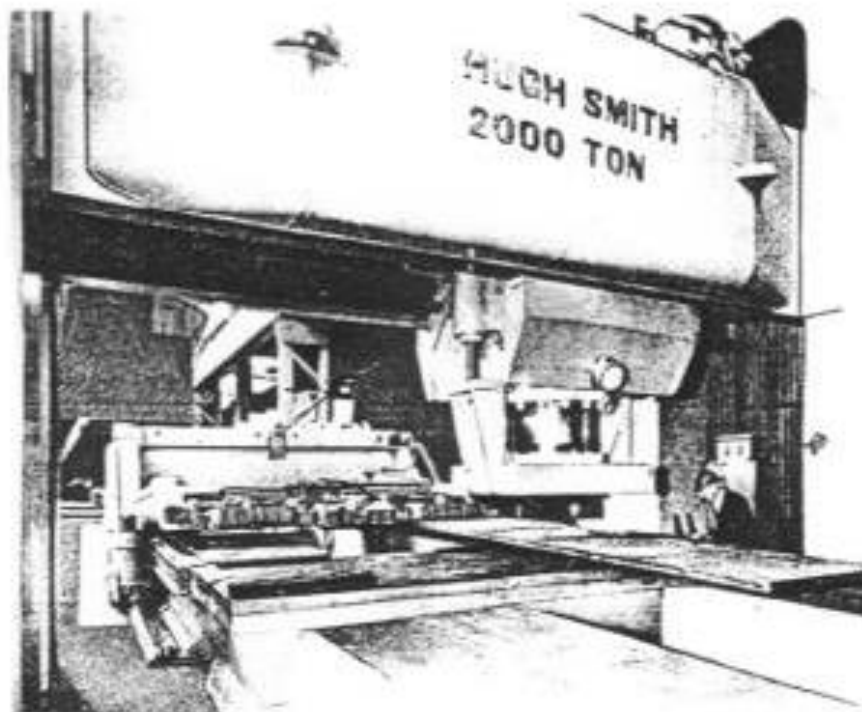




**STEELWORKS
PLATE FLATTENING PRESS**

STEELWORKS PLATE FLATTENING PRESS

TOP PICTURE: The 2000 tonne press with carriage and 22 m handling table



Positioning carriage with plate-lifting magnets

The 2000 tonnes steelworks press designed to suit the latest U.K. and American steelworks practice can cold straighten mild steel plates up to 4120 mm. wide by 203 mm. thick in weights up to 30 tonnes. Higher tensile plates of slightly less thickness can also be straightened.

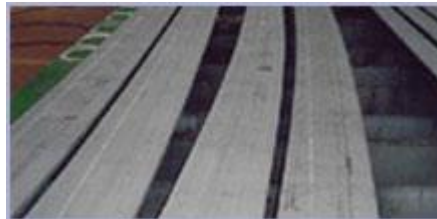
The press has a single vertical downstroking cylinder and ram assembly with a horizontal travel across the plate of 4250 mm. Hydraulically operated pins in the bottom table lift the plate for insertion of packing pieces for three point straightening.

All controls of the press and positioning equipment are centralised and the operator has easy access to the plate for straightening and checking.

Ships Framebender

- For forming all types of stiffener sections, rolled and welded 'T' sections. Rolled equal and unequal angles and bulb flat sections singly or in pairs, flat/round bar. Frame dimensions from 100 to 1200mm deep
- Bilge turns/bow flairs at single pass (port & starboard together)
- Sizes 200, 400, 600 and 700 Tonne model with fixed or adjustable bending centres for increased capacity
- Integral frame feed system with variable speed
- High capacity adjustable side & centre clamping for distortion control
- Vertical straightening feature to correct lateral distortion
- DNC control system with teach/learn and storage facilities
- Over 130 MACHINES supplied worldwide

