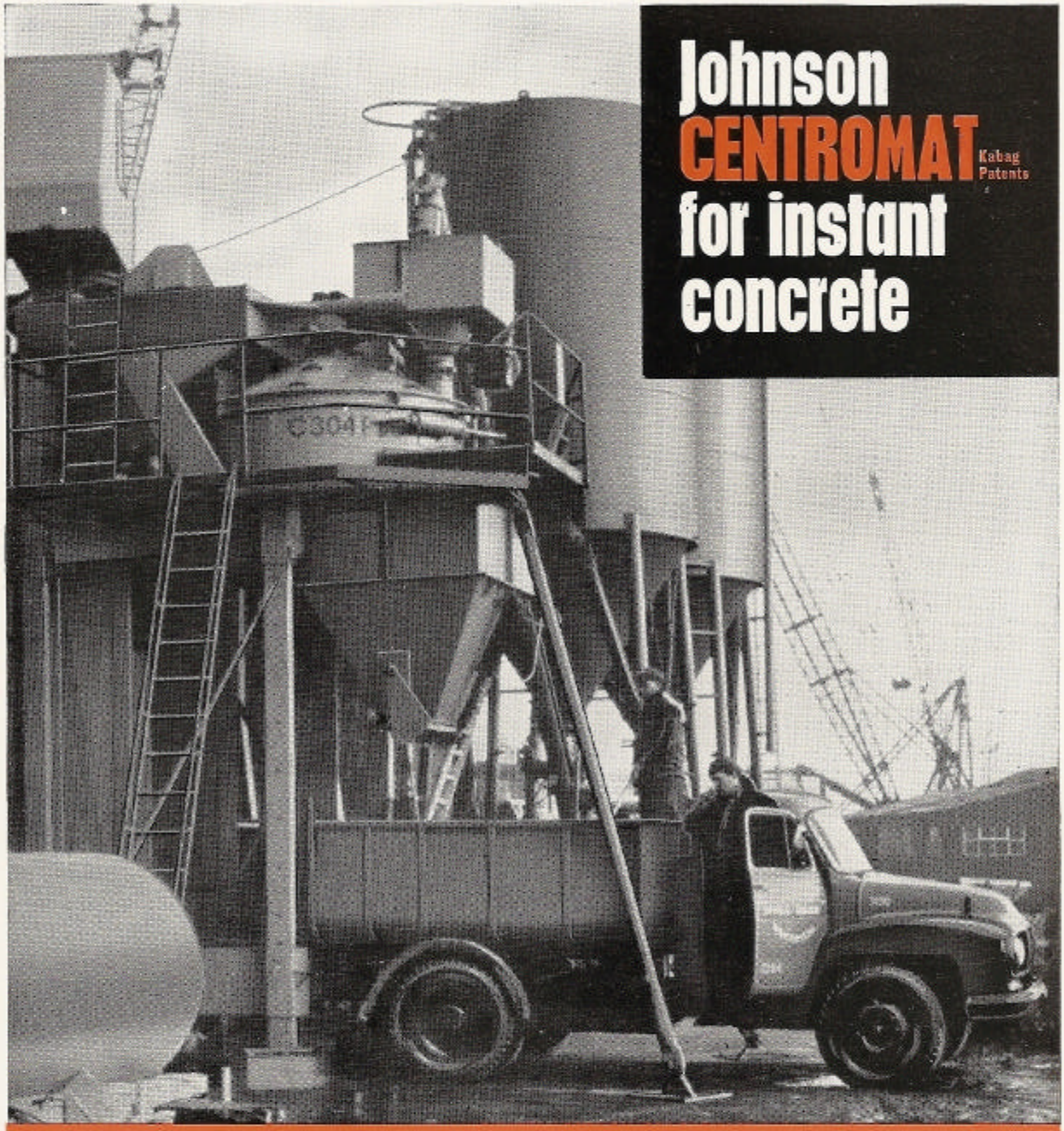

Johnson CENTROMAT for instant concrete

Kabag Patents

JOHNSON MACHINERY

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Centromat is a complete, transportable, electro-pneumatically powered concrete making plant. It combines aggregate storage and weightbatcher, pre-set cement weigher, water meter, and turbo-pan-mixer with renewable linings. A wet hopper unit is available if required.
Finger tip control from a central console at ground or mixer level.

Photograph by courtesy of Tarmac Civil Engineering Limited and C.E.G.B. Fawley Power Station, Fawley, Hants.

JOHNSON Centromat

The complete concrete batch mixing plant

★ Turbo-mixer with electro-pneumatic controls and choice of control positions.

★ Radial boom scraper for aggregate feeding.

★ Metered water supply.

★ Automatic cement feeding and weighing.

★ Transportable on own chassis.

The Johnson Centromat is the first unified turbo-mixing plant in the world. Its many features offer the user substantial economies over conventional batching plants.

★ Outputs from 25 to 50 cu. yd. per hour.

★ Available in three versions, for site installation, ready mixed concrete plant, and dry batching plant.

★ Adjustable discharge heights from 4 ft. 3 in. to 11 ft. 7½ in.

★ Erected or dismantled in two days.

★ Permits the use of different types of cement in consecutive batches.

★ 60-second batching cycle.

★ Precise finger-tip control of all batch constituents.

★ Permits maximum utilisation of ground area.

GENERAL DESCRIPTION

Aggregate Scrapers

Boom scraper, with operator's cab, mounted on Centromat, with boom lengths from 33 ft. to 53 ft., and capacities from 26 to 100 cu. yd. per hour. Power slewing and luffing available on larger scrapers.

Ground Storage Bunkers

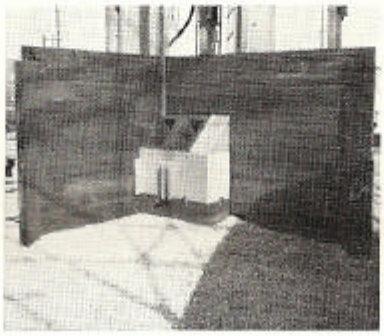
Used in conjunction with the aggregate scrapers, these are formed by the erection of dividing walls arranged to radiate from the aggregate gates like the spokes of a wheel, and of a length to match that of the scraper boom. The walls can be of timber with intermediate stanchions of heavy steel.

Aggregate Storage Bins

Aggregate bins, integral with the Centromat, can be supplied as an alternative to ground storage. The bins are manufactured from substantial steel plates and rolled sections, with adjustable telescopic steel 'prop' supports to give additional stability. They are normally fed by shovel loaders, or, in the larger plants, by inclined belt conveyors or elevators.

Aggregate Measuring Gates

These are located within 3 ft. of ground level, eliminating almost entirely wasted bulk-storage space in the aggregate bunkers and are pneumatically operated.



The location of aggregate measuring gates within 3 ft. of ground level practically eliminates wasted bulk-storage space.

Aggregate Weigh Gear

This is a rugged four-point suspension steel lever system, on renewable knife-edges, with large dial indicator and oil dashpot to prevent pointer tremble. Movable indicators, which the operator can set at the amounts required for repetitive batching, are fitted to the periphery of the dial.

Aggregate Weigh Hopper

The hopper is scientifically designed to give a rapid and clean discharge into the mixer without spillage. Its track rollers are equipped with sealed self-lubricating bearings which do not require maintenance.

Aggregate Hoist

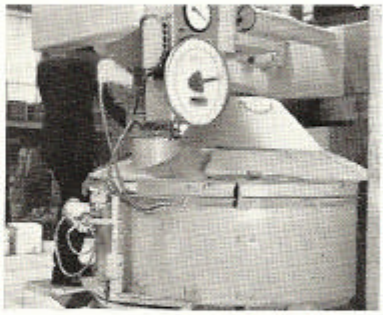
The hopper is hoisted from the weighing to the mixer charging position by wire ropes, being guided throughout its travel by a double track arranged to bring the hopper into the ideal tipping position at the top of the track.