Ships Framebender



Stiffener's Bending

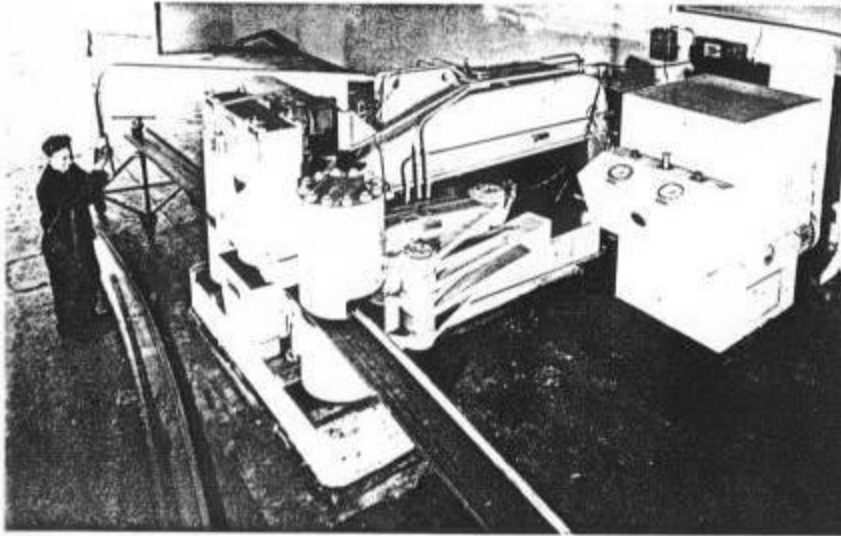
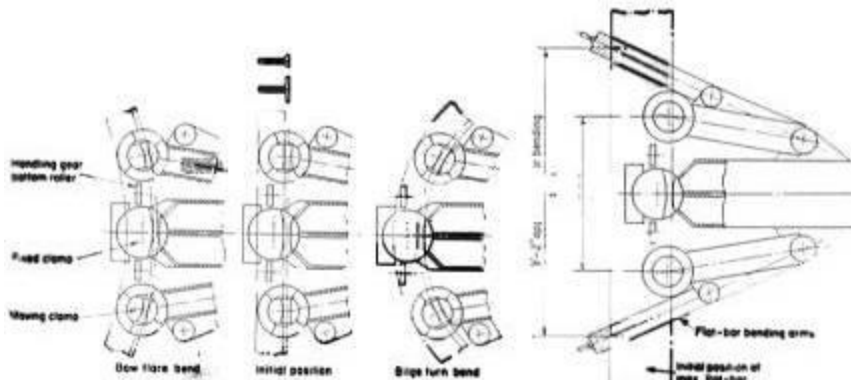


PLATE 27(a) Stiffener cold frame bender of gas-tube capacity. (A machine of a different type is required for some flanged bars i.e. both angles, channels, etc.) (b) Section drawings showing method of operation.



Section through various parts showing frames bent in a radius in both directions (i.e. inside and outside).

Five bending levers flat bars which have an facilities for gripping the additional bending arms are used as shown. Five bending levers flat bars, it is only necessary to insert make-up blocks to use.

PLATE 28 A self-propelled butt welder ("Deck Welder") with a universal welding head for Fuzarc, Fuzarc-CO₂, Fuzarc, Submerged-Arc and MIG welding processes.

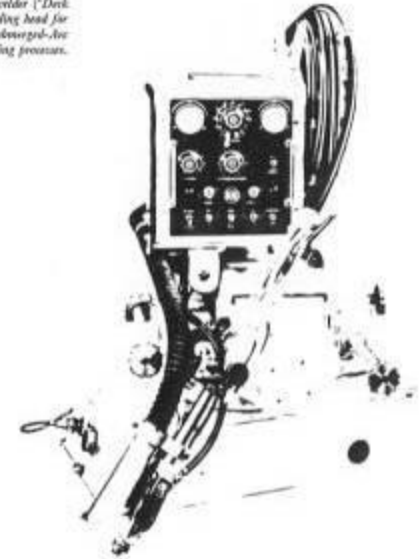
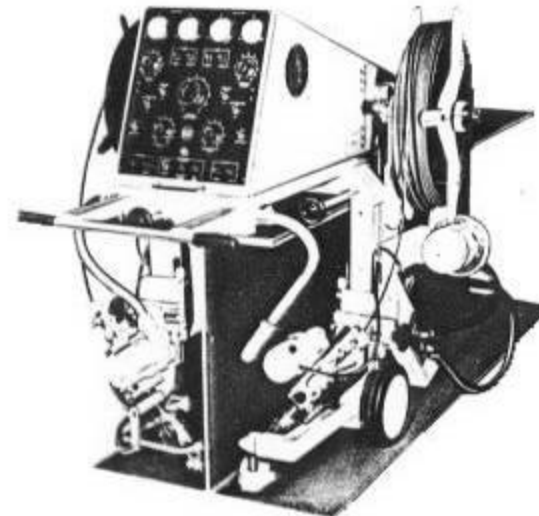


PLATE 29 Self-propelled twin fillet welder for use with both Fuzarc-CO₂ and submerged-Arc processes.



Pipe bending

curvatura del tubo e orientamento
bending and positioning

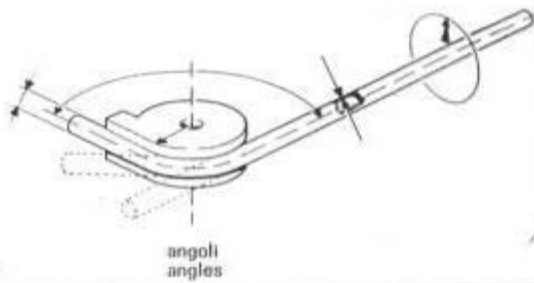


fig. 1

curvatura a spinta
ram or press bending

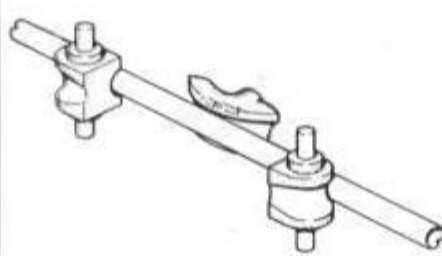


fig. 4

a 0°

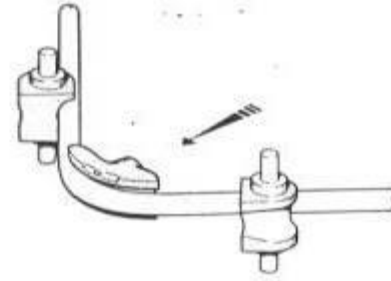


fig. 5

a 90°

curvatura con anima
bending with mandrel

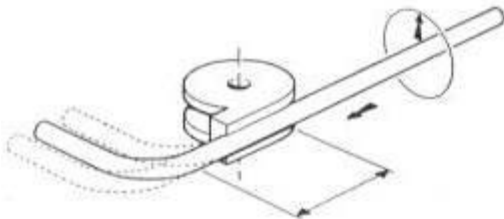


fig. 2

distanza tra le curve
distance between two bends