The skip is accelerated during its upward movement and is automatically stopped in both the weighing and tipping positions by limit switches. These switches are duplicated to guard against operational failure or faulty adjustment. Indicator lights on the console show when the skip has reached the weighing and tipping positions.

Cement Screw Feeder and Weigher

The cement is conveyed from storage silo to weigh hopper by a totally-enclosed dust-free screw feeder.

The weighing device is pre-set by turning a key until the position of the pointer on the dial corresponds to the amount required for the batch. The feeder is started by push-button operation on the console, and stops automatically when the batch quantity has been weighed in the hopper. The discharge door from the cement hopper is pneumatically-operated, and electrical interlocks prevent the screw feeder from re-starting until the cement weigher is empty and the discharge door is closed. Indicator lights on the control panel show when the screw feeder is operating or when the weigh hopper is empty. The pre-setting device only requires re-setting when the batch quantity is altered.



Totally-enclosed, dust-free pre-set cement weigher.

An important feature of the cement screw feeder and weigher is the fitting as standard, of duplicate sets of control gear. This enables two screw feeders to be operated automatically, either singly or at the same time, so that two types of cement can be handled by the plant in consecutive batches.

Two screw feeders in operation at the same time, using the duplicate sets of control gear fitted as standard. This enables two types of cement to be handled by the plant in consecutive batches.

Cement Silo

An all-steel cement silo of 20, 30, or 50 ton capacity, can be supplied, complete with inlet pipe and filtering equipment for pressure filling from bulk containers. To ensure rapid flow of cement from the silo, an electrically-operated aeration unit is normally fitted. Existing silos can usually be adapted for use with the Centromat by carrying out a slight modification.

Water Meter

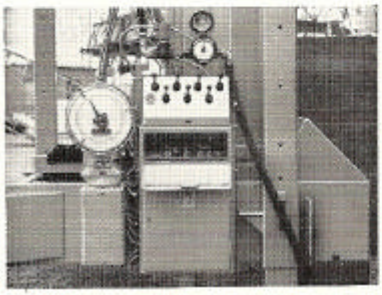
A water meter and solenoid-operated valve unit is used to control, measure and record the amount of water for each batch. The amount required is pre-set on the meter dial and when the starter button is operated, the valve opens and water begins to flow into the mixer. The rate of flow can be checked by observing the rotation of the pointer on the dial. When the pre-set amount has been dispensed, the valve is automatically closed. The water meter unit is located on the operator's console. It is rated at a feed pressure of 40 lb. per sq. in. but will operate successfully at lower pressures with correspondingly slower rates of flow.

Turbo-Mixer

The turbo-mixer is of the horizontal fixed-pan type, with rotating hardened paddles, set in a number of different positions in the pan to ensure a rapid, homogeneous mix, and, when the electrically-operated discharge door is opened, to give a quick and complete evacuation of the mixing pan. The floor and walls of the pan are fitted with renewable lining plates. The mixing chamber is totally-enclosed with easily removable access doors to facilitate inspection and cleaning.

Control Gear

The push-button electrical and pneumatic controls are grouped in a lock-up console either at ground level or mixer level as required. The controls are clearly marked and logically arranged for operation in the correct sequence. Indicator lights are provided to cover all functions of the plant and to obviate the need for visual checking on the part of the operator. When the console is located at mixer level, an open-type steel flooring platform is fitted, complete with guard rails and access ladder.



The push-button controls are grouped in the central console and logically arranged for easy operation in the correct sequence.

Compressor

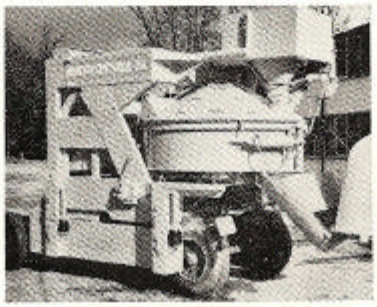
A compressor and air receiver are built into the Centromat to provide compressed air to operate the pneumatic cylinders. Fog-mist lubricator, water-separator, pressure regulator and gauges are fitted. The working pressure of the system is 100 lb./sq. in., while the compressor operates at 150 lb./sq. in., being automatically controlled to shut-off when the pressure in the receiver reaches the higher figure and to re-start when the pressure falls to slightly above the working pressure of the cylinders. This ensures that the cylinder operations will maintain speed during rapid batching.

Wet Concrete Storage Hopper

When required, a steel hopper of substantial design can be supplied integral with the plant for the temporary storage of wet concrete. The discharge door of the hopper is pneumatically-operated.

Transporting Chassis

The Centromat can be supplied mounted on a removable, strong rigid chassis, with fixed rear axle and pivoted steering axle with hydraulic and parking brakes for transporting the machine from site to site. The chassis is easily removed when the Centromat is erected.



Centromat model 204 mounted on removable road chassis.

Centromat model 204 removed from chassis when erected on site.

Guards

All moving parts of the Centromat are adequately guarded and fenced.

Electric Power Characteristics

The Centromat is designed to operate on a 390-440-volt A.C. 3-phase 50 cycle supply. A transformer is incorporated and all the control circuits, push-buttons, limit switches etc., operate on a 24-volt supply, as a safety measure. A separate set of fuses is provided for each section of the plant. These are housed in the lock-up switchbox, which can only be opened when the main isolating switch is turned off.

Foundations

The Centromat can be mounted on timber sleepers on a level surface capable of sustaining a bearing pressure of 2 ton/sq. ft. Where a permanent installation is envisaged, a concrete foundation is recommended.

The following is standard equipment on all the Centromat models:

Set of four aggregate gates (five gates can be supplied if required).

Automatic cement weigher.

Cement Screw feeder complete with outlet valve for cement silo.

Water metering unit.

Aggregate weighing skip with hoist.

STANDARD MODELS

Centromat Model	Capacity (cu. yd./hr.)	Wet Capacity of 1bag turbo-mixer cu. ft.	Aggregate Storage	Aggregate Feeder	Optional Facilities
204	25	13½	Ground bunkers	33 ft. long Boom Scraper	Wet storage hopper. High-level controls. Operator's Cabin.
304	35	18	Ground bunkers	47 ft. long Boom Scraper	Wet storage hopper. High-level controls. Operator's Cabin.
244D (Dry batch)	35	—	Storage Bunkers	33 ft. long Boom Scraper	High-level controls. Operator's Cabin.
344D " "	50	—		47 ft. long Boom Scraper	
204H	25	13½	Extra-large storage bins with rotary chute for loading conveyor	Inclined conveyor	Wet storage hopper. High-level controls. Operator's Cabin.
304H	35	18			
404	50	27	Storage bunkers	53 ft. long Boom Scraper	Wet storage hopper. High-level controls. Operator's Cabin.
404H	50	27	Extra-large storage bins with rotary chute for loading conveyor	Inclined conveyor	Wet storage hopper. High-level controls. Operator's Cabin.
444D (For dry-batching into transit mixers)	65	—	Storage bunkers	53 ft. long Boom Scraper	High-level controls. Operator's Cabin.

OPERATION

The complete batch cycle time with the Centromat is 60 seconds, the actual mixing time being 30 seconds.
The general mode of operation of the Centromat is as follows :—
The aggregates are stored in bunkers, the cement being stored in the silo. Water is supplied from the mains with a required operating pressure of 40 lb. p.s.i. If this pressure is not available from the mains a header tank of approximately 120 ft. head above the machine, or a pump, is required. The boom scraper is used to heap material against the back wall of the machine above the aggregate gates. The mixer driver operates the pneumatically controlled aggregate gates in sequence, reading the amount of each aggregate feeding into the weighing skip on a large weigher dial. Adjustable pointers, fitted to the dial, are set to show the cumulative weight of each aggregate going to make up the batch.

The cement screw feeder motor is switched on and weighing of cement is automatic. The amount of cement required for the mix is set on a dial and the feeder is started by means of a starting switch on the console. When this predetermined amount is fed into the weigh hopper the feeder is automatically switched off.