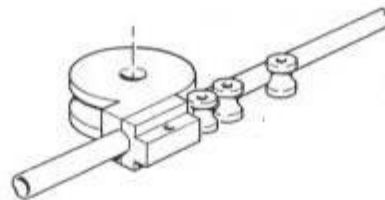


fig. 6

a 0°



fig. 7

a 90°

curvatura senza anima
bending without mandrel

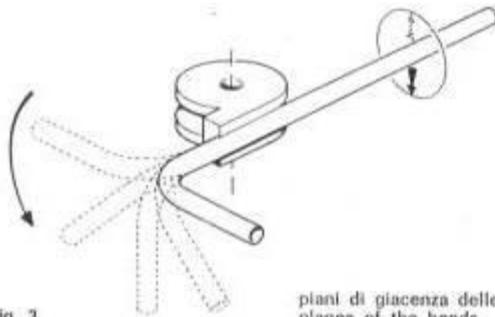


fig. 3

piani di giacenza delle curve
planes of the bends

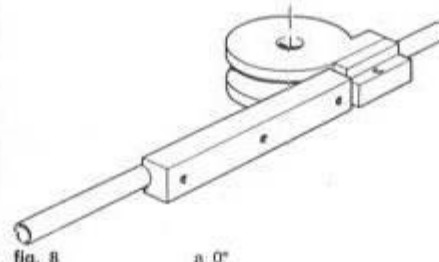


fig. 8

a 0°

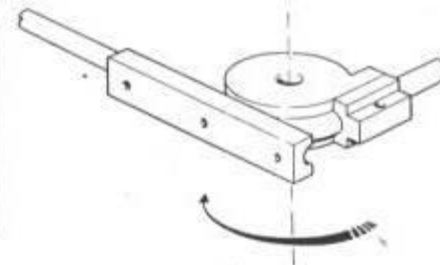


fig. 9

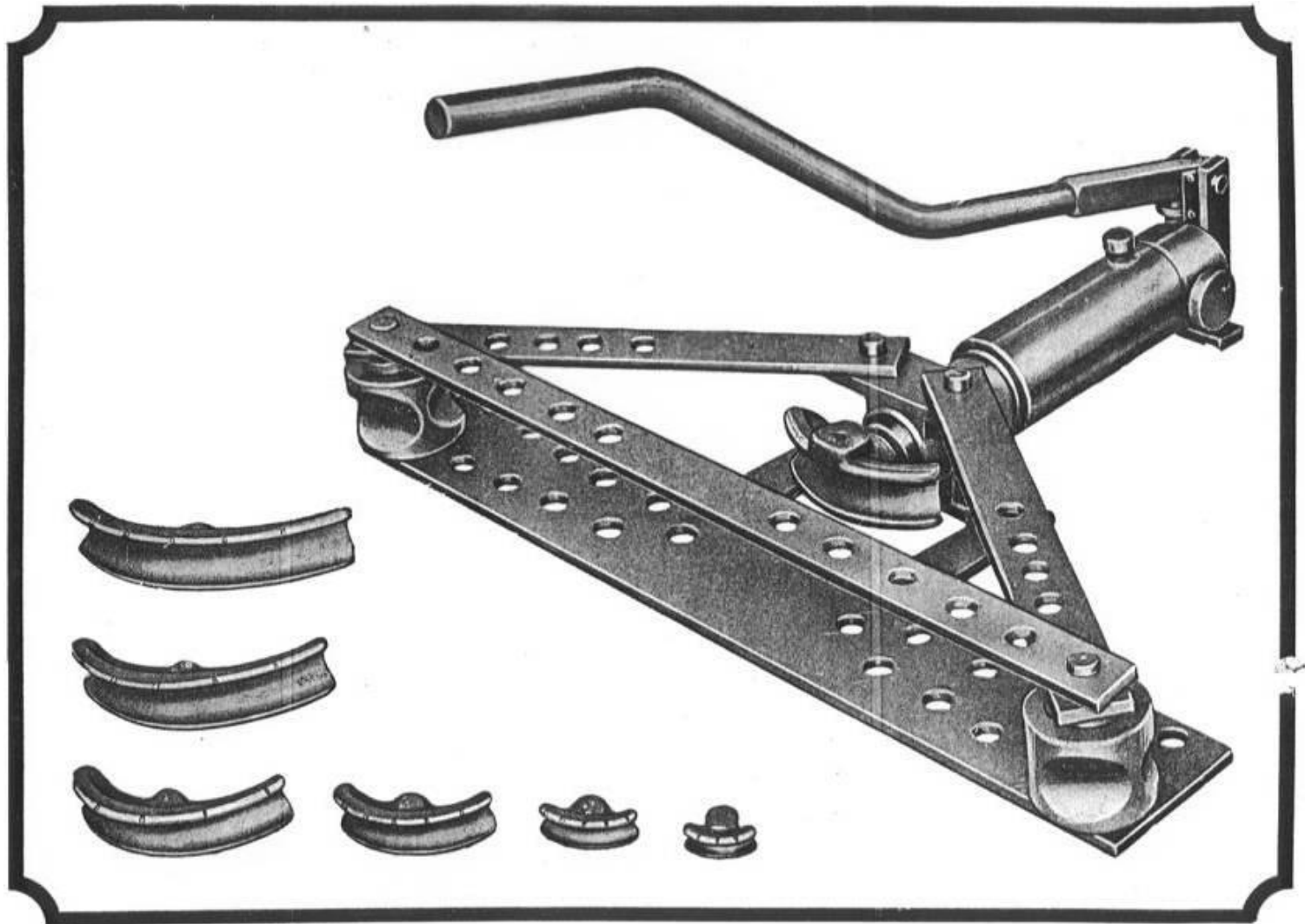
a 90°



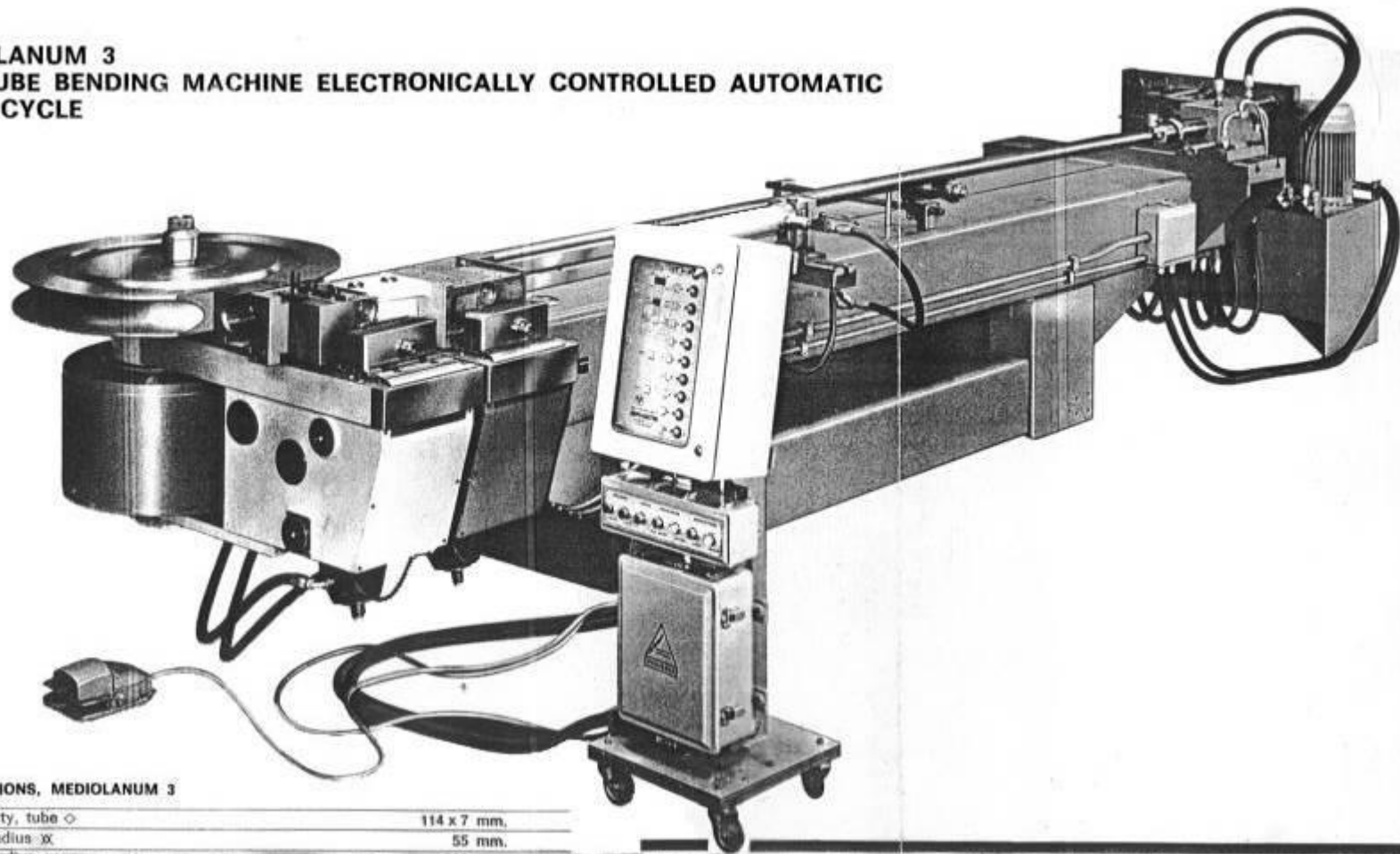
METODI E SISTEMI DI CURVATURA
METHODS AND SYSTEMS OF BENDING

TAVOLA - TABLE
N° 001
DATA - DATE
GENNAIO 1975

Onboard pipe bending



**MEDIOLANUM 3
IS A TUBE BENDING MACHINE ELECTRONICALLY CONTROLLED AUTOMATIC
WORK CYCLE**



SPECIFICATIONS, MEDIOLANUM 3

| | |
|-----------------------------------|-------------|
| Max. capacity, tube \varnothing | 114 x 7 mm. |
| Minimum radius \varnothing | 55 mm. |
| Maximum length | |