A separate weigher dial indicates the actual weight of cement in the hopper at any given time so that a ready and instantaneous check is available to show that the automatic mechanism is working correctly. After the cement is discharged into the mixer the screw feeder is re-started by operating the START button, and continues to run until the predetermined weight is again available in the hopper. The predetermined weight need only be varied when the mix is altered.

The water is measured semi-automatically by the water meter. The amount in gallons is pre-set for each batch and flow starts when the operating button is pressed.

The operating sequence is as follows :

1. Weigh out aggregates into weigh skip. The cement is already being weighed out automatically and an indicator light shows when the amount required is in the cement hopper.
2. Pre-set water meter by turning button on dial against the stop.
3. Discharge previous mix from mixer.
4. Press hoist ' UP ' button. The weigher skip will automatically rise on its track and tip its contents into mixer, an indicator light coming on when the hoist reaches the limit of its upward travel.
5. Press hoist 'DOWN' button. The skip will automatically travel downwards eventually stopping in the weighing position to receive the next batch, an indicator light coming on to show that the skip is in the 'DOWN' position.
6. Operate cement discharge valve. Discharge of cement into mixer takes approximately 5 seconds. An indicator light appears on the console to show that all the cement is discharged into the mixer.
7. Close cement discharge valve. Re-start the screw feeder and cement will begin to be weighed out in the weigh hopper for the next batch.
8. Press water meter operating button. The water will commence to run into the mixer and the meter will turn itself off when the measured amount has entered the pan.
All the components to make concrete are now in the mixer and in 30 seconds the batch will be completely mixed and ready for discharge. No advantage is gained by mixing for a longer period. During that 30 seconds the operator will be weighing-out the aggregate ready for the next batch.

NOTE ON BATCH CAPACITIES & OUTPUTS

The hourly outputs and wet capacities quoted are for guidance purposes, and will vary with the rate of working and the bulking characteristics of the mix. They are estimated on the batches per hour assumed below and the dry intake capacities of the mixers, multiplied by a factor of 0.75. To estimate output of compacted concrete a further factor of 0.90 is suggested.

Centromat Model	204	304	404
Dry intake capacity	500 Litres (17½ Cu. Ft.)	750 Litres (26 Cu. Ft.)	1000 Litres (35 Cu. Ft.)
Batches Per Hour	52	52	50

TECHNICAL DATA

CENTROMAT MODEL	204	304, 304H	404, 404H	444D
Dry Batch Capacity (cu. ft.)	18	27	36	36
Wet Batch Capacity (cu. ft.)	13½	18	27	
Mixing Cycles per Hour (average)	50	50	50	50
Rated Output (cu. yd./hr.)	25	35	50	50
Maximum Discharge Height	11 ft. 7½ in.	11 ft. 7½ in.	11 ft. 7½ in.	11 ft. 7½ in.
Aggregate Weight Capacity (lb.)	2750	2750	5500	5500
Cement Weigher Capacity (lb.)	660	660	990	990
Water Meter Capacity (gallons/minute)	38	76	76	76
Maximum Overall Height (erected) (standard)	26 ft. 0 in.	28 ft. 6 in.	29 ft. 0 in.	29 ft. 0 in.
Overall Height for transport (without boom scraper)	13 ft. 7 in.	13 ft. 7 in.	17 ft. 0 in.	17 ft. 0 in.
Overall Width for transport	8 ft. 3 in.	8 ft. 3 in.	9 ft. 6 in.	9 ft. 6 in.
Total Weight for transport (tons)	6	7	9	9
			Models 404 and 444 have no chassis.	
Power Requirement (390/440V. A.C. 3-phase, 50 c/s)	33kW.	40kW.	45kW.	40kW.
Ground Aggregate Storage (cu. yd.)	550	550	600	600
Aggregate Storage Hoppers (cu. yd.)	60	60	60	Models 304H and 404H only.
Height of Aggregate Gates above ground level	2 ft. 9 in.	3 ft. 1 in.	3 ft. 4 in.	3 ft. 4 in.

Manufactured under licence from Karlsruher Bauwaschinen G.m.b.H.

In accordance with our policy of continual improvement, we reserve the right to modify these machines without notice.

2M.4.73.J.S.

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